

## **PATTERNS OF LEARNING ORGANISATION IN ESTONIAN COMPANIES**

**Tõnis Mets, Made Torokoff**

*University of Tartu*

**Abstract.** Organisational learning is related to individuals' behaviour in an organisation, and the organisation's ability to respond more effectively to changes in its environment. Organisations possessing learning capabilities and not just reactive behaviour are considered to be learning organisations. The main aim of the paper is to identify the features of learning organisation (LO) and to evaluate the state of organisational learning in Estonian production companies. The basic models of empirical research came from Senge's five disciplines and Mets's three-dimensional learning framework. Altogether the questionnaires of 326 respondents were analysed, 187 of whom identified themselves as workers and 137 as managers. The main idea of the LO in the sample of Estonian production companies was better represented in the group of "managers" (business owners, board members, managers, middle managers and specialists), whose perception of organisational learning (OL) was described by three statistically reliable factors relevant roughly to organisational learning framework (OLF) model: internal environment and learning, shared values and the main business process. The workers perception of OL processes was less differentiated and was limited to two factors related to the internal and external environment of the company.

**Key words:** organisational learning, learning organisation, organisational learning framework

### **1. Introduction**

During the last 15–17 years the Estonian economy and Estonian companies have suffered a tremendous change of paradigm, starting from a directly planned economy, ruled by the occupying Soviet government, and becoming a market economy in an independent country. As in other Central and Eastern European countries which have been studied (Merkens et al. 2001, Uhlenbruck et al. 2003), many earlier businesses closed and new companies were established in Estonia during this period. Although the transition to a market system took about five-seven years, the convergence process within the framework of the EU is still

continuing. This means transition not only in the economic system generally, but also in social values, culture, and other human aspects.

Rapid changes in the social paradigm and adaptation to a new environment in a very liberal economy, sometimes called “shock therapy“ (Giannaros 2000), have toughened the capacity for change of the Estonian people. Capacity for change, i.e. capacity for learning, is characteristic of Estonian employees and managers at both individual and organisational level. The learning capacities of Estonian companies have been studied mainly in organisational culture and organisational change context (Alas 2004, Alas and Vadi 2003, Alas and Sharifi 2002), mostly only during the period of economic transition.

Organisational learning is not a goal in itself, it is related to individuals' behaviour in an organisation, and, as a result, to the organisation's ability to respond more effectively to its environment (Murray and Donegan 2003). Researchers have identified distinct systematic levels of organisational learning (OL) beyond simple feedback and (non)reaction to environmental changes (e.g., Argyris 1977, Georges, Romme and Witteloostuijn 1999). Organisations possessing learning capabilities and not just reactive behaviour are considered to be learning organisations (ibid), whose specific features have been described by several researchers (Senge 1990, 2003, Pedler et al. 1991). Moilanen (2001, 2005) has found variation of strength of learning characteristics in different business sectors. Previous studies have shown that there is a wide range of states between non-learning and (excellent) learning in the companies even from the same industry. These organisational learning characteristics fit into different combinations with different strength of OL features. That means – OL features appear in some kind of patterns (clusters) describing the organisation's conformity to learning organisation (LO).

The paper's aim is to identify the features of learning organisations and to evaluate the state of organisational learning in Estonian production companies. This also signifies the need to study how completely the patterns of organisational learning are appearing in organisations.

Production companies were selected for the better homogeneity of the sample of empirical research at first stage, in the future the authors propose to expand the study also on service industry. For the main theoretical basis of the studies, Senge's five disciplines of a learning organisation (1990) are used, which characterise mainly the organisational features without the need to measure and compare indicators of (economic) performance of the companies from different economic sectors. As is supposed above, we can meet not complete 'OL pattern' that raises the question about the prerequisites enabling the process of learning in the organisation. The enabling environment of learning in the organisation is covered using the three-dimension organisational learning framework (OLF) designed by Mets (2002). Therefore, to fulfil the main goal of our study we are mapping the learning features as well as identifying the framework of the learning process in the organisation.

In the theoretical overview we shall study the features and aspects of the LO in companies of different type and size, including the framework of OL. Research model is based on the both main concepts. An empirical study was carried out to

map LO and OLF characteristics in Estonian mostly small and medium-sized enterprises (SMEs).

## **2. Identifying a learning organisation and the framework for learning**

The concept of learning organisation has its roots in studies of different ways of learning by individuals and groups (Kolb 1984, Wang and Ahmed 2003). Organisational learning as a cyclic process led by the management team was first described by Argyris (1976). He also points out that learning is a reflection of how people 'think – that is cognitive rule' (Argyris 1991). The researchers have found that to create learning in organisation involves structures and strategies for learning, learning infrastructure as well as competences and skills to use this infrastructure. Relative to all types of learning are mental maps and facilitating structures (Georges et al. 1999).

There has been discussion as to whether the organisation where the learning process happens is itself a learning organisation; whether there is development or learning in the organisation (Sun and Scott 2003, Roper and Pettit 2002, Reynolds and Ablett 1998). For characterization of learning environment, the authors are using different expressions related to their models. C. Argyris (1998) is using a concept 'an ecological system of factors' that he has called 'organisational learning system'. The learning process will be held only on the condition that 'the learning system is' [...] 'adequate enough to enable the organisation to implement its existing policies and meet stated objectives' (ibid). That means that OL in its completeness takes place in organisation possessing the features of LO.

According to Peter Senge (1990:3) learning organisations are: "...organisations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together."

This formulation points to the attributes of organisations and individuals and a special way of behaviour of people in LO. The concept of LO with its features is systemised by Senge's model of five components or disciplines (1990): systems thinking, personal mastery, mental models, team learning, and building shared vision (described in more detail in the following section, Table 1). A discipline is understood by Peter Senge as a series of principles and practices integrated into organisation.

Many researchers have found several more dimensions describing an LO and complementing Senge's model. According to Moilanen (2001) the holistic view should be added. Silins et al. (2002) define seven dimensions that characterise schools as LOs: environmental scanning, vision and goals, initiative and risk-taking, review, recognition and reinforcement, and continuing professional development.

Pedler et al. (1991), on the other hand, introduce 11 characteristics of an LO. Moilanen (2001) presents the model of the 'learning organisation diamond' contain-

ing five basic elements: driving forces, finding purpose, questioning, empowering, and evaluating. The ‘organisation-individual’ and ‘managing-leading’ dimensions in her model (ibid) multiply the levels of the elements studied.

Some authors have found that the preconditions and environment for real learning in the company, i.e. the framework of an LO, are the process managers of balanced development, human resources and the organisation itself (Reynolds and Ablett 1998).

Organisational learning mostly originates from a company’s internal and external environment, business processes, resources, knowledge, etc. and also serves as cognitive mapping. A cognitive map is defined as “mental constructs which we use to understand and know our environment” (Spicer 1998).

Consequently, the characteristics of organisational learning are those of a process, as well as those of an infrastructure and of mental origin, and these different characteristics form the three different dimensions of organisational learning and organisation development. Therefore it may be claimed that new knowledge creation and learning in and by an organisation and its members is realised by an interaction of:

- individual and joint learning in different ways, sometimes partly through training by organisation members,
- mental systems, including joint language, shared values, shared patterns, mental models, cognitive maps, etc., formed or created by and among organisation members, and
- the main process, usually related to the business process in the interaction of the company and the client, and their environment in a wider meaning,

which together describe and provide a three dimension framework for organisational learning (OLF)<sup>1</sup> (Mets 2002).

How can learning in an organisation be measured, and does it equal a learning organisation? There have been several attempts to measure different aspects and features of an LO empirically (Moilanen 2001, 2005, Silins et al. 2002, Phillips 2003). Silins et al. (2002) identified instead of the seven factors of their own theoretical model (based on Senge) only four factors of an LO in secondary schools: a trusting and collaborative climate, initiatives and risk taking, shared and monitored mission, and professional development. The authors reached the different item structure of factors at two sample groups of different origin (ibid). That means the LO features form different learning patterns in different organisations and cultural environments. But it also means that there is no universal explicit right model to have.

Moilanen (2001, 2005) represents the normative approach to measuring by using her ‘learning organisation diamond’-based diagnostic questionnaire tool, which permits evaluation and comparison of companies’ five characteristics of an LO at organisational and individual levels based on 40 statements. She differentiates between ‘best’ and ‘less’ learning, i.e. learning and non-learning organisations; there

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<sup>1</sup> In the original source (Mets 2002) named as the general model of learning-based strategic development framework.

are also variances in learning portrayals depending on the business sector and the size of the company (ibid).

Chaston et al. (1999) study managers of SMEs (less than 200 employees) in different fields (construction, manufacturing, service and other) in the UK; the study focused on organisational performance, organisational capability and OL in the three learning modes: implementing, improving and integrating. Their main finding was that there appeared “to be no direct relationship between overall organisational performance and organisational learning” (ibid). One could find that the conclusion was supported also in research by Shipton et al. (2002), their findings demonstrated that there was no correlation between profitability and learning mechanisms in manufacturing organisations.

Research practice (Moilanen 2001, 2005, Silins et al. 2002) has demonstrated that the initial theoretical models more or less overlap each other, sometimes missing some aspects of the LO map. To map the features of the LO, questionnaires are most commonly used. In factor analysis the answers on questionnaires give different, sometimes even unexpected, combinations of factors, while some factors which were expected in the theory are not formed at all (for example, see: Silins et al. 2002). That means that analysis results in different patterns, which can cover different models of LO and OLF and more or less correspond to the initial model.

### **3. Research model**

The previous overview presents quite a wide range of approaches to organisational learning. Looking for LO model of following empirical analysis in Estonian production companies, the main focus is on organisational features and less on financial, market or other business performance indicators by several reasons:

1. Estonia is still a transition country and its economic environment is influenced by a fast growth of companies, but frequently the size of businesses is not comparable with businesses of traditional market economy where the LO concepts described above were studied before.
2. Previous studies (Chaston et al. 1999, Shipton et al. 2002) have demonstrated low correlation between main (financial) business performance indicators and OL.
3. As seen from the research carried by Moilanen (2001, 2005) LO (normative) performance indicators depend on the business sector and thus organisations in different business fields cannot be really compared.
4. Organisational features like in Senge’s model are universal and are not depending on the type of organisation (private business, public service, etc.). This permits to expand the studies in other countries and other business fields in future.
5. Although many researchers of small production and service companies refer to the classic concepts of OL mentioned above (Lee and Bennett 2000, Chaston et al. 1999, Chouke and Armstrong 1998), there are few empirical data about the different learning features in these companies.

The current research does not originate from the presumption that an organisation a priori behaves like an LO, therefore an exploratory approach should be used. That makes it necessary to determine what is happening in organisation not possessing a complete set of learning features according to Senge's model. This aspect is covered by the three dimension OLF model (Mets 2002). Comparative overview of both models is given in Table 1.

**Table 1. Comparative overview of Senge's learning organisation model and three-dimension organisation learning framework (based on Senge 1990 and Mets 2002)**

Senge's learning organisation (LO) model	Three-dimension organisational learning framework (OLF)	Comments
<b>Systems thinking:</b> It is the discipline that integrates the others, fusing them into a coherent body of theory and practice.	<b>Mental systems:</b> Joint language, cognitive maps, mental models, shared vision, shared values, shared patterns, creativity, principles, culture, systems, knowledge...	OLF model covers Senge's LO features taking into account the general description of the OLF model. In the course of the process both individual and team capabilities (first phase) of the organisation members and leaders are increased and their mental intersection grows (second phase), as a result of which the business process of the company is developed (third phase). New experience gained from the development of business process re-launches the first phase. In reality the learning process will go on, connecting and passing the above-described phases (stages) simultaneously, i.e. a learning environment will be formed. Process-related character describes the OL cycle as a whole, which is fed back and continuous, and parts of which are interconnected in the way the cycle is connected to the emerging learning and development environment.
<b>Mental models:</b> These are 'deeply ingrained assumptions, generalizations, or even pictures and images that influence how we understand the world and how we take action'.		
<b>Building shared vision:</b> 'pictures of the future' that foster genuine commitment and enrolment rather than compliance.	<b>Main process:</b> Plans, procedures, projects, budgets, products, technologies...; Business processes; Corporate structure and resources; Client's needs; Environment; Product; Organisation capability.	Partial coverage of the two components. Features of the main process are partially inherent to Systems thinking and Building shared vision.
<b>Personal mastery:</b> It is a process. It is a lifelong discipline. People with a high level of personal mastery are acutely aware of their ignorance, their incompetence, their growth areas.	<b>Individual and joint learning:</b> Training key persons, training team thinking and acting, mapping and analysing business processes, creating general organisational vision, creating strategies...; coaching and advising managers; informing and training personnel.	Good coverage of each other by the team learning aspects in both models. Partly the Personal mastery is related to Main process and Mental systems. Individual and joint learning are partly related to Building shared vision.
<b>Team learning:</b> Team learning starts with 'dialogue', the capacity of members of a team to suspend assumptions and enter into a genuine 'thinking together'.		

Note. The components of both models have links to managers' roles in LO (Senge 1990): leader as *designer, steward and teacher*.

The main substantial remarks for comparison of two models are presented in *Comments* of Table 1. It should additionally be mentioned that the *Mental systems* dimension of OLF model contains the phenomena of individual, as well as organisational level disciplines at Senge's model. Although the features of LO in Table 1 are described using the language of organisation 'disciplines', the realisation of OL is mainly the result of managers' role and behaviour in the OLF (see also *Note* under the Table 1). Middle managers have a dual role: they belong to the team of top managers and are themselves the leaders for their subordinates. The impact of the managers is reflected in the pattern of 'five disciplines' of an organisation.

#### 4. Methodology and empirical research

As is evident from the publications quoted above, and analysis of the research model (Table 1), there are several characteristics which belong to LO as well as to OLF. That means careful selection of employed categories for the assessment of these characteristics. Therefore, when designing the questionnaire the authors agreed on the main principles of the model structure for empirical study:

1. The basic model came from Senge's five disciplines: systems thinking, personal mastery, mental models, team learning and shared vision (see also Table 1). Deductive scale development was implemented (Hinkin 1995).
2. The questionnaire was formulated so as to cover every (five) Senge's topic with minimally seven statements.
3. The characters of every discipline (Senge's model) and dimension (Mets's model) were described in the statements as phenomena identifiable and estimable by the respondent, not only his or her opinion or feeling.
4. The correspondence of the formulated statements to the three-dimension OLF model (individual and joint learning, mental systems, and the main/business process) was also verified and additional statements were created to cover both models.

There was no complete correspondence between the 'main process' of OLF model and disciplines of Senge (see Table 1). It caused uneven coverage of Senge's LO model with the number of statements between seven and twelve per discipline, making 47 items altogether. The statements were to be evaluated on a 10-point scale (1 – I do not agree, and 10 – I fully agree with the statement). In the first stage, the questionnaire was designed for surveys in schools (Torokoff and Mets 2005), and afterwards it was re-designed for studies in business. An expert group was involved in formulating statements. The statements of the questionnaire (translation from Estonian in the next section is not tested on an English-speaking audience) forming the empirical models according to their loadings into factors are presented in the next section. To identify the characteristics of the LO listed above, a pilot study was carried out in 2005–2006.

The sample of companies and individual respondents was chosen by the expert method, i.e. the questionnaire was presented to extramural students, some of whom agreed to use this survey in the companies in which they were working. In this way empirical data for the study were gathered from six companies. The companies were both Estonian and foreign owned. Three companies had been privatised. These were mostly SMEs, only in one company the number of employees exceeded 250 (with 130 respondents). Two of the companies had ISO-certification of their production.

The respondents in the companies were workers and managers, including board members, owners, middle managers and specialists. Their fields of business included footwear production, specialised textile and sewing industry, electro-mechanics, and road haulage. Twenty participants in export training courses were added to the managers' sample group: they were all entrepreneurs or managers in a wide range of production in South Estonia. As the sample was not random, statistical conclusions about all companies active in Estonia should not be drawn.

Altogether the questionnaires of 326 respondents were analysed, 187 of whom identified themselves as workers and 137 as managers.

Exploratory factor analysis based on the program SPSS version 13.0 was used in the data processing. Comparing the extraction and rotation methods several authors showed that "the actual differences between them are small" and arrived at quite identical loadings of items for the final result (Costello and Osborne 2005). The principal components analysis method was chosen for factor extraction, the rotation method was Oblimin with Kaiser Normalisation (Stevens 2002). According to recommendations (ibid), only factors with eigenvalue greater than 1.0 and consisting of minimally four loadings greater than 0.6 were retained. That means factors with eigenvalue even greater than 1.0 but not corresponding to other preconditions were excluded. The criterion is stricter than the commonly used rule for loading value greater than 0.4 (Ford et al. 1986). We justify the strictness with the comparatively small number of respondents in our study. As the final result the sample size to variable ratios are between 6.85 and 15.5 in final composition of factors. Cronbach's alpha was used to check the scales' reliability.

We should mention that according to our experience, an analysis using different rotation methods has different sensibility for forming distinct factors out of the statements of the questionnaire. Using for example the rotation method Varimax with Kaiser Normalisation, a large number of statements create loadings into different factors and the factors cannot be clearly differentiated according to criteria described above. Rotation method Oblimin with Kaiser Normalisation enabled to maximize the number of factors with the maximum number of statements. As a result, the factors do not remain completely independent (see correlation between the factors in Table 2 and 3).

Working out the statements, the deductive scale development method based on theoretical models was used, whereas at the analysis of empirical results inductive method was used for labelling the remaining factors (see also Hinkin 1995). The



adequacy of empirical results to theoretical model depends on the quality of questionnaire, as well as on measured phenomenon itself.

## 5. Data analysis and result

The first attempts in factor analysis questionnaire data with 47 statements outlined 9–10 component models with eigenvalue greater than 1.0, some of them containing only 1–3 statements, some items gave ‘unclear’ loadings dispersed between different factors. Implementing the rules and criteria described above, and removing ‘unclear’ items enabled to find out more distinct and reliable factors. The planned model foresaw five factors (including the features of Senge’s model), but after the factor analysis of the whole sample of 326 respondents had been processed, two factors were distinctive, which described the internal and external/business environments of an organisation’s development (63.9 % of total variance explained). For the first factor (17 statements) Cronbach’s alpha is 0.96 and for the second factor (four statements): 0.84, which point to an excellent and good consistency and reliability of the questionnaire items (Ogbonna et al. 2000). The correlation between items was highly significant with a level lower than 0.001, correlation between factors: 0.53.

As the two-factor model found from the whole research sample matched neither Senge’s five-component OL model nor the three-component OLF model, the next step was to analyse the workers’ and managers’ groups separately. The data from the 187 respondents of the workers’ sample came out very similar to the first result two-factor structure model (Table 2) with even higher reliability (23 and four items, Cronbach’s alpha 0.97 and 0.85 respectively); while the inter-item correlation had the values between 0.32 and 0.84 for internal environment factor W1 (Internal environment, goals & development, Table 2), and between 0.22 and 0.68 for main processes factor W2 (Main processes, Table 2) demonstrating a significance of relations at the level 0.001 and lower. The correlation coefficient between factors W1 and W2: 0.51. Items forming factors as the result of data analysis are listed in order of descending strength and significance of loadings for the pattern (Table 2 and 3).

The factor analysis of the data from the managers’ sample (137 respondents) gave not so ‘flat’ pattern as two components in workers’ matrix. There the components formed different combinations of items in the ‘pattern of learning’ and extraction of clear factors was much more complicated than from workers’ sample. Three or four factors with lower reliability and less significant inter-item correlations, but much more relevant to the structure of the Senge’s model were reached during exploratory factor analysis. The three components in the four-factor model (respectively: *Internal environment & Learning*, *Shared values*, and *Vision & Goals*) demonstrated good reliability and internal consistency. The *Vision & Goals* factor was in negative correlation with others. This could refer to some kind of dissonance in the perception of relations between personal and company’s general goals and processes by managers’ sample. The fourth factor

*Main processes & Personal mastery* qualified as questionable according to its Cronbach's alpha value of 0.64 (see: Gliem and Gliem 2003) and therefore the four-factor model was excluded from further analysis.

**Table 2. Results of factor analysis, pattern matrix, workers' sample (n = 187)**

Factor/ Item	Factor name / Statement	W1	W2
<b>W1</b>	<b>Internal environment, Goals &amp; Development</b>		
1.	Employees' initiative and dedication are considered in pay levels.	0.93	
2.	We place a high value on employees' dedication to work.	0.93	
3.	Any work-related problems are promptly discussed.	0.92	
4.	Changes which enhance competitiveness are rapidly introduced.	0.83	
5.	Employees receive regular professional consultancy to help our organisation better achieve its goals.	0.82	
6.	We constantly analyse and renew the organisation's development plan.	0.82	
7.	Employees who are creative and generate new ideas are highly appreciated.	0.81	
8.	There is a smoothly operating feedback system.	0.80	
9.	All staff can take part in setting the goals for the organisation/structural unit.	0.79	
10.	Our staff make proposals for the introduction of changes to ensure that our common objective is achieved.	0.78	
11.	We have discussed and arrived at a common vision of the organisation's future in 5 years.	0.78	
12.	Our staff value high-quality performance.	0.76	
13.	Regular performance and development interviews are carried out between managers and employees.	0.76	
14.	Our staff are always polite towards each other.	0.75	
15.	Our staff take initiative when fulfilling the organisation's objectives.	0.74	
16.	Our staff is innovative/ innovation-minded.	0.73	
17.	The management have a positive attitude towards employees' initiatives.	0.70	
18.	All staff know and share common values.	0.69	
19.	The management of our organisation plans changes and implements them systematically.	0.66	
20.	Our staff are trained and develop systematically.	0.66	
21.	We have a system of regular performance appraisal.	0.62	
22.	We regularly have common seminars on our further development.	0.60	
23.	Performance appraisals take place in an open, informal and tolerant atmosphere.	0.61	
<b>W2</b>	<b>Main processes</b>		
1.	We view customers as cooperation partners.		0.83
2.	I take note of customer feedback.		0.81
3.	Our aim is to create a competitive advantage/edge.		0.66
4.	I understand the common core of my own personal and my organisation's objectives and follow them in my work.		0.62
	<b>Eigenvalue</b>	16.01	1.64
	<b>Cumulative variance explained, %</b>	59.3	65.4
	<b>Cronbach's alpha</b>	0.97	0.85
<b>W2</b>	<b>Correlation between factors</b>		0.51

Note: Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalisation. Rotation converged in 5 iterations. Loadings under 0.33 were hidden.

**Table 3. Results of factor analysis, pattern matrix, managers' sample (n=137)**

Factor / Item	Factor name / Statement	M1	M2	M3
<b>M1</b>	<b>Internal environment &amp; Learning</b>			
	Performance appraisals take place in an open, informal and tolerant atmosphere.	0.82		
1.	We have a system of regular performance appraisal.	0.81		
	Regular performance and development interviews are carried out between managers and employees.	0.80		
3.	We have discussed and arrived at a common vision of the organisation's future in 5 years.	0.72		
4.	We regularly have common seminars on our further development.	0.71		
5.	Our organisation uses survey results for the preparation of its development plan.	0.71		
6.	We have a self-assessment system.	0.70		
7.	All staff can take part in setting the goals for the organisation/structural unit.	0.66		
8.	Our staff are trained and develop systematically.	0.65		
9.	We constantly analyse and renew the organisation's development plan.	0.64		
10.				
<b>M2</b>	<b>Shared values</b>			
1.	Our staff are always polite towards each other.		0.91	
2.	All employees share a common understanding of work quality		0.80	
3.	All staff know and share common values.		0.76	
4.	We place a high value on employees' dedication to work.		0.66	
	Our staff take criticism adequately, they analyse and admit their mistakes.		0.66	
5.	Our staff value high-quality performance.		0.64	
6.				
<b>M3</b>	<b>Main process</b>			
	I do not put up with conflicts in my work and I attempt to resolve them.			0.77
1.	I take note of customer feedback.			0.74
2.	We view customers as cooperation partners.			0.66
3.	Our aim is to develop and grow.			0.61
4.		8.07	2.18	1.80
	<b>Eigenvalue</b>			
	<b>Cumulative variance explained, %</b>	40.5	51.4	60.3
	<b>Cronbach's alpha</b>	0.92	0.88	0.73
<b>M2</b>	<b>Correlation between factors</b>	0.42		
<b>M3</b>	<b>Correlation between factors</b>	0.28	0.22	

Note: Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 6 iterations. Loadings under 0.33 were hidden.

The three-factor empirical model (see Table 3) is more reliable and consistent than the four-factor model. It has quite good correspondence to theoretical three-dimensional OLF model described in the overview above – only mental systems are covered partly. That can come from the differences between initial models (Table 1), but can also be the shortcoming of the questionnaire in cognitive mapping. As the components of the model have also better internal congruence (inter-

component correlation is positive) than the four-factor model it seems that the OLF environment is the precondition (first stage) for creating OL capabilities in the company.

Only thirteen, i.e. less than half of the statements in workers' factors are represented in the managers' factor pattern in different sequence. Item 1 related to employees' dedication and reward which gives the highest loadings into the first factor of workers is not represented in the managers' factors at all. The first *Internal environment...* factor induced for workers' sample has only eight (i.e. one third) items common with the similar factor of managers. This refers to the difference in perception of organisation by workers and managers group, but not only. The mental models/system of the person reflect his/her role in organisation as well as understanding of environment around him/her (see also discussion in the following section).

In the process of data analysis the theoretical models were not completely confirmed. The Senge's five disciplines' structure used to generate statements was not supported by the observed data. The two and three factor solutions appeared to fit better the data to this measurement model in two different sub-samples of the study. Better conformity to the initial three-dimension OLF model was reached in the managers' sample.

*Some self-criticism and suggestions for further research.* The loadings of factors (Table 2 and 3) demonstrate deviation from the initial five-component model structure of items designed for the questionnaire. According to the reliability criteria and recommendations for factor formation (Stevens 2002) from 47 statements of the questionnaire, 27 and 20 at workers' and managers' sample respectively were really used. The reason for this may be insufficient or inaccurate coverage of the cognitive maps of respondents, but unclear items' loading may indicate also the weakness or absence of the mapped aspect in the organisation. Therefore some additional qualitative study should be carried out on this subject. For wider coverage of OL cognitive maps, and a higher outcome in factor W2 (*Main processes & ...*) the number of statements should increase to 10–12 items per factor.

Negative inter-factor correlation in the four-component model refers to some kind of dissonance in the perception of relations between personal and the company's general goals and processes by managers' sample. This can be an indicator of inconsistency of the sample as it is drawing together a wide range of roles in the company from the technical specialist to top manager. Presumably the bigger number of respondents permits differentiate more sample groups (specialists, middle and top managers, etc) in further studies.

We suggest that the Senge five-discipline model is specific to more intelligent and more knowledge-business oriented organisations than those we studied. This is a hint for further studies in Estonian knowledge-creation oriented companies in the ICT and biotech sectors.

## **6. Discussion and conclusion**

The purpose of this study was to identify the features of learning organisation and to evaluate the state of organisational learning in Estonian production companies. To do that, we examined the patterns of LO perception and behaviour among 326 members of production organisations. Using the model of Senge as basic for LO we mapped the current situation of OL in Estonian companies. We found that two different organisational learning patterns or cultures exist in Estonian production enterprises: managers' OL and workers' OL. It was not surprising for the researchers that there is a difference between the perception of OL aspects of workers and managers. It was understandable for the researchers from their own consultancy background and previous experience in the companies. But it was surprising that there was no reference on that aspect in a wide range of organisational learning publications before the current study. The results demonstrate that production workers are still mainly process-oriented and that there is little space for their own initiatives. Quality circles, for example, are a very rare phenomenon in Estonian enterprises. The managers are more organization oriented and trained for their role to behave as team members in a management team. But the middle managers have not expanded their role towards the creation of workers teams and team learning. The main idea of the LO in our sample of Estonian production companies was better represented in the group of "managers" (entrepreneurs, managers, middle managers and specialists), whose perception of OL was mainly described by the pattern of three or four factors, three of which were statistically reliable, while the fourth could be described as just an appearing trend of OL in the companies (or as indicating the need to improve the questionnaire). This indicates a modest distribution of LO behaviour among the companies' management staff. The workers' perception of OL processes was less differentiated and was limited to two factors related to the internal and external environment of the company. In the authors' opinion this is related to the following circumstances:

1. The managers of different levels and specialists are more actively involved in the company's development and decision processes. Their role in the company, their educational preparation and their attitudes are more complex and complicated than those of production workers. This creates the multi-dimensional perception of the organisation and OL. The system thinking and personal mastery improvement aspects remain relatively weak, which may indicate unused potential in Estonian companies.
2. The perception of the company by the workers is very tightly related to their reward and dedication. This can mean the importance of the need for income in their job and less self-realisation. They differentiate between the company's internal and external factors, but they have less self-reliance about their own role and less responsibility to develop themselves.

The patterns of LO of both sample groups are far from Senge's five component model, the three-component framework aspects is represented more relevantly:

individual & joint learning, shared values, and main/business process. Interpreting the factors' patterns from the empirical study in Senge's model context, OLF environment patterns are created, but not all capabilities of LO in the management of Estonian production companies have been realised. OL principles, therefore also LO behaviour, have not reached everyday practice, although the OLF environment patterns have been identified in the Estonian companies. Our opinion is that Senge's five disciplines describe an organisation with good leaders and facilitators and a mature team-working culture. This means that the Estonian companies can be positioned being half way to becoming completely LO, i.e. they are still located between organizational learning and non-learning.

As implications for further research we believe that OL and LO studies need a more nuanced research questions and instruments (questionnaires) related to different organisation types and different groups of organisation members. A better understanding of learning processes supports better management practice, employees' education and labour policy. OL is above all a human resource and social capital development topic within a company.

The current situation in Estonian companies is caused by the relatively cheap workforce, which has been the main success factor so far. Since joining the EU and the relative liberation of labour force movement inside the EU, the situation has drastically changed, as many Estonian builders, truck-drivers and production workers have found new jobs abroad. This leads to the need for a re-orientation towards higher value added and higher rewards to employees in Estonian companies. One of the best ways to achieve that is investment not only in better production equipment, but also in social capital, including better organisational learning capabilities in companies.

Addresses:

Tõnis Mets  
Centre for Entrepreneurship  
Faculty of Economics and Business Administration  
University of Tartu  
Narva mnt 4-B104  
51009 Tartu, Estonia

Tel.: +372 7376 362

E-mail: tonis.mets@ut.ee

Made Torokoff  
Centre for Entrepreneurship  
Faculty of Economics and Business Administration  
University of Tartu  
Narva mnt 4-B104  
51009 Tartu, Estonia

Tel.: +372 7376 362

E-mail: made.torokoff@ut.ee

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