

**Examining the Relationship between Learning Organization Dimensions and Change
Adaptation, Innovation as well as Organizational Performance**

by

Constantine Kontoghiorghes, Ph.D.

Assistant Professor

HRD Department

Oakland University

302 O'Dowd Hall

Rochester, MI 48309

Phone: (248) 370-4174 Fax: (248) 370-4095

Kontoghi@Oakland.edu

Or

ConstantineK@att.net

Susan Awbrey, Ph.D.

Vice Provost

Oakland University

Rochester, MI 48309

Phone: (248) 370-4955 Fax: (248) 370-4095

Awbrey@Oakland.edu

and

Pamela Feurig

HRD Department

Oakland University

plf@daimlerchrysler.com

Track for all authors: Academic

Examining the Relationship between Learning Organization Dimensions and Change Adaptation, Innovation as well as Organizational Performance

*Constantine Kontoghiorghes
Oakland University*

*Susan Awbrey
Oakland University*

*Pamela Feurig
Oakland University*

The main purpose of this empirical study was to examine the relationship between certain learning organization dimensions and change adaptation, innovation as well as bottom-line organizational performance. The following learning organization dimensions were found to be the strongest predictors of rapid change adaptation, quick product or service introduction, and bottom-line organizational performance: “open communications and information sharing”, “risk taking and new idea promotion”, and “information, facts, time, and resource availability to perform one’s job in a professional manner”.

Introduction

Peter Senge has described the learning organization as “continually expanding its capacity to create its future”(Senge, 1990). The learning organization is an ideal. It is a journey not a destination – a goal toward which organizations grow and evolve (Kofman & Senge, 1993). Although heretical in many senses the underpinnings of the learning organization are old ideas integrated in new ways. Foundational to the learning organization is the idea of learning through practice or experiential learning, a concept developed by John Dewey in 1938. This runs counter to many of our cultural assumptions about learning such as: learning is individual, there is a beginning and an end to learning, learning should be separated from the rest of our activities, and learning requires teaching (Wenger, 1996). Experiential learning recognizes that learning is inherent in human nature, it is fundamentally social, it changes who we are, it involves engagement in practice, it reflects our participation in communities of practice, it deals with boundaries, and learning is the interplay between local and global (Wenger, 1996).

Recognizing that learning is linked to practice is important to understanding learning organizations. However, it is not sufficient. Learning organizations also require a “shift of mind” that goes beyond just learning new tasks (Senge, 1990). It requires a change in what Scottish psychologist Kenneth Craik called our mental models, our frameworks for interpreting the external world (Senge, Kleiner, Roberts, Roth, Ross, & Smith, 1999). This mind shift involves development of “creative tension” between a vision of what could be and our sense of current reality (Senge, et al., 1999). Accomplishing this mind shift and dissolving “frozen patterns of thought” (Kofman & Senge, 1993, p2.) means moving toward what Chris Argyris calls double loop learning – the ability to reflect on and improve the processes of the

organization, the ways in which we interrelate to achieve our goals. Double loop learning doesn't just correct errors that allow the organization to carry on with its current policies and objectives. It involves learning that leads to the "modification" of the organizations norms, policies, and objectives. Double loop learning includes openness to dialogue about areas that heretofore in the organization have been considered undiscussable (Argyris & Schon, 1978.)

This is learning with a much broader purpose. Learning organizations are "communities of commitment" not just collections of individuals who learn. The commitment in learning organizations is to cooperation, to awareness of the whole, and to engaging the creative rather than reactive nature of human beings. It is "commitment to changes needed in the larger world and to seeing our organizations as vehicles for bringing about such changes" (Kofman & Senge, 1993). It is a commitment to addressing areas of organizational and cultural dysfunction. The learning organization is defined by a new relationship between the organization and the people who comprise it.

According to Edmondson (1996), "this focus on learning gives rise to a cognitive approach, in which individuals' beliefs and insights are viewed as critical influences on organizational effectiveness. Organizational learning theorists propose that it is not enough for leaders to design appropriate structures and continue to make well-reasoned decisions; instead, organizations must be characterized at all levels by attentiveness to changing conditions" (p.1). Thus, The leadership in a learning organization is no longer command and control top-down. The leader becomes a designer, teacher, and steward (Senge, 2002). Senge describes five learning disciplines that form the core of the learning organization – personal mastery, mental models, shared vision, team learning, systems thinking (Senge, 1990). All are important but understanding the organization as a system underlies all the other disciplines and joins them together. Without systems thinking, the ability to see interconnections and interdependencies, an organization may have a learning environment for its individual employees but it will not become a learning organization (Senge, 1990).

Members of a learning organization engage in "detecting and correcting errors in organizational theory-in-use, and embedding the results of their inquiry in private images and shared maps of the organization" (Argyris & Schon, 1978). This goes beyond simply the transfer of training to short term tasks. In essence the organization's members continue to redefine the organization through reflection and interaction. Because the ecology of learning required for a learning organization involves double loop learning (or even deuterio learning) it differs from that of most organizations whose learning systems primarily support single loop learning (Argyris & Schon, 1978).

Learning organization theory has become very popular with over one hundred plus books and journal articles currently on file (DiBella, 1997). However, there are critics who claim "everyone is talking about [it] but few are living it" (Watkins & Marsick, 1993). David Garvin's Harvard Review article claims that in order to manage a phenomenon you must be able to measure it (Garvin, 1993). But before a phenomenon can be measured it must be identified. How do we know when an organization is a "learning organization?" Several authors have attempted to identify the characteristics of the learning organization and to develop inventories and steps that can be used to identify when an organization can be classified as a learning organization (Redding, 1997; DiBella, 1997; Bennett & O'Brien, 1991.) But even today the picture remains blurred. Perhaps this is due to the evolutionary nature of learning organizations and their continuum of development.

In general, a learning organization can be described by at least five different organizational dimensions: structure, information systems, human resource and human resource development practices, organization culture, and leadership (DeSimone, Werner, & Harris, 2002). In terms of structure, learning organizations are known to remove hierarchical barriers and promote such collaborative structures as self-managed teams and cross-functional teams. Further, learning organizations institute structures and practices that encourage information sharing and retention while at the same time implement reward systems that reinforce long-term performance and the development and sharing of new skills and knowledge. The culture of learning organizations is characterized by an emphasis, promotion, and reinforcement of risk taking. In terms of leadership, learning organizations rely on visionaries “who can move the organization toward the kinds of culture, systems, and practices that are needed to support this philosophy” (DeSimone, Werner, & Harris, 2002, p. 600).

Even when an organization can be identified as exhibiting learning organization characteristics, it has still proved difficult to assess the effectiveness and impact of its state on its performance. The successes of Harley-Davidson, Motorola, AT&T and many other original members of the Center for Organizational Learning have been noted anecdotally in the literature. Despite this anecdotal evidence, however, “empirical research demonstrating the effectiveness of learning organization interventions is sparse” (DeSimone, Werner, & Harris, 2002, p. 600). According to DeSimone et al. (2002) “one of the problems in the learning organization literature is that theorists and practitioners have projected a wide range of ideas and techniques onto the term. Consequently, it is difficult to design a learning organization intervention and difficult to combine research evidence from different studies” (p. 600).

Purpose of the Study

Given thus the limitations of learning organization research, the main purpose of this empirical study is to address the existing research gap by examining the relationship between certain learning organization dimensions and change adaptation, innovation as well as bottom-line organizational performance. The learning organization dimensions incorporated in this study are: emphasis and rewards for learning; learning transfer climate; information sharing and management practices; risk taking promotion and reinforcement; high performance team environment; and, knowledge management. Change adaptation was defined in terms of the extent to which the organization can adapt to changes instantly, while innovation in terms of the extent to which the organization can introduce new products or services quickly and easily. Bottom-line organizational performance was defined in terms of quality, productivity, profitability, organizational competitiveness, and employee commitment indicators.

In terms of learning transfer, researchers have shown that the degree to which learning is transferred back to the job greatly depends on how conducive the work environment is toward learning. In particular, supervisory and coworker support for new learning, intrinsic and extrinsic rewards, task cues - the degree to which characteristics of the learner’s job prompt or remind him or her to use new skills and knowledge acquired in training, pre-training motivation, employee commitment, and a continuous-learning as well as a quality driven culture have been found to be significantly associated with learning transfer (Axtell, Maitlis, & Yearta, 1997; Baldwin & Ford, 1988; Clark, Dobbins, & Ladd, 1993; Facticeau, Dobbins, Russell, Ladd, & Kudisch, 1995; Holton, Bates, & Ruona, 2001; Kontoghiorghes, 2001a; Kontoghiorghes, 2001b;

Rouillier & Goldstein, 1993; Tracey, Hinkin, Tannenbaum, & Mathieu, 2001; Tracey, Tannenbaum, & Kavangh, 1995).

Research Questions

In short, this study attempted to answer the following research questions:

1. To what extent are the identified learning organization dimensions associated with rapid change adaptation?
2. To what extent are the identified learning organization dimensions associated with the innovation indicator of quick product or service introduction?
3. To what extent are the identified learning organization dimensions associated with bottom-line organizational performance?

Methodology

Instrument. The instrument of this study consisted of a 109 Likert item questionnaire, which was designed to assess the organization in terms of learning organization, learning transfer, total quality management (TQM), and sociotechnical system (STS) dimensions and performance indicators. Many of the dimensions and indicators were assessed with scales that were described in previous literature or research (Buckingham & Coffman; 1999; Hackman & Oldham, 1980; Kontoghiorghes, 2001a; Kontoghiorghes, 2001b; Kontoghiorghes & Dembeck, 2001; Lindsay & Petrick, 1997; Macy & Izumi, 1993; Pasmore, 1988; Whitney & Pavett, 1998), while several were custom-designed specifically for this and other studies. In all, the questionnaire attempts to determine the extent to which the organization is functioning as a high performance system and according to learning organization, TQM and STS theory and principles. Again, only items pertaining to the earlier described learning organization dimensions are analyzed in this study.

The instrument utilized a six-point scale that ranged from “strongly disagree” to “strongly agree”. The first version of the questionnaire, which consisted of 99 Likert items, was originally pilot-tested on a group of 15 participants for clarity. Furthermore, a group of seven experts in the organization development, human resource development, or quality management areas reviewed the instrument for content validity. Upon revision, the instrument was then administered to a group of 129 members of four different organizations. Reliability tests were conducted and the instrument was further refined and expanded. As stated earlier, in its final format the instrument consisted of 109 Likert items. The overall reliability of the instrument was measured in terms of coefficient alpha and was found to be 0.98.

Subjects. The sampling frame of this study consists of 300 employees of the information technology department of a large auto maker, 256 employees of a case management division of a large health care insurance organization, 189 employees of an auto parts manufacturing facility, and 60 employees of another auto parts manufacturing facility of a different organization. Collectively, 579 of the possible 805 participants returned their surveys and the return rate is thus calculated at 71.9%. More specifically, 198 of the participants represent the information technology department of the large auto maker, 192 the large health care insurance organization, while the remaining 189 represent the two manufacturing facilities.

In short, 26.1% of all respondents were hourly employees, 5.2% administrative personnel, 38.5% salaried professional, 10.1% supervisors, 5.4% middle management, and 2.2% senior

management. 55% of all respondents were male and 45% female. In terms of education, 31.8% of all respondents had a high school degree, 22.6% an associates, 31.2% a bachelors, 10.7% a masters, and 1.5% a Ph.D. The rest 2.1% of respondents did not indicate an educational level.

Data analysis. With regard to data analysis, the instrument was construct validated through a principal components analysis which utilized a varimax rotation. The generated learning organization factors were in turn used to build stepwise regression models pertaining to rapid change adaptation and quick product or service introduction. Thus, through stepwise regression analysis the most important learning organization dimensions for rapid change adaptation and quick product or service introduction were identified, prioritized and described. Finally, a correlational analysis between the organizational performance indicators and derived factors described the extent to which each construct validated learning organization dimension is related to organizational performance. It should be noted that only factors that had an eigenvalue of 1 or greater were retained for this study.

Results and Findings

Principal component analysis. The results of the factorial analysis are presented in Table 1. As shown, the principal component analysis that utilized a varimax rotation produced an eight factor solution that accounted for 60.9% of the total variance. The sample size utilized for the principal components analysis was 516 for which the critical value for significant loadings was calculated at |0.23| (Stevens, 1986).

In short, the first rotated factor, which accounted for 11.49% of the total variance, had the highest factor loadings from seven variables that together described a participative system, which in turn is characterized by constant and open communications among units, levels, and employees. This factor was thus named the “*open communications and information sharing*” factor. The second rotated factor, which accounted for 8.07% of the total variance, was comprised of variables that collectively characterize the extent to which the organization promotes risk taking behavior as well as generation and trial of new ideas. This factor was thus called “*risk taking and new ideas promotion*”.

The third factor generated dealt with the extent to which the employees receive encouragement and support for learning and growth opportunities, as well as praise and recognition when applying new learning on the job. This factor accounted for 7.74% of the total variance and was called “*Support and recognition for learning and development*”. The fourth factor, which accounted 7.55% of the total variance, pertained to the extent to which the employees have all materials, equipment, facts, information, support, and time in order to perform their job in a professional manner. This factor was therefore labeled “*information, facts, time, and resource availability to perform job in a professional manner*”. The fifth factor comprised of variables that defined the extent to which the employee was functioning in a team-based environment within which team members are truly committed to the success and growth of each other and are willing to put in effort above the minimum required. This factor, which was called “*High performance team environment*” accounted for 7.26% of the total variance.

The last three factors generated by the analysis were all learning related dimensions. Factor 6, which accounted for 6.78% of the total variance, grouped together the variables that reflected the extent to which the employees were rewarded by the organization for their learning, new ideas, and performance. This factor was thus labeled “*Rewards for learning, performance, and ideas*”. The seventh factor dealt with the extent to which the employee was functioning in an

environment that was conducive to training transfer and continuous learning. This factor in turn was called “*Positive training transfer and continuous learning climate*”. The last factor produced by the principal component analysis was comprised of variables that described the extent to which the employee was expected to manage his or her own learning, had all necessary skills and knowledge to perform the job at the expected level, had influence over the things that determine how the work is done, as well as the extent to which information technologies were used by the organization to capture and distribute important knowledge to those who need it. The last factor was therefore named “*Knowledge management*”. Factors 7 and 8 accounted for 6.71% and 5.26% of the total variance respectively.

In all, the principal components analysis and varimax rotation produced an eight factor solution that was successful in differentiating between the assessed dimensions and thus construct validated the scales used. The reliabilities of the produced factors are shown in Table 2. As shown, almost all factors had a reliability coefficient in the 0.77 to 0.89 range, which in turn can be considered relatively high. The only exception was the reliability coefficient of the *Knowledge management* factor (coefficient alpha = 0.63). Hence, results pertaining to the *Knowledge management* factor should be viewed with caution. The overall alpha for all 43 learning organization variables included in this paper was measured at 0.95.

Table 1 Varimax Rotated Factor Matrix of Learning Organization Items (N=516)

Item and Factor Description	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
<i>Open Communications and Information Sharing</i>								
Constant communications across levels or between departments	0.65	0.14	0.03	0.28	0.25	0.14	0.14	0.00
Participative organization	0.65	0.30	0.16	0.24	0.01	0.14	0.14	0.13
Managers and supervisors share information openly	0.64	0.18	0.24	0.02	0.19	0.34	0.10	0.11
Business information is shared with employees	0.61	0.21	0.13	0.10	0.13	0.34	0.09	0.14
High degree of employee involvement	0.59	0.23	0.10	0.18	0.23	0.14	0.14	0.24
No boundary interference between units to solve joint problems	0.57	0.19	0.05	0.44	0.16	0.06	0.08	-0.02
Organizational policies do not restrict innovation	0.55	0.28	0.04	0.26	0.15	0.04	0.06	0.08
<i>Risktaking and New Idea Promotion</i>								
Risk taking is expected	0.21	0.77	0.14	0.04	0.13	0.03	0.03	0.15
People who take risks and fail are not punished	0.19	0.73	0.09	0.19	0.15	0.15	0.00	0.06
Innovators get ahead in the organization	0.33	0.66	0.08	0.21	0.08	0.14	0.19	0.12
New ideas are constantly sought and tried	0.29	0.61	0.15	0.14	0.21	0.20	0.17	0.10
<i>Support and Recognition for Learning and Development</i>								
Praised and recognized by supervisor when applying new learning	0.08	0.13	0.79	0.05	0.11	0.18	0.19	0.02
Strong supervisory encouragement for new learning	0.14	0.06	0.76	0.14	0.09	-0.07	0.08	0.27
Praised and recognized when doing a good job	0.06	0.37	0.57	0.15	0.19	0.38	0.07	0.00
Encouragement for personal development	0.39	0.14	0.56	0.00	0.09	0.17	0.28	-0.04
Supervisor expects application of new learning	0.08	0.09	0.53	0.04	0.05	-0.16	0.51	0.19
Have learning and growth opportunities	0.27	0.07	0.44	0.09	0.17	0.19	0.16	0.34
Praised and recognized by coworkers when applying new learning	-0.02	-0.04	0.40	0.07	0.38	0.26	0.28	0.05
<i>Information, Facts, Time, and Resource Availability to Perform Job in a Professional Manner</i>								
Have materials and equipment to do work right	0.21	0.12	0.15	0.78	0.13	0.06	0.08	0.10
Have facts and information needed to do a good job	0.22	0.18	0.18	0.73	0.09	0.12	0.11	0.18
Have ample time to perform job in a professional manner	0.21	0.07	0.00	0.67	0.09	0.33	0.11	0.09
People meet each other's needs	0.27	0.38	-0.04	0.50	0.27	0.14	0.26	-0.01
<i>High Performance Team Environment</i>								
People are willing to help the organization succeed	0.19	0.22	-0.01	0.02	0.73	0.11	0.07	0.13
People help one another without being told to do so	0.37	0.13	0.18	0.10	0.72	0.05	-0.06	0.00
Coworkers committed to quality work	-0.04	0.10	0.14	0.28	0.59	0.19	0.23	0.08
Team members are committed to one another's success	0.42	0.17	0.24	0.17	0.55	0.21	0.06	0.06
Member of a self-directed work team	0.29	0.09	0.17	0.09	0.47	-0.15	0.16	0.12
People freely share their knowledge with others	0.42	0.13	0.10	0.15	0.45	0.10	0.03	0.20
<i>Rewards for Learning, Performance, and New Ideas</i>								
Receive extrinsic rewards when applying new learning	0.43	0.07	0.11	0.08	0.07	0.67	0.22	0.10
Receive fair pay for the work I do	0.07	0.13	-0.01	0.38	0.14	0.59	-0.16	0.21
Learning is well rewarded	0.48	0.15	0.16	0.12	0.11	0.59	0.34	0.08
Outstanding performance is quickly recognized	0.29	0.31	0.26	0.23	0.12	0.52	0.08	0.04
New ideas are rewarded	0.33	0.37	0.15	0.17	0.10	0.51	0.13	0.00
<i>Positive Training Transfer and Continuous Learning Climate</i>								
Held accountable for training received	0.19	0.14	0.12	0.02	0.00	0.04	0.72	-0.04
Feel motivated to learn during training	0.02	-0.04	0.19	0.14	0.25	0.14	0.61	0.21
Training received is similar to performed tasks	0.11	0.06	0.22	0.11	0.07	0.15	0.49	0.36
Continuous learning is a high business priority	0.33	0.20	0.19	0.20	0.00	0.14	0.49	0.22
Feel motivated to transfer learning back to the job	0.03	0.05	0.33	0.09	0.19	-0.04	0.43	0.34
Employees committed to continuous learning	0.24	0.34	0.00	0.35	0.25	0.27	0.42	0.08
<i>Knowledge Management</i>								
Encouraged and expected to manage own learning	0.13	0.22	0.16	0.00	-0.01	0.07	0.04	0.70
Have all necessary skills and knowledge to perform job	-0.01	-0.10	-0.01	0.16	0.22	0.01	0.22	0.60
IT use to capture and distribute knowledge	0.19	0.30	0.10	0.14	0.06	0.26	0.17	0.54
Have influence over my work	0.26	0.14	0.21	0.37	0.16	-0.03	0.03	0.41

Table 2. Reliability Coefficients of Produced Factors

Factor	Number of Items	Coefficient Alpha
Open Communications and Information Sharing	7	0.89
Risktaking and New Idea Promotion	4	0.84
Support and Recognition for Learning and Development	7	0.84
Resource Availability to Perform Job in a Professional Manner	4	0.83
High Performance Team Environment	6	0.81
Rewards for Learning, Performance, and New Ideas	5	0.84
Positive Training Transfer and Continuous Learning Climate	6	0.77
Knowledge Management	4	0.63

Stepwise regression analysis for the “rapid change adaptation” variable. As shown in Table 3, the stepwise regression model of rapid change adaptation incorporated in its design six of the eight produced factors, which accounted for 50.3% of the total variance. At 1.2% the shrinkage of the produced model can be considered very small. Accounting for 23.6% of the total variance the “open communications and information sharing” factor was found to be by far the strongest predictor of rapid change adaptation. “Risktaking and new idea promotion” was the second factor selected by the model and accounted for 9.9% of the total variance. “Resource availability to perform job in a professional manner” was found to be the third strongest predictor of rapid change adaptation and accounted for 7.4% of the total variance. The remaining factors entered into the model were “high performance team environment”, rewards for learning, performance, and new ideas”, and “positive training transfer and continuous learning climate”. These three factors accounted for 4.7%, 3.2% and 1.5% of the total variance respectively. The factors that were not selected by the regression model were “support and recognition for learning and development” as well as “knowledge management”.

Table 3. Stepwise Regression Model of Rapid Change Adaptation^{a,b,c}

Model	Variables		R	R ²	Adjusted R ²	Std. Error of the Estimate
	Entered	Removed				
1	Open communications and information sharing		.486	.236	.234	1.22
2	Risktaking and new idea promotion	.	.579	.335	.333	1.14
3	Resource availability to perform job in a professional manner	.	.639	.409	.405	1.07
4	High performance team environment	.	.675	.456	.451	1.03
5	Rewards for learning, performance, and new ideas	.	.698	.487	.482	1.00
6	Positive training transfer and continuous learning climate	.	.709	.503	.497	0.99

^a. Dependent Variable: Rapid change adaptation; N = 511

^b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). ^c. F = 85.10, p < 0.001

Table 4. Beta Coefficients for Rapid Change Adaptation Regression Model

Model	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	3.148	.044		72.07	.000
1 Open communications and information sharing	.672	.044	.483	15.38	.000
2 Risktaking and new idea promotion	.438	.044	.314	10.00	.000
3 Resource availability to perform job in a professional manner	.381	.044	.272	8.671	.000
4 High performance team environment	.300	.044	.215	6.858	.000
5 Rewards for learning, performance, and new ideas applying skills and knowledge learned in training	.248	.044	.178	5.668	.000
6 Positive training transfer and continuous learning climate	.172	.044	.124	3.951	.000

Stepwise regression analysis for the “quick product or service introduction” variable.

The results of the stepwise regression analysis for “quick product or service introduction” are shown in Tables 5 and 6. According to the data presented in Table 5, the seven factors selected by the model accounted for 48.3% of the total variance of the dependent variable. At 1.4% shrinkage once again is considered very small. It is interesting to note that the three strongest predictors of “quick product or service introduction” are also the same of “rapid change adaptation”. The only difference is the order with which they appear in each model. In particular, “resource availability to perform the job in a professional manner”, or the extent to which employees are given the materials, equipment, facts, information, and co-worker support they need to perform their job effectively, accounted for 13.4% of the total variance and was thus found to be the strongest predictor of the dependent variable. Accounting 12.9% of the total variance, “open communications and information sharing” was found to be the second strongest predictor. The third predictor selected by the regression model was “risktaking and new idea promotion” which in turn accounted for 9.5% of the total variance. The remaining factors that were selected by the regression model were “rewards for learning, performance and new ideas”, “high performance team environment”, “positive training transfer and continuous learning climate”, and “knowledge management”. These factors accounted for 6.8%, 3.9%, 1.2%, and 0.4% of the total variance respectively. Once again, the factor pertaining to “support and recognition for learning and development” was not selected by the regression model.

Table 5. Stepwise Regression Model of Quick Product or Service Introduction ^{a,b,c}

Variables			<u>R</u>	<u>R</u> ²	Adjusted <u>R</u> ²	Std. Error of the Estimate
Model	Entered	Removed				
1	Resource availability to perform job in a professional manner	.	.368	.136	.134	1.22
2	Open communications and information sharing	.	.514	.264	.261	1.13
3	Risktaking and new idea promotion	.	.600	.360	.356	1.05
4	Rewards for learning, performance, and new ideas	.	.654	.428	.424	0.99
5	High performance team environment	.	.683	.467	.462	0.96
6	Positive training transfer and continuous learning climate	.	.692	.479	.473	0.95
7	Knowledge management	.	.695	.483	.476	0.95

^a. Dependent Variable: Quick product or service introduction; N = 515

^b. Method: Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). ^c. F = 67.80, p < 0.001

Table 6. Beta Coefficients for Quick Product or Service Introduction Regression Model

Model	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	3.605	.042		86.36	.000
1 Resource availability to perform job in a professional manner	.482	.042	.368	11.54	.000
2 Open communications and information sharing	.470	.042	.359	11.24	.000
3 Risktaking and new idea promotion	.405	.042	.309	9.682	.000
4 Rewards for learning, performance, and new ideas applying skills and knowledge learned in training	.342	.042	.261	8.196	.000
5 High performance team environment	.259	.042	.198	6.194	.000
6 Positive training transfer and continuous learning climate	.142	.042	.108	3.393	.001
7 Knowledge management	.085	.042	.065	2.031	.043

Pearson correlations between learning organization factors and organizational performance. The Pearson correlations between the generated eight factors and indicators of organizational performance are depicted in Table 7. As shown, the eight factors were correlated with indicators pertaining to rapid change adaptation, quick product or service introduction, organizational competitiveness, productivity, quality, and employee commitment. The correlations ranged from -0.02 to 0.52 with the majority of them being in the low to moderate range. Taking into consideration the average correlation of each factor with the respective performance indicators, it can be concluded that the learning organization factors that are more highly associated with organizational performance are those that pertain to the structural, information systems, and organization culture dimensions.

Table 7. Pearson Correlations of Learning Organization Factors and Performance Indicators

Performance Indicators	Open Communications and information sharing	Resource availability	Risktaking and new idea promotion	High performance team environment	Rewards for learning, performance, and new ideas	Positive training transfer and continuous learning climate	Support for learning and development	Knowledge management
Rapid change adaptation	.52**	.30**	.31**	.20**	.17**	.14**	.03	.03
Quick product or service intro	.39**	.41**	.30**	.19**	.26**	.12**	.01	.08
Organizational competitiveness	.27**	.25**	.39**	.09**	.11**	.13**	.05	.12**
Profitability	.02	.06	.10*	.15**	.05	.19**	.16**	-.02
Productivity Indicators								
Employee output	.17**	.23**	.17**	.40**	.16**	.14**	.14**	-.02
Cost effective production	.42**	.34**	.29**	.23**	.19**	.16**	.04	.09
Quality Indicators								
External customer satisfaction	.25**	.37**	.30**	.27**	.18**	.12**	.07	.07
External customer loyalty	.23**	.17**	.22**	.17**	.19**	.16**	.14**	.07
Peer work output satisfaction	.12**	.27**	.21**	.46**	.17**	.17**	.07	.14
Quick reaction to solve unexpected	.31**	.34**	.32**	.34**	.17**	-.02	.08	.11*
No rework needed	.35**	.28**	.23**	.22**	.16**	.16**	.04	.07
Employee Commitment								
Committed to the company	.16**	.12**	.20**	.20**	.16**	.20**	.23**	.17**
Company satisfaction	.30**	.36**	.19**	.15**	.41**	.13**	.20**	.17**
No absenteeism	.28**	.25**	.17**	.18**	.21**	.07	.13**	.01
No turnover	.26**	.31**	.22**	.12**	.24**	.02	.06	.05
Average Correlation	.27	.27	.24	.22	.19	.13	.10	.08

**Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed). Listwise N = 482

The factors that were found to exhibit an average correlation of 0.2 or higher with the performance indicators were “open communications and information sharing” ($r = 0.27$), “resource availability” ($r = 0.27$), “risk taking and new idea promotion” ($r = 0.24$), and “high performance team environment” ($r = 0.22$). It is interesting to note that the average correlations between the learning related dimensions and performance indicators were found to be in the low range. In particular, the average correlation of “positive training transfer and continuous learning climate”, “support for learning and development”, and “knowledge management” with the performance indicators were 0.13, 0.10, and 0.08 respectively. In the meantime, the “rewards for learning, performance, and ideas” factor was found to exhibit an average correlation of 0.19 with the performance indicators.

By examining the individual correlations in Table 7, one can observe that only six out of the possible 120 correlations between the learning organization factors and the performance indicators are above 0.4. Further, only four of the eight factors were found to exhibit a correlation of 0.4 or higher with at least one of the performance indicators. The “open communications and information sharing” factor was found to be more highly correlated with “rapid change adaptation” ($r = 0.52$, $p < 0.01$) and “cost effective production” ($r = 0.42$, $p < 0.01$). At the same time, the “high performance team environment” factor was found to be more highly correlated with “peer work output satisfaction” ($r = 0.46$, $p < 0.01$) and “employee output” ($r = 0.40$, $p < 0.01$). Lastly, the factors of “resource availability” and “rewards for learning, performance, and new ideas” exhibited a correlation of 0.41 ($p < 0.01$) with “quick product or service introduction” and “company satisfaction” respectively. It is worth noting that all factors were found to exhibit a low to a very weak association with “profitability”.

Summary, Discussion, and Conclusions

In all, the correlational data in conjunction with the results of the regression analyses indicate that the most important learning organization dimensions for change adaptation, quick product or service introduction, and bottom-line organizational performance are those pertaining to the structural, cultural, and information systems of the organization. More specifically, the stepwise regression model for “rapid change adaptation” identified “open communications and information sharing”, “risktaking and new idea promotion”, and “resource availability” to be its strongest predictors. Moreover, the statistical analysis identified “resource availability”, “open communications and information sharing”, and “risktaking and new idea promotion” to be the strongest predictors of “quick product or service introduction”. The fourth and fifth strongest predictors for both models, in reverse order, were “high performance team environment” and “rewards for learning, performance, and new ideas”. Taking into account that all these five factors were also found to exhibit the highest average correlations with the 15 performance indicators in Table 7, it is safe to conclude that organizational interventions that focus on the structural, cultural, and information system characteristics of the organization will be more likely to produce higher levels of performance, change adaptation, and innovation than those that strictly focus on learning and its application.

Collectively, the three factors that were found to more strongly predict rapid change adaptation and quick product or service introduction, characterize a very participative and open organizational system. Within such a non-bureaucratic system information is openly shared with employees, while constant and open communications across levels and between departments allow joint solutions to problems without boundary interference. Furthermore, the three factors

together describe an organizational system that not only provides the employees with all the time, facts, information, and tools they need in order to perform their job in a professional manner, it also gives them the freedom to try new ideas and be risk takers. The latter of course validates the importance of Argyri's double-loop learning theory and demonstrates how democratic and open systems, which in turn allow employees to think, challenge the operating norms of the organization, be creative, and take risks do ultimately transform themselves into innovative and rapidly adapting entities capable of coping with today's highly complex and rapidly changing environments. As Argyris put it, "if learning is to persist, managers and employees must look inward. They must learn how the very way they go about defining and solving problems can be a source of problems in its own right" (Abernathy, 1999, p. 84).

In a nutshell, the results of this study suggest that organizational designs that are based on the holographic principles of connectivity, redundancy, and self-organization do indeed facilitate innovation and rapid change adaptation. An advantage today's organizations have is that through information technologies they can very easily transform themselves into holographic entities and thus eliminate the bounded rationality that may characterize them. To do so, however, they will need to operate as open and trusting systems capable of adapting participative practices, which in turn promote employee involvement and empowerment. Simply put, open communications, free flow of information, and risk taking do not occur in hierarchical and bureaucratic systems for which information is considered a sacred commodity and deviation from operating norms a serious violation.

Another implication that stems from the results of this study is that although learning organization designs facilitate change adaptation and innovation, and thus organizational growth and evolution, they are not as equally effective when it comes to such bottom-line organizational performance as productivity, quality, and profitability. This finding is in agreement with Lawler's and Mohrman's (1998) assertion according to which no single approach to management offers a complete system of management. According to Lawler and Mohrman (1998), "the challenge for the future is to develop a complete system of management that integrates and goes beyond what is offered by any one of them" (p. 207).

Limitations and Recommendations for Future Research

Although this study is based on data gathered from organizations representing different sectors of the industry, replicating this study in other industries and environments will help determine the extent to which the presented results can be generalized to other settings as well. Moreover, the dimensions incorporated in this study are only a subset of all possible ones that can be studied under learning organization theory. Hence, replication of this study with inclusion of more learning organization dimensions may help develop a better conceptual framework with regard to the association between learning organization practices and change adaptation, innovation as well as bottom-line organizational performance.

References

- Abernathy, J. D. (1999). A chat with Chris Argyris. *Training and Development*, 53 (5), 80-84.
- Argyris, C. & Schon, D. A. (1978). *Organizational learning: A theory of action perspective*. Reading, MA: Addison Wesley.
- Axtell, C., Maitlis, S., & Yearta, S. (1997). Predicting immediate and longer-term transfer of training. *Personnel Review*, 26 (3), 201-212.
- Baldwin, T.T., & Ford, J.K. (1988). Transfer of training: A review and future directions for future research. *Personnel Psychology*, 41(1), 63-105.
- Bennett, J. K. & O'Brien, M. J. (1991). The building blocks of the learning organization. *Training*, 21 (6), 11-18.
- Buckingham, M., & Coffman, C. (1999). *First break all the rules: what the world's greatest managers do differently*. New York: Simon & Schuster.
- Clark, S.C., Dobbins, H.G., & Ladd, T.R. (1993). Exploratory field study of training motivation. *Group & Organization Management*, 18(3), 292-307.
- DeSimone, R.L., Werner, J.M., & Harris, D.M. (2002). *Human Resource Development* (3rd ed.). Orlando, FL: Harcourt, Inc.
- DiBella, A. (1997). Gearing up to become a learning organization. *Journal for Quality & Participation*, 20 (3), 12-14.
- Edmondson, A. C. (1996). Three faces of Eden: The persistence of competing theories and multiple diagnoses in organizational intervention research. *Human Relations*, 49 (5) 571-582.
- Facteau, J., Dobbins, G., Russell, J., Ladd, R., & Kudisch, J. (1995). The influence of general perceptions of the training environment on pretraining motivation and perceived training transfer. *Journal of Management*, 21, (1), 1-25.
- Garvin, D. (1993). Building a learning organization. *Harvard Business Review*, 71 (4), 78-91.
- Hackman, J.R., & Oldham, G.R. (1980). *Work redesign*. Reading, MA: Addison Wesley.
- Holton, E., Bates, R., & Ruona, W. (2000). Development of a generalized learning transfer system inventory. *Human Resource Development Quarterly*, 11 (4), 333-360.
- Kontoghiorghes, C. (2001a). Factors affecting training effectiveness in the context of the introduction of new technology—a US case study. *International Journal of Training and Development*, 5 (4), 248-260.
- Kofman, F. & Senge, P. M. (1993). Communities of commitment: the heart of learning organizations. *Organizational Dynamics*, 22 (2), 5-22.
- Kontoghiorghes, C. (2001b). A Holistic approach toward motivation to learn in the workplace. *Performance Improvement Quarterly*, 14 (4), 3-17.
- Kontoghiorghes, C. & Dembeck, D. (2001). Prioritizing quality management and sociotechnical variables in terms of quality performance. *Quality Management Journal*, 8 (3) 36-48.
- Lawler III, E., & Mohrman, S. (1998). Employee involvement, reengineering, and TQM: Focusing on capability development. In S. Mohrman, J. Galbraith, E. Lawler III, & Associates, *Tomorrow's organization – Crafting winning capabilities in a dynamic world* (pp. 179-207). San Francisco: Jossey-Bass.
- Lindsay, W.M., & Petrick, J.A. (1997). *Total quality and organization Development*. Boca Raton, FL: St. Lucie Press.

Macy, B.A., & Izumi, H. (1993). Organizational change, design, and work innovation: A meta-analysis of 131 North American field studies ---- 1961-1991. *Research in organizational change and development*, 7, 235-313.

Pasmore, A.W. (1988). *Designing effective organizations: The sociotechnical systems perspective*. New York: Wiley & Sons.

Redding, J. (1997). Hardwiring the learning organization. *Training and Development*, 51 (8), 61-67.

Rouiller, J.Z., & Goldstein, L.I. (1993). The relationship between organizational transfer climate and positive transfer of training. *Human Resource Development Quarterly*, 4 (4), 377-390.

Senge, P. M. (2002). The leader's new work. From <http://www.solne.org/res/kr/newwork.html>.

Senge, P.M. (1990). *The fifth discipline: The art and practice of the learning organization*. NY: Doubleday.

Senge, P.M., Kleiner, A., Roberts, C., Roth, G., Ross, R., & Smith, B. (1999). *The dance of change: The challenges to sustaining momentum in learning organizations*. New York: Random House.

Tracey, J.B., Hinkin, R.T., Tannenbaum, S., & Mathieu, E.J. (2001). The influence of individual characteristics and the work environment on varying levels of training outcomes. *Human Resource Development Quarterly*, 12(1), 5-23.

Tracey, J.B.; Tannenbaum, I.S.; & Kavanagh, J.M. (1995). Applying trained skills on the job: The importance of the work environment. *Journal of Applied Psychology*, 80 (2), 239-252.

Watkins, K. E. & Marsick, V. J. (1993). *Sculpting the learning organization: lessons in the art of systemic change*. San Francisco: Jossey-Bass.

Wenger, E. (1996). Communities of practice: the social fabric of a learning organization. *Healthcare Forum Journal*, 29, (4) 20-26.

Whitney, G. & Pavett, C. (1998). Total quality management as an organizational change: Predictors of successful implementation. *Quality Management Journal*, 5 (4), 9-22.