



ORIGINAL ARTICLE

# The Mediating Role of Organizational Learning in the Relationship of Organizational Intelligence and Organizational Agility

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**Abstract**

**Objectives:** Organizational learning is defined as creating, absorbing, retaining, transferring, and application of knowledge within an organization. This article aims to examine the mediating role of organizational learning in the relationship of organizational intelligence and organizational agility.

**Methods:** This analytical and cross-sectional study was conducted in 2015 at four teaching hospitals of Yazd city, Iran. A total of 370 administrative and medical staff contributed to the study. We used stratified-random method for sampling. Required data were gathered using three valid questionnaires including Alberkht (2003) organizational intelligence, Neefe (2001) organizational learning, and Sharifi and Zhang (1999) organizational agility questionnaires. Data analysis was done through R and SPSS 18 statistical software.

**Results:** The results showed that organizational learning acts as a mediator in the relationship of organizational intelligence and organizational agility (path coefficient = 0.943). Also, organizational learning has a statistical relationship with organizational agility (path coefficient = 0.382).

**Conclusion:** Our findings suggest that the improvement of organizational learning abilities can affect an organization's agility which is crucial for its survival.

## 1. Introduction

Nowadays, evolution of healthcare organization is very important for the growth and development of

organizations and any defects have irreversible consequences for them [1]. Also, technological changes demand management changes [2]. Organizations increasingly involve three words: customers, competition, and change, and they look for ways to overcome these issues [3]. The increased rate of innovation and technological expansions, fragmentation of markets, and

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elevated customer expectations toward customized harvests have led to the especially turbulent and rapid changes in the business environment [4]. Most researchers predict that the workplace is changing constantly and rapidly [5]. Hospitals are not separate from this issue and without change will not be able to achieve health policy goals [6]. Organizational intelligence that consist of human intelligence and machine intelligence can increase the power of competitiveness.

Albrecht [7] believed that organizational intelligence is the mental capacity and ability to perform a task or important activities. In his opinion, organizational intelligence has seven components that include: (1) strategic vision; (2) shared fate; (3) desire to change; (4) heart; (5) alignment; (6) knowledge application; and (7) performance pressure. Lefter et al [28] in an article named "The dimensions of organizational intelligence of human prospects in Romanian companies" indicated that only 30% of the staff of medium and large companies were familiar with the concept of organizational intelligence and the staff of small companies were not familiar with this concept at all. Healthcare organizations are looking for better ways to carry out their affairs and to learn how to implement them [8]. Hospitals are organizations that have interactions between nurses and patients, nurses and doctors, and doctors and patients, and they can use these interactions to experiment and learn [9]. Organizational learning was used for the first time in 1963 by Cyert and March in their first study on the behavioral aspects of organizational decision making [10]. As Argote [11] believed, service organizations such as hospitals are increasingly expanding and these organizations have different degrees of learning that will have an influence on productivity, performance, and strategic and management decisions. Cyert and March believe that learning is as an effective strategy to increase the efficiency of an organization [12] and occurs when behaviors change [13]. Learning can increase the effectiveness of management in order to attract opportunities [14]. Argyris defines organizational learning as a process of detecting and correcting errors that conclude from sharing knowledge, beliefs, and assumptions between individuals and teams [15]. Two factors that seem to have considerably created organizational learning are: (1) the rate of change; and (2) an increase in competitive pressures. Neefe [16] suggests that organizational learning is derived from five dimensions that include individual skills, mental models, vision, team learning or team work, and systems thinking.

Agility is a term used since 1991. Agility is a matter that business organizations chose in the 21<sup>st</sup> century [17]. Public health and the promotion of healthcare is a fundamental issue in the world. One of the most important factors for organizations is agility that is used in variable environments. Organizational agility is the ability to respond to changes in their environment

quickly and successfully. The main characteristics of this environment are change and uncertainty [18]. Hospitals are the most important organization in the field of healthcare services that require skilled manpower, equipment, and suitable facilities. Therefore, agile hospitals can reduce production costs, increase market shares and patient satisfaction, introduce new services, and enhance the competitiveness of the hospital. Grol et al [19] suggested that healthcare systems need different factors that use strategy, activities, and that combines various scales. Organizational agility identifies four dimensions [20]: (1) ability to respond; (2) the competition; (3) flexibility; and (4) speed or power to accept. Organizational intelligence, organizational learning, and organizational agility have been used in industry over and over but in hospitals they are less used. In Simic's [21] research he pointed out that individuals and organizations that have higher organizational intelligence are superior in the fields of understanding problems, understanding knowledge, and performance improvement compared with other organizations. Samokadas and Sauni (2004) developed a hierarchical and theoretical model and tested it empirically. This model shows how human resources management activities help the agility of human resources [22]. For organizations, communities, and those who are planning for their future, understanding the nature of change seems essential but unfortunately few researches pay attention to organization spiritual assets such as organizational intelligence, organizational learning, and organizational agility. Thus, this article aims to examine the mediating role of organizational learning in the relationship of organizational intelligence and organizational agility.

### 1.1. Research hypotheses

- (1) Observable variables (strategic vision, shared fate, tendency to change, heart, alignment, expanding knowledge, performance, interpersonal skills, mental models, com vision, team learning, systems thinking, ability to respond, aptitude, flexibility, and speed or power to accept) and latent variables (organizational intelligence, organizational learning, organizational agility)
- (2) There is a significant relationship between organizational intelligence and organizational agility in the teaching hospitals of Yazd city
- (3) There is a significant relationship between organizational intelligence and organizational learning in the teaching hospitals of Yazd city
- (4) There is a significant relationship between organizational learning and organizational agility in the teaching hospitals of Yazd city

- (5) Organizational learning has a mediator role in increasing organizational agility through organizational intelligence

## 1.2. Research conceptual model

Despite the relationships between these three variables in conceptual theoretical bases, there are a few empirical researches to study the relationship between these variables. The innovation aspect of this research is studying the causative relationship between the three variables in hospital and to test the causative relationship using structural equations modeling. Therefore, the conceptual model was tested to study the effect of organizational intelligence on organizational agility regarding the mediator role of organizational learning.

## 2. Material and methods

This study is an applied and analytical study which has been conducted through cross-sectional methods during 2015 at four teaching hospitals of Yazd, Iran, including Shahid Sadoughi, Shahid Rahnemoon, Afshar, and burning hospital (Shohada Mehrab). A total of 370 administrative and medical staff contributed to the study. We used stratified-random method for sampling.

The required data were gathered using three valid questionnaires including: (1) Albrecht (2003) [7] organizational intelligence questionnaire that includes 49 items and seven observation variables containing: strategic vision, shared fate, tendency to change, heart, alignment, expanding knowledge, and performance pressure; (2) Neefe (2001) [16] organizational learning questionnaire that includes 24 items and is comprised of five components: interpersonal skills, mental models, shared vision, team work, and systems thinking; and (3) Sharifi and Zhang (1999) [20] organizational agility questionnaire that includes 16 items and four observation variables containing: ability to respond, the competition, flexibility, and speed or power to accept.

The reliability obtained with Cronbach  $\alpha$  coefficient for the first questionnaire was 96%, the second questionnaire was 75%, and the third questionnaire was 80%.

To analyze data, we performed descriptive statistics and structural equations modeling using statistical software like R (version 2.12.0, semTools Version 0.4-7), lavaan package, semPlot, and semtool [23–25] for structural equation modeling and SPSS version 18 (SPSS Inc., Chicago, IL, USA) for descriptive statistics. In structural equation modeling, it is assumed that the latent variables have a normal distribution with a mean of zero [26].

### 2.1. Findings

The mean age and its standard error of the studied population was  $36 \pm 6$  years. In the 370 selected

samples, 78.6% were women and 21.4% were men. From the aspect of education, 9.1% were high school educated, 4.3% had a diploma, 76.5% had a bachelor degree, 13.8% had Master of Science, and 3.5% of samples had a PhD.

To study descriptive information, the mean, and standard deviation have been shown in Table 1.

The data in Table 1 show that among organizational intelligence dimensions, the tendency to change had a score of 3/68 and compared with other dimensions it had the highest score. The score for alignment was 3/27 and compared with other dimensions it had the lowest score. The mean score of organizational intelligence of hospitals was 2.29, which was higher than the average (compared with 0).

The data in Table 2 show that among organizational learning dimensions, the systems thinking had a score of 3/96 and compared with other dimensions it had the highest score. The score for mental models was 1.15 and compared with other dimensions it had the lowest score. The mean organizational learning score of hospitals was 1.48, which was higher than the average (compared with 0).

The data in Table 3 show that among organizational agility dimensions, the competition with a score of 3/67 had the highest score compared with other dimensions. Ability to respond had a score of 2.78 and compared with other dimensions it had the lowest score. The mean organizational agility score of hospitals was 1.52, which was higher than the average (compared with 0).

After data collection, in the analysis of how observable variables determine latent variables, it was found that all observable variables related to latent variables were tested and showed that observable variables can evaluate latent variables among these dimensions except for the mental models which was not significant ( $p = 0.389$ ; Hypothesis 1).

### 2.2. Testing conceptual model of research

The conceptual model consists of a structural model and a measurement model that is tested using structural equation modeling. The first step is drawing a causal graph using Amos<sub>23</sub> software. According to the structural equation modeling the question is whether the collected empirical data can support the theoretical models or not. For this purpose, the fitting indicators in Table 4 were shown that determine if theoretical models and experimental data fit. The standardized path coefficients for the model are presented in Figure 1. The goodness of fit indexes are all well above the recommended minimal value, showing a very good fit (Table 4).

Based on the above criteria and comparing obtained values with the standard values, it was concluded that the theoretical model is consistent with empirical data.

As can be seen in the path analysis model and Table 5, organizational intelligence effects organizational agility directly with a path coefficient of 0.571 (Hypothesis 2)

**Table 1.** Descriptive statistics of organizational intelligence and its dimensions.

Dimension	<i>n</i>	Minimum	Maximum	Mean	SD	Skew	Kurtosis
Strategic vision	370	1.29	4.71	3.16	0.75	-0.21	-0.72
Shared fate	370	1.29	4.71	3.3	0.73	-0.5	-0.33
Tendency to change	370	1.5	5	3.68	0.73	-0.52	-0.18
Heart	370	1.43	4.57	3.33	0.63	-0.56	-0.1
Alignment	370	1.5	4.5	3.27	0.63	-0.34	-0.7
Expanding knowledge	370	1.57	4.86	3.45	0.69	-0.33	-0.69
Performance	370	1.29	4.71	3.34	0.79	-0.57	-0.2

SD = standard deviation.

**Table 2.** Descriptive statistics of organizational learning and its dimensions.

Dimension	Samples	Minimum	Maximum	Mean	SD	Skew	Kurtosis
Interpersonal skills	370	1	4	2.22	0.6	0.26	-0.49
Mental models	307	0.33	2.33	1.15	0.34	0.27	0.06
Shared vision	370	1	4.5	2.49	0.74	0.01	-0.63
Team work	370	1	4.5	2.5	0.75	-0.02	-0.54
Systems thinking	370	3	5	3.96	0.46	-0.19	-0.59

SD = standard deviation.

**Table 3.** Descriptive statistics of organizational agility and its dimensions.

Dimension	Samples	Minimum	Maximum	Mean	SD	Skew	Kurtosis
Ability to respond	370	1.67	4	2.78	0.58	0.18	-0.55
The competition	370	2.43	4.86	3.67	0.55	0.04	-0.8
Flexibility	370	2	5	3.55	0.69	0.07	-0.87
Speed	370	2	5	3.54	0.7	0.04	-0.73

SD = standard deviation.

and on organizational learning with a path coefficient of 0.975 (Hypothesis 3). Organizational learning effects organizational agility with a path coefficient of 0.382 (Hypothesis 4). Also, organizational intelligence indirectly effects via organizational learning with a path coefficient of 0.372 on organizational agility. The simultaneous (total) effect of organizational intelligence and organizational learning on organizational agility is 0.943 (Hypothesis 5).

### 3. Discussion

This study created a conceptual model using data collection from 370 samples of administrative and medical staff conducted at four teaching hospitals of Yazd city in 2015, including Shahid Sadoughi, Shahid Rahmehoon, Afshar, and burning hospital. For this purpose, 370 questionnaires were collected and analyzed.

Descriptive statistics showed through the dimensions of organizational intelligence, the tendency to change had a score of 3/68 and compared with other dimensions it had the highest score. Alignment had a score of 3/27 and compared with other dimensions it had the lowest score. The mean of organizational intelligence was 2.29,

which was higher than average. This is consistent with Jadidi and Memari [27] and Lefter et al [28]. Through the dimension of organizational learning, systems thinking had a score of 3/96 which was the highest score

**Table 4.** Results indicators conceptual model.

Symbol	Index value	Acceptable value
X <sup>2</sup>	0.193	>5
GFI	0.965	>90
AGFI	0.952	>90
NNFI	0.997	>90
NFI	0.977	>90
CFI	0.997	>90
RFI	0.973	>90
IFI	0.997	>90
PNFI	0.822	>.5
RMSEA	0.018	>.05
(Fmin) X <sup>2</sup> /df	0.153	<3
RFI	0.153	fmin

Data are presented as % unless otherwise indicated. AGFI = adjusted goodness of fit; CFI = comparative fit index; df = difference; GFI = goodness of fit; IFI = ; NFI = normed fit index; NNFI = non-normed fit index; PNEI = parsimonious normed fit index; RFI = relative fit index; RMSEA = root mean square error of approximation.

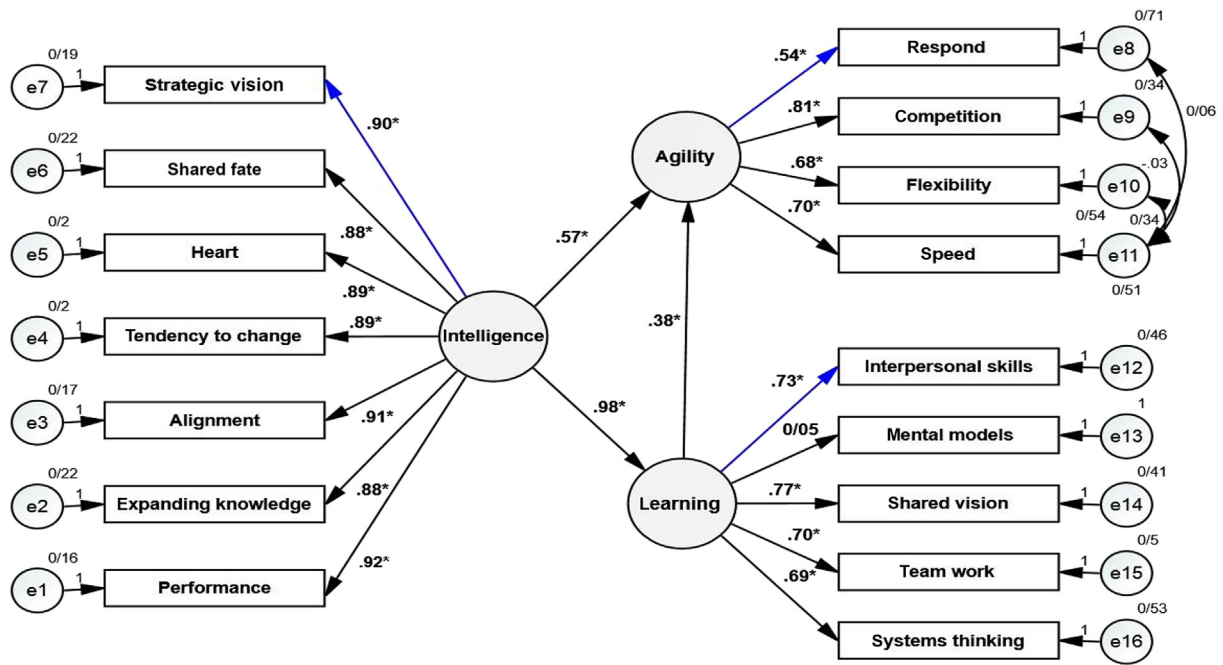


Figure 1. Research conceptual model and standardized indexes.

compared with other dimensions. It is shown that the holistic and comprehensive approach to events and staff have created good relationships between events and phenomena. Mental models with a score of 1.15 had the

lowest score compared with other dimensions. After mental models, individual skills (not provided) promote organizational learning (with a score of 2.22). The mean organizational learning score of hospitals was 1.48,

Table 5. Effects of research variables, standardized coefficients, and standardized solution (fit).

Total effect	Direct effect	Indirect effect	Variable
0.943	0.571	0.372	Organizational intelligence, organizational agility
–	0.975	–	Organizational intelligence, organizational learning
–	0.382	–	Organizational learning, organizational agility

Table.5-1: standardized estimations and their standard errors for parameters corresponding to figure 1.

Row		Est. std	Se	Z	p
1	Intelligence = strategic vision	0.901	0.011	84.601	<0.001
2	Intelligence = com fate	0.883	0.012	71.775	<0.001
3	Intelligence = heart	0.893	0.011	78.043	<0.001
4	Intelligence = tendency to change	0.894	0.011	78.801	<0.001
5	Intelligence = alignment	0.913	0.010	95.216	<0.001
6	Intelligence = expanding knowledge	0.883	0.012	71.690	<0.001
7	Intelligence = performance pres	0.918	0.009	100.983	<0.001
8	Learning = individual skills	0.733	0.024	30.633	<0.001
9	Learning = mental model	0.046	0.053	0.862	0.388
10	Learning = com vision	0.767	0.023	33.168	<0.001
11	Learning = team work	0.705	0.028	25.347	<0.001
12	Learning = systems thinking	0.689	0.029	23.766	<0.001
13	Agility = respond	0.536	0.033	16.174	<0.001
14	Agility = the competition	0.812	0.021	38.376	<0.001
15	Agility = flexibility	0.679	0.031	22.108	<0.001
16	Agility = speed	0.702	0.029	24.161	<0.001
17	Agility ~ intelligence	0.571	0.013	42.427	<0.001
18	Learning ~ intelligence	0.975	0.003	329.809	<0.001
19	Agility ~ learning	0.382	0.013	30.474	<0.001
20	Indirect = il*la	0.372	0.013	28.520	<0.001
21	Total = ia + (il*la)	0.943	0.009	110.676	<0.001

Est. = estimated; ia, il, la = parameter name for regression of agility on inteligency that shows direct effect; SD = standard deviation; \*: operator in il\*la shows indirect effect of inteligency on agility; ~: shows path for regression; =: shows path for covariance and so on.

which was higher than the average. This is consistent with the Bahadori et al [29] study (by a mean score of 3.09). Among the dimensions of organizational agility, aptitude with a score of 3/67 is better off than other dimensions and ability to respond with a score of 2.78 had the lowest score compared with other dimensions. The mean of organizational agility score of hospitals was 1.71 which was higher than average. This is consistent with Yarmohammadian et al [30].

The research conceptual model using structural equation modeling to examine the relationship between organizational intelligence, organizational learning, and organizational agility and the mediating role of organizational learning in the relationship between organizational intelligence and organizational agility in teaching hospitals of Yazd was tested. The results showed that there is a significant relationship between organizational intelligence and organizational agility (regression coefficient was 0.571) and is compatible with the research of Bagherzadeh and Akbari Dibavar [3]. In the study by Porkiani and Hejinipour [31], their research related to the study of the relationship between organizational intelligence and organizational agility in a supreme audit court and showed that there is a significant and positive relationship between organizational intelligence and organizational agility ( $r = 0.688, p < 0.001$ ) which is compatible with our research.

Also, the results showed that the organizational intelligence and organizational learning have a positive and significant relationship (organizational intelligence with regression coefficient of 0.975 effect on organizational learning), which is consistent with the study by Hosseini and Cheili Ciril [32]. Our results are also consistent with the research of Mirzazadeh and Saffar [33] related to the relationship between organizational intelligence and organizational learning that showed there is a significant and positive relationship between organizational intelligence and organizational learning (regression coefficient is 0.56). The simultaneous (total) effect of organizational intelligence and organizational learning on agility obtained 0.943. Formal testing has confirmed the mediational role of organizational learning in the relationship between organizational intelligence and organizational agility. Therefore, intelligence and learning together have a greater impact on agility. Using smart staff and appropriate technology creates a field of intelligent and agile organizations. In this environment, staff training is important, established communication with staff, and the provision of the necessary information for them on time. In organizations that create the field of intelligence and learning, agility is appearing and administrators are able to identify changes and confront them. Service organizations, including hospitals, more than ever need to be agile, because not only do they have to achieve their aims and objectives but also human lives are concerned so their responsibility is two-fold. Like any other

research our study has some limitations. Some of the limitations in our research are lack of control over certain variables such as level of education that directly and indirectly effect our research. Also, we did this work in teaching hospitals which can affect our results because education itself is a part of the mission of educational hospitals.

Our findings suggest that the improvement of organizational learning abilities can affect an organization's agility which is crucial for its survival.

## Conflicts of interest

All authors of this paper declare that they have no conflicts of interest.

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