ORGANIZATIONAL AGILITY LEVEL EVALUATION MODEL AND EMPIRICAL ASSESSMENT IN HIGH-GROWTH COMPANIES

Mindaugas Deksnys[1]
Prof. Dr. Rima Žitkienė[2]
[1, 2] Mykolas Romeris University, Lithuania

ABSTRACT

In an ever-changing and increasingly competitive global environment organizations need to adapt faster to survive. In order to face market uncertainties, organizations must become agile. Organizational agility is a complex and multidimensional concept. One of the main challenges in researching organizational agility is its measurement. The variety and combination of attributes, characteristics, capabilities, and practices make the measurement of organizational agility level highly complicated and subjective. The purpose of this article is to explore the organizational agility level measurement methods and present a possible evaluation model. In the article, authors propose organizational agility evaluation and assessment methodology. The presented model is empirically tested in the context of high-growth companies in Lithuania. These companies' agility level is evaluated using fuzzy numbers logic which allows more precise agility level evaluation in the organization. This article contributes to research by providing a more unified concept, which can be adapted in studying organizational agility in a wide and global range of organizations, regardless of the industry they operate in.

Keywords: Organizational agility, organizational agility level, fuzzy agility evaluation framework

INTRODUCTION

In order to effectively compete in changing market environment, organizations have to be proactive and anticipate change. To achieve that, organizational structures should allow for greater agility, through flexibility and response. Practitioners need new organizational solutions, forms, and tools to embrace the changing environment and capture new opportunities. Successful adaptation to external forces requires agile organizational enablers, abilities, and practices. In order to control and improve agility level, organizations need to be able to measure agility level and identify which internal organizational factors affect it. Measurement, identification, and evaluation of factors affecting organizational agility level in highly volatile environment remain important questions for researchers and practitioners. This article aims to answer some of them.

Organizational agility is especially important in the context of fast-growing companies. Normal growth organizations adapt to changes in the environment

and adaptation is reactive to the environmental triggers (competition, change in technology or consumer tastes, etc.). If the environment is relatively static, an organization is not pressured to adapt quickly. However, in high-growth companies, in addition to external pressures, change and adaptation are also forced from within the organization and agility becomes pro-active. Often led by success and growth in sales revenues, profits, and market share - fast-growing companies undergo considerable internal changes as well. Therefore, during high-growth periods, organizational agility is crucial in adapting to fast changes from both internal and external influence. Thus, making high-growth companies especially suitable context to study organizational agility.

Organizational agility is especially important in the context of fast-growing companies. Normal growth organizations adapt to changes in environment and adaptation is reactive to the environmental triggers (competition, change in technology or consumer tastes, etc.). If the environment is relatively static, an organization is not pressured to adapt quickly. However, in high-growth companies, in addition to external pressures, change and adaptation are also forced from within the organization and agility becomes pro-active. Often led by success and growth in sales revenues, profits, and market share - fast-growing companies undergo considerable internal changes as well. Therefore, during high-growth periods, organizational agility is crucial in adapting to fast changes from both internal and external influence. Thus, making high-growth companies especially suitable context to study organizational agility.

METHODOLOGIES USED FOR MEASURING AGILITY LEVEL

There is no consensus on the organizational agility level measurement approach in scientific literature and researchers distinguish different components of agility [1]. Regardless, researchers seem to agree that organizational agility is one of the most important factors in ensuring an organization's ability to adapt to changing the environment [2]–[4]. Organizational agility level measurement models have their shortcomings. There have been a number of attempts and different approaches to measuring organizational agility levels in the past. Many organizational agility methodologies are too specific on one or another aspect of an organization: some relate to specific business processes, such as software or product development; others concentrate on measuring agility level in supply chains; some only measure internal organizational factors while ignoring external influences. Such a variety of methodologies make the concept of organizational agility diverse and vague. Many authors are concentrating only on the specific industry of organizations, in particular – the manufacturing sector, where they analyze what manufacturing organizations can do to enhance their agility [5]–[7]. Others evaluate the agility in the context of a business process or area – e.g. supply chain agility [8]–[10], human resource agility [11], [12], information technologies [13]. Some of the research is only based on theoretical assumptions and not validated empirically [12], [14], [15]. Some measurement models can be applied to a wider range of organizations and are more holistic [6], [16].

Regardless of the number of attempts to measure and evaluate organizational agility magnitude, the lack of consensus still persists. Lack of precision regarding characteristics of the agile enterprise, limit the possibilities to measure the practices of the agile enterprise. Therefore, constructing a comprehensive measuring tool for organizational agility level is a major issue from both practical and theoretical perspectives [17]. From a theoretical perspective, it encourages future research into organizational agility, while a managerial perspective will gain insights into successful growth companies and provide an actionable model. Organizational agility is a complex and multidimensional concept. One of the main challenges in researching organizational agility is its measurement. The variety and combination of enablers, characteristics, capabilities, and practices make the measurement of organizational agility level highly complicated and subjective. This can be related to the vagueness and definition of agility, which differs from various organizations with their own unique sets of characteristics [18]. The different types of organizations over various industries complicate this task even further. One of the goals of this article is an attempt to move towards a more comprehensive and holistic measurement process, which can be applied to different types of organizations.

FUZZY AGILITY INDEX METHOD FOR MEASURING AGILITY LEVEL

To overcome the problem of vagueness and imprecision authors of this article selected a fuzzy logic approach of evaluating the organizational agility level of the enterprise. To measure organizational agility level, a set of criteria are selected and evaluated by experts. Experts can be high-ranked decision-makers in the organization (CEO, director, board member, etc.) or researchers who analyze this field. However, expert opinions are subjective and can be influenced by their character or experience. In order to reduce uncertainty authors of this article use the fuzzy logic method developed by Lin et al., (2006) to analyze responses of surveyed experts, and adapt it to the purposes of this article. The fuzzy logic evaluation of organizational agility level is chosen due to several advantages [19]:

1. This method provides realistic and revealing information. It calculates Fuzzy Agility Index (FAI) expressed in a range of values, which allows seeing the overall organizational agility potential and ensures unbiased decision.

2. This method can be used as a self-assessment tool for evaluating organizational agility levels. It allows to identify the weak factors and improve them.

3. It provides the rational structure to approach the vague, imprecise and ill-defined phenomena of organizational agility.

According to Lin et al. (2006), the fuzzy agility evaluation (FAE) framework, is composed of two major parts. The first part evaluates the business operation environment (agility drivers) and identifies agility capabilities. Organization environment evaluation is needed to identify the agility drivers, which influence

the organization to change and reconsider the company's structure, strategy, and process. Organizational agility capabilities are the important abilities that are required to make appropriate responses to changes and respond to the external environment. The second part of the framework evaluates agility capabilities and combines the ratings and the weights to obtain a Fuzzy Agility Index (FAI) of an agile enterprise. The authors of this article enhance Lin et al. (2006) organizational agility level measurement framework by adding two parameters from a conceptual model as discussed in preceding sections – agility enablers and agility practices. Steps of organizational agility level evaluation framework [19]:

1. *Select criteria for evaluation.* Based on analysis of theoretical aspects of organizational agility, the applicable organizational agility enablers, capabilities and practices are selected. Table 1 summarizes organizational agility attributes, which are used to evaluate organizational agility level in fast-growing companies. Each dimension consists of certain attributes, that are formed into groups. Dimensions, attribute groups, and attributes are coded, as presented in Table 1.

Table 1 *Organizational agility dimensions and attributes*

Dimension	Attribute group	Agility attribute
Enablers (AC_1)	Structure and processes (AC_{11})	– Simple organizational culture and decision-making (AC_{111}) – Easily changeable business process (AC_{112})
	Human resources (AC_{12})	– Qualified and competent personnel (AC_{121}) – Flexible and open to change employees (AC_{122})
	Network (AC_{13})	– Easily accessible needed resources (finances, specialists, technologies, etc.) (AC_{131}) – Effective supplier, distributor, and business partner network (AC_{132})
	Technology (AC_{14})	– Easily changeable technology and information system (AC_{141})
Capabilities (AC_2)	Awareness and competence (AC_{21})	– Ability to sense changes and identify new business opportunities (AC_{211}) – Ability to implement important changes in the organization (AC_{212})
	Reconfiguration (AC_{22})	– Ability to change organizational resources (employees, equipment, assets, etc.) (AC_{221})
	Learning (AC_{23})	– Ability to share knowledge and empower employees (AC_{231})
	Coordination (AC_{24})	– Ability to quickly develop and introduce new products/services to the market (AC_{241})
	Cooperation (AC_{25})	– Ability to outsource, expand and change business partner network (AC_{251})

Practices (AC_3)	Organizational (AC_{31})	– Constant search for new business and development opportunities (AC_{311}) – Constant analysis and adaptation to internal and external changes (AC_{312})
	Employee empowerment (AC_{32})	– Continuously increasing employee competence and qualifications (AC_{321}) – Constant sharing of knowledge and information within organization (AC_{322})
	Customer enrichment (AC_{33})	– Constant improvement of products/services based on customer needs (AC_{331})
	Cooperation (AC_{34})	– Constant improvement of business network and its support (AC_{341}) – Constant monitoring of business partner quality and effectiveness (AC_{342})

Source: author

2. *Determine the appropriate linguistic scale to assess the performance ratings and importance weights of the agility attributes.* Evaluation of importance and weight for a particular organizational agility attribute will be done by surveying experts – company directors. High-growth companies' directors are selected as a primary data source, due to their deep knowledge of their particular organization - its processes, structure, network, employees, market environment, industry competition and other factors. The questionnaire is used for this article to obtain information from experts – company directors. In order to collect research data a telephone survey was used. The questionnaire used consisted of statements that were structured to reflect the selected agility attributes (Table 1) from 3 dimensions – enablers, capabilities, and practices.

Company directors' responses were used in assigning importance weight and performance rating for each agility attribute. However, it is impractical to determine the concrete value ("crisp number") of importance on one or another vague agility attribute. For example, assigning a specific value to 'employee empowerment' or 'flat organizational structure'. Therefore, authors of this article use 7-point Likert scale applying triangular fuzzy numbers for evaluating performance ratings of agility attributes: excellent (E), very good (VG), good (G), fair (F), poor (P), very poor (VP), worst (W) (Table 2). Importance weights of the agile attributes, they are evaluated using 7-point Likert scale applying triangular fuzzy numbers: very high (VH), high (H), fairly high (FH), medium (M), fairly low (FL), low (L), very low (VL) (Table 3).

3. *Measure the performance and importance of agility attributes using linguistic terms.* After the linguistic variables for evaluating performance rating and importance weights of agility attributes are defined (step 1), the experts use linguistic terms (step 2) to determine the ratings of the performance of various agility attributes. In addition, experts evaluate the importance weight of each agility attribute as it applies to their particular company and industry specifics. Fuzzy numbers are used to evaluate importance weights and performance rating of agility attributes.

Table 2 *Linguistic variable for performance rating of the agility attributes*

Linguistic variable	Code	Fuzzy number ($\widetilde{A}$)		
Worst	W	0,0	0,5	1,5
Very Poor	VP	1,0	2,0	3,0
Poor	P	2,0	3,5	5,0
Fair	F	3,0	5,0	7,0
Good	G	5,0	6,5	8,0
Very Good	VG	7,0	8,0	9,0
Excellent	E	8,5	9,5	10,0
No Opinion	NO	-	-	-

Source: adapted from Lin et al. (2006)

Table 3 *Linguistic variable for importance weights of the agility attributes*

Linguistic variable	Code	Fuzzy number ($\widetilde{A}$)		
Very Low	VL	0,00	0,05	0,15
Low	L	0,10	0,20	0,30
Fairly Low	FL	0,20	0,35	0,50
Medium	M	0,30	0,50	0,70
Fairly High	FH	0,50	0,65	0,80
High	H	0,70	0,80	0,90
Very High	VH	0,85	0,95	1,00
Do not Know	DN	-	-	-

Source: adapted from Lin et al. (2006)

4. *Approximate the linguistic terms by fuzzy numbers.* Applying approximate reasoning of fuzzy sets theory by the linguistic value can be approximated by a fuzzy number [20]. The approximation will be specific for the context of this article – high-growth companies. For example, linguistic variable for Worst (W) performance rating can have a fuzzy number of (0, 0.5, 1.5), where 0 and 1.5 are lower and upper bounds of the available area for the evaluation data. Applying the relation between linguistic terms and fuzzy numbers, linguistic terms are transferred into fuzzy numbers.

5. *Aggregate fuzzy ratings with fuzzy weights to obtain a Fuzzy Agility Index (FAI) of an enterprise.* Fuzzy Agility Index fuses information by combining fuzzy ratings and fuzzy weights of all the attributes that influence organizational

agility level. Organizational agility level increases with increasing FAI; therefore, it represents overall agility of an organization. The Fuzzy Agility Index (FAI) of organization can be calculated using the Equation 1.

(1)

$$FAI = \frac{\sum_{k=1}^{n}(W_{ij} \times R_{ij})}{\sum_{k=1}^{n} W_{ij}}$$

where:

FAI – organization's Fuzzy Agility Index;
Wij - fuzzy importance weight of the agile attribute *ij*;
Rij - performance rating of the agile attribute *ij*.

6. *Match the FAI with an appropriate level.* Once FAI is established it can be matched with the linguistic label. Euclidean distance method is a most widely used method for matching the membership function with linguistic terms [21]. It is used in fuzzy numbers logic method for more accurate evaluation of agility level. It helps to attribute Fuzzy Agility Index (FAI) to Agility Level more precisely, in other words - to which Agility Level FAI is closer. The natural language expression set for Agility Level (AL) with fuzzy values are presented in Table 4.

Table 4 *Agility Levels*

Agility Level (AL)	Code	Fuzzy number ($\widetilde{A}$)		
Slow	S	0	1.5	3.0
Fair	F	1.5	3.0	4.5
Agile	A	3.5	5.0	6.5
Very Agile	VA	5.5	7.0	8.5
Extremely Agile	EA	7.0	8.5	10

Source: adapted from Lin et al. (2006)

Then by using Euclidean distance method, the Euclidean distance (d) from the Fuzzy Agility Index (FAI) to each Agility Level (AL) is calculated using the following Euclidean Distance Formula 2.

(2)

$$d(FAI, AL_i) = \left\{ \sum_{x \in p} \left[\int FAI(X) - \int AL_i\,(X) \right]^2 \right\}^{\frac{1}{2}}$$

where:

d – Euclidean distance

FAI – fuzzy agility index

AL – agility level

EMPIRICAL MEASUREMENT OF ORGANIZATIONAL AGILITY LEVEL

Hypotheses are tested after the agility level for the surveyed organizations is determined. Based on theoretical organizational agility aspects analysis, it was observed, that the fast-growing organizations need to adapt to the changing environment, thus they have to be agile. Based on scientific literature analysis the following hypothesis is formed: H_1: "Majority of high-growth companies' agility level is 'very agile' ".

To test the hypothesis (H_1), cluster analysis is applied. Cluster analysis means the grouping of data in order to incorporate homogeneous data into a group (cluster). Cluster analysis is applied in order to classify available data into several groups so that the elements of each group demonstrate similar characteristics. The article uses cluster analysis in order to enable dividing the companies under consideration into groups according to their agility level. To perform cluster analysis, several methods are used: Euclidean distance and K-means method.

An empirical study into organizational agility was conducted during September 2016. The list of high-growth Lithuanian companies was obtained from "Gazele 2015" project implemented by the business daily newspaper "Verslo Žinios" analytics department [22]. 3576 companies were selected from "Gazele 2015" list for telephone survey based on the following criteria:

a) Business operations started no later than 2011 January 1st;
b) Any ownership structure;
c) Revenue for first accountable year (2011) was between 300,000 and 1,000,000 EUR;
d) Last accountable year (2014) was profitable;
e) Revenue grew more than 20% (2014 compared to 2011);
f) Transparency and openness, which is represented by the consent to publicize their financial results and absence of tax-related liabilities.
g) The company has been in the same industry for the accountable period (2011-2014)
h) The company provided valid contact information and the name of director

Upon selection of the companies, telephone interviews with their management (directors) were held. In all, directors of 1,227 companies were contacted. 252 of them agreed to participate in the survey. The same questions were presented to all of them and the responses were recorded. 239 questionnaires were used for data processing. Thirteen of them had to be rejected because they were not completed in full. It has been established, by means of the *N* formula, that the sample size is 245 when the margin of error is 5% and the confidence level is 90%. Thus, it can

be concluded that the results of the survey are representative and reflect the entire target population.

Before testing the Hypothesis, the organizational agility level for each company needs to be calculated using Fuzzy agility index methodology. For demonstration purposes, evaluation of organizational agility level will be presented only for one studied company (Company 1). While the calculation of agility level in rest of 238 studied companies will be performed using the same methodology. After collecting responses via telephone survey using linguistic terms, performance ratings and importance weights of agility attributes for Company 1 are listed in Table 5.

Table 5 *Agility attribute ratings and weights (in linguistic terms) for Company 1*

Agility attribute	Importance Weight (W_{ij})	Performance rating (R_{ij})
AC_{111}	FH	G
AC_{112}	L	VP
AC_{121}	H	G
AC_{122}	L	G
AC_{131}	H	G
AC_{132}	L	P
AC_{141}	FL	F
AC_{211}	FL	P
AC_{212}	L	P
AC_{221}	FL	P
AC_{231}	FH	G
AC_{241}	FL	G
AC_{251}	FL	F
AC_{311}	FL	G
AC_{312}	M	G
AC_{321}	FH	G
AC_{322}	FH	G
AC_{331}	FL	P
AC_{341}	L	P
AC_{342}	FH	G

Source: author

In next step, agility attribute performance ratings and importance weights in linguistic terms are approximated using values in Table 2 and Table 3 to fuzzy numbers ($\widetilde{A}$) and presented in Table 6.

Table 6 *Agility attribute ratings and weights (in fuzzy numbers) for Company 1.*

Agility attribute	Importance Weight (W_{ij})	Performance rating (R_{ij})
AC_{111}	(0.5, 0.65, 0.8)	(5.0, 6.5, 8.0)
AC_{112}	(0.1, 0.2, 0.3)	(1.0, 2.0, 3.0)
AC_{121}	(0.7, 0.8, 0.9)	(5.0, 6.5, 8.0)
AC_{122}	(0.1, 0.2, 0.3)	(5.0, 6.5, 8.0)
AC_{131}	(0.7, 0.8, 0.9)	(5.0, 6.5, 8.0)
AC_{132}	(0.1, 0.2, 0.3)	(2.0, 3.5, 5.0)
AC_{141}	(0.2, 0.35, 0.5)	(3.0, 5.0, 7.0)
AC_{211}	(0.2, 0.35, 0.5)	(2.0, 3.5, 5.0)
AC_{212}	(0.1, 0.2, 0.3)	(2.0, 3.5, 5.0)
AC_{221}	(0.2, 0.35, 0.5)	(2.0, 3.5, 5.0)
AC_{231}	(0.5, 0.65, 0.8)	(5.0, 6.5, 8.0)
AC_{241}	(0.2, 0.35, 0.5)	(5.0, 6.5, 8.0)
AC_{251}	(0.2, 0.35, 0.5)	(3.0, 5.0, 7.0)
AC_{311}	(0.2, 0.35, 0.5)	(5.0, 6.5, 8.0)
AC_{312}	(0.3, 0.5, 0.7)	(5.0, 6.5, 8.0)
AC_{321}	(0.5, 0.65, 0.8)	(5.0, 6.5, 8.0)
AC_{322}	(0.5, 0.65, 0.8)	(5.0, 6.5, 8.0)
AC_{331}	(0.2, 0.35, 0.5)	(2.0, 3.5, 5.0)
AC_{341}	(0.1, 0.2, 0.3)	(2.0, 3.5, 5.0)
AC_{342}	(0.5, 0.65, 0.8)	(5.0, 6.5, 8.0)

Source: author

In next step, Fuzzy Agility Index (FAI) for Company 1 is calculated using equation (1).

$$FAI_{Company\ 1} = (4.36, 5.72, 7.16)$$

Fuzzy Agility Index for Company 1 is (4.36, 5.72, 7.16). Similar FAI calculations are done for all remaining 238 respondents. Next, using Euclidean

Distance Formula (2), the Fuzzy Agility Index for Company 1 is matched with Agility Level (Table 4).

$$d(FAI, S) = \sqrt{(4.36 - 0)^2 + (5.72 - 1.5)^2 + (7.16 - 3.0)^2} = 7.35$$

$$d(FAI, F) = \sqrt{(4.36 - 1.5)^2 + (5.72 - 3.0)^2 + (7.16 - 4.5)^2} = 4.76$$

$$d(FAI, A) = \sqrt{(4.36 - 3.5)^2 + (5.72 - 5.0)^2 + (7.16 - 6.5)^2} = \mathbf{1.30}$$

$$d(FAI, VA) = \sqrt{(4.36 - 5.5)^2 + (5.72 - 7.0)^2 + (7.16 - 8.5)^2} = 2.18$$

$$d(FAI, EA) = \sqrt{(4.36 - 7.0)^2 + (5.72 - 8.5)^2 + (7.16 - 10)^2} = 4.78$$

Preceding calculations of Euclidean distance for various Agility levels show, that Company's 1 Fuzzy Agility Index (FAI) is closest to Agility Level – 'Agile (A)'. This is represented by the lowest Euclidean distance value of *1.30*. This indicates that Company 1 is Agile. Using similar method, Agility Levels for the remaining 238 surveyed companies are evaluated.

Upon selection of companies for the study, distribution by types of industry, and calculating agility level for each company, the hypotheses can be tested. To test the first hypothesis (H_1) 'Majority of high-growth companies' agility level is 'very agile'", the companies were divided into clusters based on the degree of agility. Two methods were used for this purpose: Euclidean distance method and K-means method. Clustering procedure results using Euclidean distance method are presented in Table 7.

Table 7 *Cluster analysis using Euclidean distance method*

Industry		Agility Level					
		A		VA		EA	
		count	%	count	%	count	%
	Construction	10	21.7	29	19.7	2	8.7
	Manufacturing	8	17.4	25	17.0	2	8.7
	Transportation and storage	6	13.0	31	21.1	4	17.4
	Wholesale and retail; repair of motor vehicles	22	47.8	62	42.2	15	65.2

Source: author‘s calculations

As indicated in Table 7, companies are divided into three clusters: agile (A), very agile (VA), and extremely agile (EA). In order to verify the statistical significance of the clustering procedure, a chi-square test was carried out; its results are provided in Table 8 below.

Table 8 *Pearson Chi-Square Tests for Euclidean distance method*

		Agility
Industry	Chi-square	5.991
	df	6
	Sig.	0.424[a]

a. More than 20% of cells in this subtable have expected cell counts less than 5. Chi-square results may be invalid.

Source: author‘s calculations

As evident from *Table 8*, $p > 0,05$ (Sig. > 0,05). This means that the chi-square test criterion cannot be applied in the verification of statistical significance as the results may be erroneous. To ensure a more accurate cluster analysis, one more method – the k-means method is used, as already mentioned in the methodological part of the thesis. Results obtained by means of this method are presented in Table 9.

Table 9 *Cluster analysis using K-means method*

Industry	Agility					
	A		VA		EA	
	Count	%	Count	%	Count	%
Construction	11	19.0	28	22.6	2	5.9
Manufacturing	10	17.2	23	18.5	2	5.9
Transportation and storage	7	12.1	27	21.8	7	20.6
Wholesale and retail; repair of motor vehicles	30	51.7	46	37.1	23	67.6

Source: author's calculations

As can be seen from Table 9, in the case of the k-means method, just as the Euclidean distance method, the companies of the industries are grouped in three clusters: agile (A), very agile (VA) and extremely agile (EA). The Pearson chi-square test is used to verify the results (see Table 10).

Table 10 *Pearson Chi-Square Tests for K-means method*

		Agility
Industry	Chi-square	14.664
	df	6
	Sig.	0.023[a]

Results are based on nonempty rows and columns in each innermost subtable.
a. The Chi-square statistic is significant at the 0.05 level.
Source: author's calculations

Table 10 shows that $p < 0.05$ (Sig. < 0.05), which leads to a conclusion that the chi-square test is statistically significant and can be used for the verification of the clustering results. In this case the chi-square (χ^2) is equal to 14.664 when the degrees of freedom are equal to 6. The limit value of the chi-square (χ^2_{tbl}) is 12.59, when $\alpha = 0.05$. Hence $\chi^2 > \chi^2_{tbl}$, therefore, it may be concluded that the results of clustering are significant. Summarized results obtained through the clustering procedure are presented in Table 11.

Table 11 *Summarized clusterization results*

	Agility level				
Method	Slow	Fair	Agile	Very agile	Extremely agile
Euclidean distance	0	0	46	147	23
K-Means	0	0	58	124	34

Source: author‘s calculations

An analysis of the data in Table 11 shows that in each industry under consideration, the majority of companies fall within the second cluster (very agile). This can be explained that high-growth companies during their last period of growth (2011-2014) have seen major changes in the external environment. In order to take advantage of this growth opportunity, they had to adapt and change internally. The fact that they were successful in adapting to this change and grew considerably (on average 165%), shows that their internal organization was agile. Also, it should be taken into consideration, that successful company directors tend to evaluate their organization and its ability to adapt more favourably, compared to less successful counterparts. This can explain the lack of ‘Slow’ and ‘Fair’ agility levels in surveyed organizations of four industries. On the other hand, the number of ‘Extremely agile’ agility level cluster companies have the smallest number of companies. This indicates that even successful companies can improve agility level. This has considerable indications for the importance of organizational agility research for practical purposes. If successful, high growth and profitable companies have a place to improve their agility level, then less successful and struggling counterparts should need more serious improvements. This opens directions for further research in the area of organizational agility and its practical improvement. Therefore, regardless of the method used, all the examined companies are agile, very agile or extremely agile. It can be concluded, on the basis of the study results, that the first hypothesis (H_1) ‘Majority of high-growth companies’ agility level is ‘very agile’’ has been confirmed.

CONCLUSIONS

Different methodologies used for evaluation of organizational agility level has been analyzed in this article. Organizational agility level measurement methodology is presented. It is suitable for a wide range of industries and combines organizational agility drivers, enablers, capabilities and practices into one model. Model of organizational agility evaluation could be beneficial for practitioners when analyzing their organizational agility level, internal factors, and attributes. Future research can be focused on external factors that affect organizational agility on the industry, regional level or market as a whole.

The testing of the organizational agility measurement methodology is based on an empirical survey of directors in high-growth Lithuanian companies. The survey was conducted through telephone interviews. The number of methods were used when analyzing collected responses. The responses were expressed in quantitative terms using triangular fuzzy numbers. Triangular fuzzy numbers method had been selected in order to reduce the inaccuracy and uncertainty of the responses. Fuzzy Agility Index was used to measure agility level for each surveyed company. Cluster analysis was applied in order to group the companies under consideration into clusters and continue the analysis for each cluster individually.

On completion of the analysis, it has been established that all fast-growing companies in Lithuania consider themselves to be agile, very agile or extremely agile. Majority of them being 'very agile'. This can be explained by the success of the surveyed companies. The context of the study was high-growth companies. Gazele 2015 is the list of most successful companies in Lithuania in terms of revenue growth. On average, respondent companies grew 165% and all were profitable. Organizational agility is part of this success and experts (company directors) have evaluated their organizations' agility attributes accordingly. It was concluded that the first hypothesis (H_1) 'Majority of high-growth companies' agility level is 'very agile'' has been confirmed.

REFERENCES

[1] Hasan M. A., Sarkis J., and Shankar R., "Agility and production flow layouts: An analytical decision analysis," *Computers and Industrial Engineering*, vol. 62, no. 4, pp. 898–907, 2012.

[2] Cegarra-Navarro J. G., Soto-Acosta P., and Wensley A., "Structured knowledge processes and firm performance: The role of organizational agility," *Journal of Business Research*, vol. 69, no. 5, pp. 1544–1549, May 2016.

[3] Mehdibeigi N., Dehghani M., and Yaghoubi N. M., "Customer Knowledge Management and Organization's Effectiveness: Explaining the Mediator Role of Organizational Agility," *Procedia - Social and Behavioral Sciences*, vol. 230, pp. 94–103, 2016.

[4] Samdantsoodol A., Cang, H. Yu S., Eardley A., and Buyantsogt A., "Predicting the relationships between virtual enterprises and agility in supply chains," *Expert Systems with Applications*, vol. 84, pp. 58–73, 2017.

[5] Ganguly A., Nilchiani R., and Farr J. V., "Evaluating agility in corporate enterprises," *International Journal of Production Economics*, vol. 118, no. 2, pp. 410–423, Apr. 2009.

[6] Yauch C., "Measuring agility as a performance outcome," *Journal of Manufacturing Technology Management*, vol. 22, no. 3, pp. 384–404, 2011.

[7] Yusuf Y. Y., Sarhadi M., and Gunasekaran A., "Agile manufacturing: the drivers, concepts and attributes," *International Journal of Production Economics*, vol. 62, no. 1, pp. 33–43, 1999.

[8] Ren J., Yusuf Y. Y., and Burns N. D., "A decision-support framework for agile enterprise partnering," *International Journal of Advanced Manufacturing Technology*, vol. 41, no. 1–2, pp. 180–192, 2009.

[9] Sharifi H. and Zhang Z., "Agile manufacturing in practice - Application of a methodology," *International Journal of Operations & Production Management*, vol. 21, no. 5/6, pp. 772–794, 2001.

[10] Hoek R. I., "Rediscovery of postponement a literature review and directions for research," *Journal of Operations Management*, vol. 19, no. 2, pp. 161–184, 2001.

[11] Breu K., Hemingway C. J., Strathern M., and Bridger D., "Workforce agility: The new employee strategy for the knowledge economy," *Journal of Information Technology*, vol. 17, no. 1. pp. 21–31, 2002.

[12] Shafer R. A., "Creating organizational agility: The human resource dimension.," *Dissertation Abstracts International Section A: Humanities and Social Sciences*, vol. 57, no. 12–A. p. 5317, 1997.

[13] Kassim N. M. and Zain M., "Assessing the Measurement of Organizational Agility," *Journal of American Academy of Business, Cambridge*, vol. 4, no. 1/2, pp. 174–177, 2004.

[14] Goldman S. L., Nagel R. N., and Preiss K., Agile Competitors and Virtual Organizations: Strategies for Enriching the Customer, vol. 29. 1995.

[15] Sherehiy B., Karwowski W., and Layer J. K., "A review of enterprise agility: Concepts, frameworks, and attributes," *International Journal of Industrial Ergonomics*, vol. 37, no. 5, pp. 445–460, May 2007.

[16] Tsourveloudis N. C. and Valavanis K. P., "On the measurement of enterprise agility," *Journal of Intelligent and Robotic Systems: Theory and Applications*, vol. 33, no. 3, pp. 329–342, 2002.

[17] Charbonnier-Voirin A., "The development and partial testing of the psychometric properties of a measurement scale of organizational agility.," *M@ n@ gement*, vol. 14, no. 2, pp. 119–156, 2011.

[18] Shaarabh M., "A Review on Measurement of Agility," *Industrial Engineering & Management*, vol. 3, no. 1, pp. 1–4, 2014.

[19] Lin C.-T. T., Chiu H., and Tseng Y.-H., *Agility evaluation using fuzzy logic*, vol. 101, no. 2. 2006, pp. 353–368.

[20] Klir G. J. and Yuan B., Fuzzy Sets and Fuzzy Logic: Theory and Applications. 1995.

[21] Vinodh S. and Devadasan S. R., "Twenty criteria based agility assessment using fuzzy logic approach," *International Journal of Advanced Manufacturing Technology*, vol. 54, no. 9–12, pp. 1219–1231, 2011.

[22] Verslo Žinios, "Gazele 2015." Verslo Žinios Analizės Skyrius, 2016.