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DOCTORAL DISSERTATION

**ORGANIZATIONAL
AGILITY IN HIGH GROWTH
COMPANIES**

SOCIAL SCIENCES,
MANAGEMENT 03S
VILNIUS, 2018

MYKOLAS ROMERIS UNIVERSITY

Mindaugas Deksnys

ORGANIZATIONAL AGILITY IN HIGH
GROWTH COMPANIES

Doctoral Dissertation
Social Sciences, Management (03 S)

Vilnius, 2018

This doctoral dissertation was prepared at Mykolas Romeris University during 2013-2018 under the right to organize doctoral studies granted to Vytautas Magnus University together with Klaipėda University, Aleksandras Stulginskis University, Mykolas Romeris University and Šiauliai University by the order of the Minister of Education and Science of the Republic of Lithuania No. V-1019 dated on June 8, 2011.

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ISBN 978-9955-19-924-3 (online)

ISBN 978-9955-19-925-0 (print)

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MYKOLO ROMERIO UNIVERSITETAS

Mindaugas Deksnys

ORGANIZACIJOS JUDRUMAS SPARČIAI
AUGANČIOSE ĮMONĖSE

Daktaro disertacija
Socialiniai mokslai, vadyba (03 S)

Vilnius, 2018

Mokslo daktaro disertacija rengta 2013–2018 metais Mykolo Romerio universitete pagal Vytauto Didžiojo universitetui su Klaipėdos universitetu, Aleksandro Stulginskio universitetu, Mykolo Romerio universitetu ir Šiaulių universitetu Lietuvos Respublikos švietimo ir mokslo ministro 2011 m. birželio 8 d. įsakymu Nr. V-1019 suteiktą doktorantūros teisę.

Mokslinė vadovė:

Prof. Dr. Rima Žitkienė (Mykolo Romerio Universitetas, socialiniai mokslai, vadyba, 03S)

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LIST OF ABBREVIATIONS AND TERMINOLOGY

Abbreviation or Acronym	Full title and Term	Description
	Agility capabilities	the abilities of a company needed to effectively respond to the environmental changes
	Agility drivers	represent the environmental changes and external forces that push business to adapt in order to compete
	Agility enablers	the resources that help organizations to adapt and be agile.
AL	Agility Level	Measurement magnitude for organizational agility
	Agility practices	the actions and activities agile organizations perform before or during change periods
ANOVA	Analysis of Variance	Collection of statistical models used to analyze the differences among group means
BTS	Bartlett's Test of Sphericity	Statistical method
CEO	Chief Executive Officer	Position of the most senior corporate officer, executive
EBSCO	EBSCO Information Services	Academic publishing database
EFA	Exploratory Factor Analysis	Statistical method used to uncover the underlying structure of a relatively large set of variables
	Flexibility	the combination of enablers or capabilities to adapt to internal or external changes
FAE	Fuzzy Agility Evaluation	Framework to measure organizational agility level
FAI	Fuzzy Agility Index	Magnitude to express agility level in organization
HR	Human Resources	Functional unit in organization
HRM	Human Resource Management	Management functional area
HSD	Honest Significant Difference	single-step multiple comparison procedure and statistical test. Also known as Tukey's test
IT	Information technology	Functional unit in organization
JIT	Just In Time	A business inventory strategy
JSTOR	short for Journal Storage	Digital library of academic journals, books, and primary sources
KMO	Kaiser-Meyer-Olkin Measure	Statistical measure to test Factor Analysis suitability

Abbreviation or Acronym	Full title and Term	Description
	Agility capabilities	the abilities of a company needed to effectively respond to the environmental changes
	Agility drivers	represent the environmental changes and external forces that push business to adapt in order to compete
	Agility enablers	the resources that help organizations to adapt and be agile.
NACE Rev. 2	Nomenclature statistique des activités économiques dans la Communauté européenne	Statistical classification of economic activities in the European Community (new revised version)
OECD	Economic Co-operation and Development	Intergovernmental economic organization with 35-member countries
	Organizational agility	is an organizational ability to recognize unexpected changes in the environment and appropriately respond in a swift and efficient manner, by utilizing and reconfiguring internal resources, thus gaining competitive advantage in the process
PCA	Principal Components Analysis	Statistical technique used to emphasize variation and bring out strong patterns in a dataset
SPSS	Statistical Package for the Social Sciences	Software package for statistical analysis
TQM	Total Quality Management	Management approach to long-term success through customer satisfaction

INTRODUCTION

Relevance of the topic. Organizations are constantly facing change. Globalization, fast technological advances, competition, disruptive business models, emerging new markets, constantly evolving consumer preferences – are daily challenges for most big and small organizations. Combined with more traditional risks of business and economy lifecycles, these everchanging challenges force organizations to become more efficient and agile in order to survive. Organizational agility is increasingly growing in significance as one of the main tools for gaining and maintaining a competitive advantage in the fast-changing market environment. Agility is becoming one of the key organizational characteristics that business practitioners seek in order to stay adaptive and competitive in turbulent environments.

Due to increasing popularity of e-commerce, even small-size businesses are able to compete on a global scale. These developments further increase the need for organizational agility in order to adapt and compete outside home markets. To take advantage of emerged global opportunities, companies have to have efficient and agile business processes, flexible organizational structure, open-to-change workforce, agile networks and partners, and easily adaptable technology.

Consumer habits and needs constantly change as well. The current age of information abundance and speed provides new levels of choice for the customers. Customers are becoming more knowledgeable. Product and service reviews, user ratings are available instantly for the judgment and choice by consumers. Ability to select the best service provider or business partner at moment's notice gives new meaning for a competitive marketplace. In order to stay competitive companies should not only provide great product or service but also be ready to change and customize them to accommodate the ever-changing customer tastes and expectations. Agility allows organizations to adapt to the changing market situation, customer expectations and plays a major role in organizational survival in the consumer-driven environment.

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. These are the areas this dissertation aims to research.

Organizational agility is especially important in the context of high-growth 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 - high-growth 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.

Measurement, identification, and evaluation of factors affecting organizational agility level in highly volatile environment remain important questions for researchers and practitioners. This dissertation is dedicated to answering some of them.

Level of topic examination. Organizational agility is a multidimensional and complex topic and is approached by many researchers from different perspectives. One camp of the researchers (Alberts & Hayes, 2003; Bottani, 2010; Cai, 2013; Charbonnier-Voirin, 2011; Dyer & Shafer, 1998; Eshlaghy, Mashayekhi, Rajabzadeh, & Razavian, 2010; Giachetti, Martinez, Sáenz, & Chen, 2003; Jackson & Johansson, 2003; C. T. Lin, Chiu, & Chu, 2006; Ren, Yusuf, & Burns, 2009; Sharifi & Zhang, 2001; Yusuf, Sarhadi, & Gunasekaran, 1999) study agility from the perspective of enablers and capabilities which help organizations to achieve agility. The second group of researchers (Charbonnier-Voirin, 2011; Gehani, 2010; Goldman, Nagel, & Preiss, 1995; Sherehiy, Karwowski, & Layer, 2007; Vázquez-Bustelo, Avella, & Fernández, 2007) identify main practices that agile organizations use in their daily operations. Third group of researchers (Dove, 2005; Dyer & Shafer, 2003; Holsapple & Li, 2008; Lu & Ramamurthy, 2011a; Nijssen & Paauwe, 2012; Sambamurthy, Bharadwaj, & Grover, 2003; J. Singh & Sharma, 2013; Wright & Snell, 1998) approaches agility from the perspective of how organizations interact with changing environment through sense-response dimension.

Most of the earlier research is concentrated only on specific industry of organizations, in particular – manufacturing sector, where researchers analyze what manufacturing organization can do to enhance their agility (Ganguly, Nilchiani, & Farr, 2009; Jackson & Johansson, 2003; S. L. Yang & Li, 2002; Yauch, 2011; Yusuf et al., 1999). Others evaluate agility in a narrow context of business process or area – e.g. supply chain agility (Ren et al., 2009; Sharifi & Zhang, 2001; R. I. Van Hoek, 2001), human resource agility (Breu, Hemingway, Strathern, & Bridger, 2002; Shafer, 1997), knowledge management and IT capabilities (Cai, 2013; Kassim & Zain, 2004; Lu & Ramamurthy, 2011b; Sarker & Sarker, 2009; D. Singh, Oberoi, & Ahuja, 2013), business processes (Arteta & Giachetti, 2004), strategic alignment (Tallon & Pinsonneault, 2011), market orientation (Grewal & Tansuhaj, 2001). Lin et al., (2010) focuses on agility properties in organization networks.

Recently, researchers have increased focus on IT, learning and innovations effect on agility level in an organization and its performance (Cegarra-Navarro, Soto-Acosta, & Wensley, 2016; Khoshlahn & Ardabili, 2016; Panda & Rath, 2016; Ravichandran, 2017, 2018). Few of the researchers analyze how organizational agility influences competitive advantage (Côrte-Real, Oliveira, & Ruivo, 2017; Mikalef & Pateli, 2017). Other analyses focus on individual factors and their influence on organizational agility. For example, Panda and Rath (2017), Mikalef and Pateli (2017), Felipe et al. (2016), Yeganegi and Azar (2012) study how information technology capabilities affect agility level in the organization. Their empirical research shows the direct positive correlation between IT capabilities and agility level in the organization, i.e. the better IT capabilities organization has, the more agile it is.

Another factor that is gaining researchers' attention is knowledge and human resource management and their effect on organizational agility. Scientists claim that there is a positive relationship between the effectiveness of human resource management actions and organizational agility level (Teimouri, Jenab, Moazeni, & Bakhtiari, 2017). Learning and knowledge sharing also has a positive effect on organizational agility level (M. A. Bahrami, Kiani, Montazeralfaraj, Zadeh, & Zadeh, 2016). In fact, in a modern fast-changing environment, constant learning and innovation are one of the most important factors ensuring successful organizational performance. Researchers also agree that innovative organizations are agiler compared to less innovative counterparts (Ravichandran, 2017). Without innovations organizations' growth opportunities are limited.

Organizational agility concept is also discussed in doctoral dissertations. For example, Kharabe (2013) in his dissertation analyzes the effects of enterprise systems on organizational agility level. The author argues that innovations are necessary for achieving a high level of organizational agility. Kharabe (2013) shows, that enterprise system agility has a positive influence on overall organizational agility level. In Smithwick (2016) doctoral dissertation factors influencing construction contractor' organizational agility are analyzed. Allwein (2017) dissertation presents agility theory, which is a result of organization's digital infrastructure. Organizational agility or high-growth companies context is not widely researched in Lithuanian author dissertations, however, important agility element of capabilities is analyzed by several authors in their dissertations. Mickevičienė (2010) in her dissertation presents methodology to evaluate organization's capability to compete using internal and external organizational factors. Organizational dynamic capabilities influence on supply chain was researched by Masteika (2015) in his dissertation, where author presents model to identify dynamic capabilities and their influence on particular stages of supply chain. Paliokaitė (2013) in her dissertation analyzes organizational ambidexterity as organizational capability and its effect on innovation. While dynamic capabilities and organizational inertia in changing environment is studied by Nedzinskas (2013) in his dissertation.

In summary, it can be stated that organizational agility topic receives plenty of attention from researchers. The scientific literature pays much attention to the effect of agility on the organization's performance and its competitive edge. Researchers also analyze individual factors that increase organizations' agility level. However, it has been noted that there is a lack of a systematic approach towards the agility of organization and lack of holistic models that could be applied to assess the organization's agility in different markets, industries and countries. Thus, the topic of organizational is relevant both in a theoretical and practical sense and requires further research.

Scientific problem: What internal factors influence organizational agility and how to measure the agility level in high-growth companies

Research object: Organizational agility.

Research aim: after identifying main factors affecting organizational agility level, propose theoretical organizational agility evaluation model and measure agility level in high-growth companies using presented methodology.

Research tasks: In order to achieve dissertation aim, the following tasks are set:

1. Systemize organizational agility theoretical concepts based on scientific literature analysis.
2. Identify organizational agility drivers, enablers, capabilities and practices.
3. Develop theoretical agility level evaluation model in high-growth organizations.
4. Analyze organizational agility level evaluation methods and propose a methodology for its measurement.
5. Using the proposed methodology, empirically verify the application of the model and evaluate agility level and affecting factors in Lithuanian high-growth companies.

Scientific research methods: Scientific literature analysis and synthesis, comparison, generalization, as well as inductive top-down theorizing methods, is used to analyze theoretical aspects of organizational agility, forming a theoretical model of agility of organizations, and identifying the factors determining the organization agility level. For formation of organization agility evaluation model, graphic modeling, questionnaire survey methods, and expert evaluation methods are used. Analysis of the empirical research results are based on descriptive statistics, fuzzy number logic, factor analysis and analysis of variance methods.

The scientific novelty of the study:

1. After analyzing and evaluating the concepts of agility offered by the researchers, the definition of organizational agility is presented. The proposed definition makes the concept of agility more holistic and applicable for wide range of organizations, regardless of the industry they operate in. Universal organizational agility definition allows researchers to approach organizational agility concept from unified direction and apply it to wide range of organizations.
2. Organizational agility theoretical model based on sense-response framework is presented. Author of the dissertation proposes holistic approach towards studying organizational agility and combines different elements of organizational agility (capabilities, enablers and practices), which previously have been studied separately, into more cohesive theoretical model. Organizational agility theoretical model opens a possibility to study, evaluate and compare organizational agility between organizations in different industries and countries.
3. The factors that determine organization's agility are identified and systematized in the dissertation. Both individual and factor groups are considered and presented. Organizational agility attributes, capabilities, enablers and practices are unified to be applicable to variety of organizations. This allows to apply same methodology and criteria when studying organizational agility and comparing results in different organizations.
4. Fuzzy logic methodology is applied in evaluating agility level in the company. This provides more accurate tool for researchers to measure agility level in wide range of organizations and compare data using unified approach.

5. Unified questionnaire is proposed to evaluate organizational agility in high-growth companies. It can be applied and benefit future studies of agility in organizations in other countries or different context.
6. The organizational agility level evaluation model is proposed and empirically tested in the context of high-growth companies. Fuzzy agility Index is calculated and three hypotheses tested and confirmed. This helps to identify key factors that drive and influence an organization to be agile.

The applied significance of the work:

1. In order to improve agility in the organization, practitioners (business owners, managers, leaders, etc.) need to be able to measure it. Agility measurement model presented in this dissertation, based on fuzzy logic, can be applied to evaluate agility in practitioner's organization.
2. Questionnaire presented and used in empirical assessment of organizational agility can be used for practical purposes when evaluating agility level in the company.
3. This dissertation identifies key internal factors, which help to improve organizational agility level. This, in turn, will help practitioners to efficiently focus agility level improvement efforts in their organizations.
4. Agility attribute analysis of high-growth companies performed in this dissertation will provide insights into practices, capabilities, and attributes that successful and agile organizations have.

Research limitations:

1. The organizational agility research in this dissertation was limited to the context of high-growth companies in Lithuania. The differences between countries can arise from differences in legislature, statistical representation of company results, classification under industries, availability of reliable data, or other country specific differences. To test the model applicability in other countries, the researcher needs to conduct a survey in the country under investigation.
2. Some organizations in specific industries may have unique attributes that are key to the organizational agility in their particular company. Model presented in this dissertation attempts to unify the agility level evaluation and uses generalized attributes that could fit majority of organization. However, for these niche sectors of economy not all attributes can be considered. Therefore, researchers or should identify the factors and attributes that may be unique in their organization and apply them when evaluating organizational agility level.
3. An ability of the organization is a complex concept, and therefore factors driving agility can change, due to changes in the economic and political situation in the country. For this reason, the model for agility level measurement proposed in the dissertation should be periodically reviewed and verified.

The structure of the dissertation

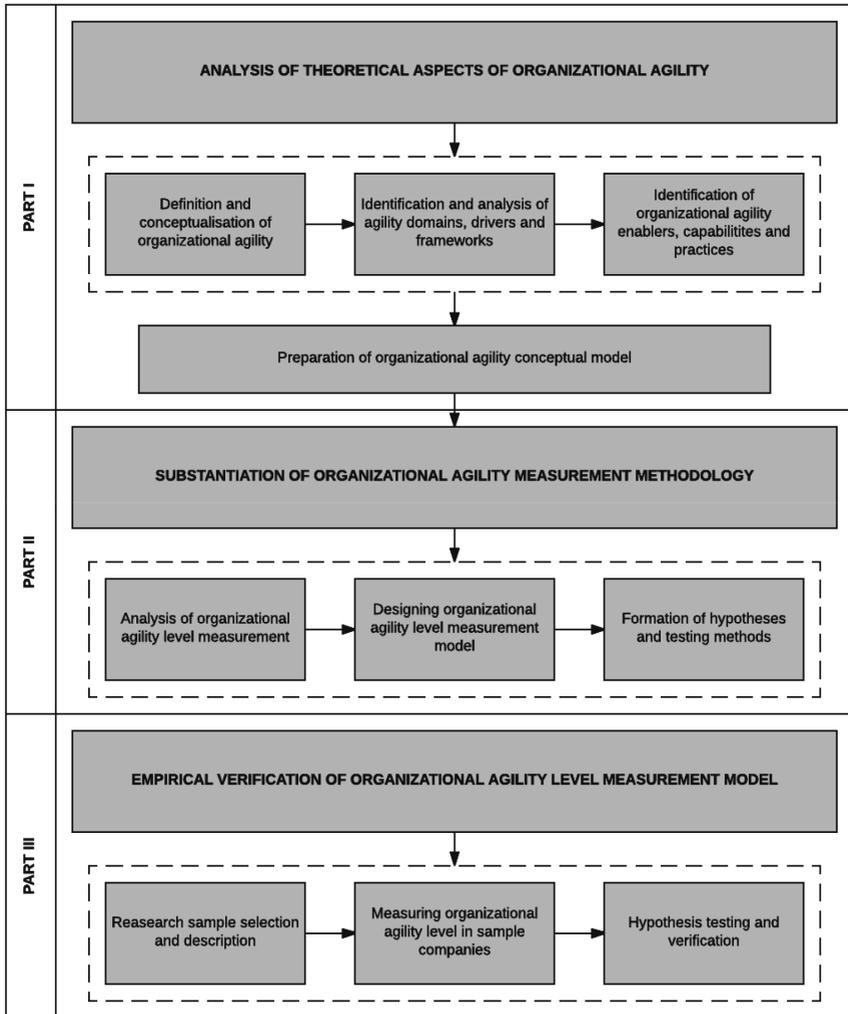


Figure 1. Logical structure of the dissertation
Source: author

In the first part of the dissertation theoretical aspects of organizational agility are analyzed. Organizational agility is defined and conceptualized. Organizational agility domains, drivers, typology are analyzed and discussed. Organizational agility frameworks are analyzed and agility enablers, capabilities, and practices are selected. Dissertation context of high-growth companies is discussed. Organizational agility theoretical model is presented at the end of section one.

In the second part of the dissertation, different methodologies for organizational agility level measurement are systematized and analyzed. Author of the dissertation selects and describes the method used for evaluating agility level in organizations. Hypotheses are formed and methods for testing these hypotheses are selected and described.

The third part of the dissertation is dedicated to the empirical assessment of the organizational agility in the context of high-growth companies. Author of the dissertation presents the selection process of the sample and describes the sample of selected companies from different perspectives. Organizational agility level is then measured in sample companies and results are presented. As the next step, hypotheses are tested, calculations and results are presented.

1. THEORETICAL ASPECTS OF ORGANIZATIONAL AGILITY

1.1. Terminology disambiguation: flexibility vs agility

Scientific literature review reveals the inconsistencies and ambiguities between flexibility and agility terms. They are often used interchangeably and it is not clear whether they are synonyms or they should be used as separate concepts. Lack of clarity restricts further development of both concepts and limits practical application (Bernardes & Hanna, 2009). Before the attempt to find a unified agility definition, clarification of the differences between organizational agility and organizational flexibility is needed.

The complication in finding unified organization agility definition comes from the multidimensionality of the subject. Organizational agility term was used rather loosely over time and refer to the capabilities of an organization to adjust to changes (H. Bahrami, 1992). Organizational agility also called enterprise agility has main interrelated terms: “organizational flexibility” and “strategic flexibility”. All above terms are often used trying to describe the same phenomena. Although these terms have similar use and many practitioners use them interchangeably, they differ in their constructs. To avoid further complication the disambiguation of the several terms is needed.

Flexibility, in general, describes the combination of enablers or capabilities to adapt to internal or external changes. The concept of flexibility in an organizational dimension refers to firm's ability to change the course of action, adapt to changes in the environment. Wide nature of the flexibility term implies its many uses in different contexts. Flexibility covers both offensive and defensive attributes (H. Bahrami, 1992). Offensive being able to proactively see opportunities in the market and take advantage of them, by utilizing different firm's capabilities. It also can be used defensively, when adjusting to shrinking markets, absorbing shocks or withstanding new negative changes.

Huang & Nof (1999) illustrate the difference between agility and flexibility through the use of two systems: service unit – single type system, and organization – more complex system which includes several service units. A service unit can be flexible or less flexible and make up larger organizational or multiple systems. They conclude that flexibility can only be defined in a single system and agility is identical with flexibility in such configuration. However, the major difference between agility and flexibility appear in larger organizations, comprised of several service units. Multiple service units can have low flexibility but combined they are agile. The distinction of agility as a term at an organizational level compared to flexibility as a term for lower level is continued by Baker (2006). He argues that agility term places greater focus on strategic levels, while flexibility is more commonly associated with the operational level. Agility covers both range and response dimensions, while flexibility can be one or another.

The notion of agility and flexibility applying to different organizational levels is continued by Tsourveloudis & Valavanis (2002), where flexibility refers to product range using particular production strategies, while agility is about quick movement and change of the whole organization to a certain direction. In a manufacturing context, which can be applied to enterprise level, flexibility refers to the capabilities to change production

from one task to another, or from one situation to another, when those situations are planned ahead of time. For example, flexible organization can anticipate change in demand due to seasonality of the products and plan for increase in production capacity. Agile organization, on the other hand, applies to a wider context than flexibility and refers to overall organizational ability to adapt to *unplanned* and often *fast* changes in market environment.

Wadhwa (2003) argues that the main difference between agility and flexibility is the character of the situations that need to be changed and adapted to. Flexibility refers to responses to the anticipated events when the procedures are already in place to manage the change. According to Bernardes & Hanna (2009), flexibility has *ex-ante* relation with change, where the organization is prepared, anticipates the changes and has capabilities to do things differently when the need arises. Thus, flexibility is a capability to change status within a limited scope, utilizing existing and pre-established organizational resources. Agility, on the other hand, refers to unplanned changes and organizational ability to respond fast to these changes in a fundamental scope. Flexibility allows the organization to absorb environmental changes in predefined parameters, while agility is supported by flexibility and helps the organization to reorganize fast without knowing the end result. Flexibility is an inherent system property, while agility is an approach and ability to organize the system or organization (Bernardes & Hanna, 2009).

Other differences between flexibility and agility are represented in the former lacking speed and having slow response time, changing continuously instead of one-time change, missing knowledge and learning, concentrating on specific processes and parts of the company instead of whole organization (Conboy, 2009; Wendler, 2013). For the purposes of this dissertation organizational agility concept opens wider scope of dimensions compared to flexibility. Flexibility term does not include the dimension of response speed and timeliness. Speed dimension is particularly important in fast-changing environments that affect internal changes, which is especially important in high-growth company context.

Strategic flexibility definition is used interchangeably with organizational flexibility and organizational agility, although they have distinctions. Strategic flexibility refers to firm's ability to respond to changing environmental conditions (Hitt, Keats, & DeMarie, 1998). According to Overby et al., (2005), Strategic flexibility refers to strategic issues, which helps firms to achieve competitive advantage and are separate from operational and tactical issues. Organizational agility, on the other hand, applies to both strategic and operational level. Organizational agility is a much broader concept compared to strategic flexibility and helps organizations to adapt to environmental changes by changing strategy *and* reorganizing internal operational issues and resources as well as larger business network.

In the context of management theory, flexibility and agility can be explained through the organizational change Theory O and Theory E. Theory E approach is focused on economic value creation and employs structured approach to change, using formal structure and systems. It is planned and driven from top management to the rest of organization. On the other hand, Theory O approaches organizational change from the perspec-

tive of human capabilities to implement strategy and learn from experience. Change is dealt with in a participative manner (Beer & Nohira, 2000). Flexibility is closer to the Theory E approach, where change is anticipated and planned and driven through top-down structured direction. While agile organization has features of Theory O approach and depends on the constant preparedness of the organization to adapt to unplanned changes.

Table 1. *Difference between agility and flexibility.*

	Agility	Flexibility
Scope	Organization-wide	Process and function specific
Situation characteristics	Unpredictable	Anticipated
Response rate (speed)	Fast	Sequential
Outcome	Unknown	Pre-established
Type of change	One-time	Continuous

Source: author

In summary, the difference between agility and flexibility can be seen in five dimensions - scope (specific process or enterprise-wide), event characteristics (planned vs unplanned), speed (fast or sequential), outcome (unknown and pre-defined), type of change (continuous vs one-time) (Table 1). Agility refers to a much broader context – whole organization, while flexibility more often describes separate processes or functions within the organization. Regarding the event characteristics, agility term is used in the context of fast unpredicted changes in the competitive environment, changes in consumer tastes; while flexibility term applies to planned or at least anticipated events. Characteristics of events lead to the approach towards them. For unpredicted events – fast or agile response is needed, while for anticipated events the organizational processes are needed to be prepared to be flexible, when an event occurs, in order to adapt and seize the opportunity.

1.2. Concept of Agility

While organizational flexibility has been studied for the last few decades and many attempts have been made to define agility in the business organizations. However, most definitions focused on separate functional areas of the businesses. Only recently organizational agility - as entire enterprise phenomena, gained more interest from researchers (Wendler, 2013). In order to process the vast body of research which covers multiple uses of terms, and to provide a disambiguation of the organizational agility term, author of this dissertation uses inductive top-down theorizing method introduced (Figure 2) by Shepherd & Sutcliffe, (2011). This method helps to understand and resolve the paradoxes that are present in the scientific management literature in relationship to organizational flexibility and trace the meaning and conceptualization of the term.

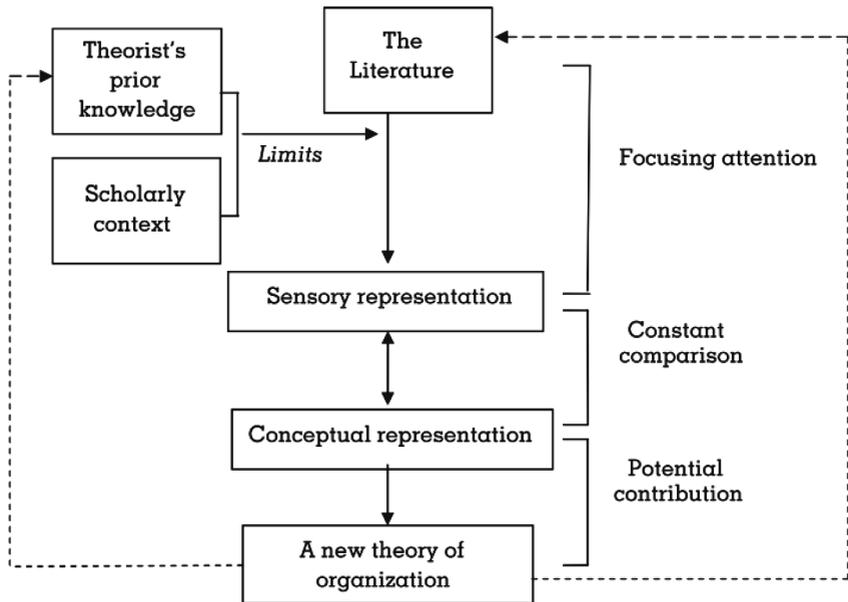


Figure 2. Model of Inductive Top-Down Theorizing
 Source: Shepherd and Sutcliffe (2011)

According to Shepherd & Sutcliffe, (2011), inductive top-down theorizing method is especially appropriate when the body of previous research is vast, dynamic, complex, and/or from disparate sources. Inductive top-down theorizing method is most appropriate for understanding and resolving paradoxes that exist in bodies of literature that are extensive, containing large volumes of journal articles, books, presentations, and working papers, represent a substantial amount of information. Researching such complex and multi-dimensional concept as organizational agility, inductive top-down theorizing method allows reexamining assumptions that underlie current knowledge and opens possibilities for new organizational theoretical insights. (Shepherd & Sutcliffe, 2011).

In the beginning of literature review, a broad search of scientific databases was performed first. Broad use and popularity of the term, makes it difficult to thoroughly and systematically review all the articles in the scope of this work. To focus scientific literature review, author of this dissertation narrowed down a search to the articles to high impact factor journals, which allows selecting the most cited and influential articles on the organizational agility subject. Besides high-impact journals, the literature review was supplemented by articles from other scientific journals with high citation count of over 100, to ensure the significant impact. Keywords “organizational agility”, “strategic flexibility” or a combination of them to narrow down the relevant articles are used. Keywords “organizational flexibility” and “strategic agility” were also included. This top-down approach allows to narrow down the scope and reveal most influential and relevant research.

As literature review revealed, organizational agility has its roots in manufacturing context and started as a research by Nagel & Dove (1991). It was defined as a manufacturing system which is able to meet the needs of a changing marketplace, shifts quickly between products, in real time in order to adapt to changing customer needs. Early agility research (Goldman et al., 1995; Sharifi & Zhang, 2001; Yusuf et al., 1999) characterized agility as an ability to reconfigure manufacturing system in order to respond to unpredictable changes in the market. The ability to reconfigure entails utilization of structural and infrastructural elements, which adds to the position that agility is a more encompassing capability compared to flexibility (Attafar, Ghandehari, & Momeni, 2012). By synthesizing existing technologies and production methods (Goldman et al., 1995), combining managerial and manufacturing tools (Sharifi & Zhang, 2001) with the help of people and processes (Brown & Bessant, 2003) organizations are able to reach agility. Literature often confuses definitions of organizational agility and manufacturing agility, due to mixing performance outcomes and manufacturing processes (Narasimhan, Swink, & Kim, 2006). Researchers conceptually differentiate organizational agility – a performance capability, from agile manufacturing systems – cluster of related practices (Attafar et al., 2012). Authors of early research into organizational agility focused mainly on manufacturing organizations, thus agility definitions are concentrated around manufacturing processes and new products.

Goldman et al. (1995) introduced the concept of agile enterprise strategy and vision, by defining the agile organization as one which is profitable in continuously changing environment and is able to adapt to unpredictable consumer habits. Dove (1996) proposed that organizational agility level depends on a balance of its four dimensions: cost, time, quality and scope. Yusuf et al. (1999) argued that organizational agility level is influenced by aligning “competitive bases” (speed, flexibility, innovation proactivity, quality, and profitability), reconfigurable resources and knowledge. In order to improve organizational agility level, companies have to combine these enablers and adapt to consumer needs and changing marketplace. Referring back to the discussion of the differences between organizational flexibility and agility, from Yusuf et al. (1999) definition possible distinction between these two terms can be identified, with the flexibility being an inclusive enabler for organizational agility and emphasis on speed.

The context of knowledge and ability to respond was further developed by Dove (1999), where he equalized agility as a sum of response ability and knowledge management Ganguly et al. (2009). Some of the researchers (Dove, 2005; Goranson, 1991) define agility as an ability to adapt to sudden, unpredictable and unexpected changes, with the emphasis on the unplanned nature of the changes. This also helps to distinguish between flexibility and agility concept in the organizational setting, with the former referring to a preparation and proactivity to changes that could be estimated, while agility being ready to adapt to unexpected changes in the environment in a speedy manner. Other authors (Raschke & David, 2005; Sambamurthy et al., 2003) approach organizational agility concept using processes and define agility as an ability to redesign, modify and reconfigure existing processes rapidly and/or create new processes to accommodate the needs of the firm and adapt to external changes and market conditions.

The concepts of speed and innovation as key properties of organizational agility was brought up by (Lu & Ramamurthy, 2011a). They define agility as an organizational capability to deal with unexpected changes in the environment via rapid and innovative responses, which help to take advantage of those changes. Speed is one of the most important requirements for agility in terms of response and implementation, while innovativeness refers to the quality and substance of response (e.g. strategic orientation, product development, decision-making) (Cai, 2013). Author of the dissertation argues that speed is one of the key distinguishing elements between flexibility and agility.

To start the further analysis, organizational agility had to be defined. Based on the literature review the most notable and cited organizational agility definitions were selected and summarized the Appendix A. Analysis of agility concept in organization shows that there is no consensus on the definition. Various authors approach agility definition from different perspectives and focus on different factors. In search for unified definition, author of this dissertation attempts to look into the commonalities between different approaches in the organizational agility literature. Main keyword identification allows to group main agility definition directions under common themes. Although various authors word the concepts differently, the main themes are apparent. One of the key attributes for organization agility – speed, is identified by authors using different terms for the same attribute, e.g. speedily, quickly, rapidly and similar. By grouping similar attributes, main themes in organizational agility definitions start to emerge: speed of adaptation, organizational capability, adaptation efficiency, response to the change, unexpected change and resource reconfiguration.

Table 2. *Key themes in Agility Definitions*

Key themes	Authors
Organizational capability	Swafford et al. (2006); Sambamurthy et al., (2003); Ren et al. (2009); Raschke & David (2005); Narasimhan et al. (2006); Meredith & Francis (2000); Menor et al. (2001); Lu & Ramamurthy (2011a); Gunasekaran (1998, 1999); Goldman et al. (1995); Highsmith (2004); Cho et al. (1996); Brown & Bessant (2003); Nagel & Dove (1991);
Speed of adaptation	Yusuf et al. (1999); Ren et al. (2009); Meredith & Francis (2000); Menor et al. (2001); Lu & Ramamurthy (2011a); Lin et al. (2006); Gunasekaran (1998, 1999); Goldman et al. (1995); Gehani (1995); Cho et al. (1996); Brown & Bessant (2003); Nagel & Dove (1991);
Adaptation efficiency	Swafford et al. (2006); Narasimhan et al. (2006); Meredith & Francis (2000); Menor et al. (2001); Lu & Ramamurthy (2011a); Gunasekaran (1998, 1999); Goldman et al. (1995); Highsmith (2004); Dove (1999, 2006); Cho et al. (1996); Brown & Bessant (2003); Nagel & Dove (1991)
Response to the change	Ren et al. (2009); Raschke & David (2005); Prince & Kay (2003); Narasimhan et al. (2006); Menor et al. (2001); Lu & Ramamurthy (2011a); Lin et al. (2006); Goldman et al. (1995); Gehani (1995); Highsmith (2004); Nagel & Dove (1991);
Unexpected change	Sharifi & Zhang (2001); Sambamurthy et al., (2003); Menor et al. (2001); Lu & Ramamurthy (2011a); Dove (1999, 2006); Cho et al. (1996);
Resource reconfiguration	Yusuf et al. (1999); Sambamurthy et al., (2003); Raschke & David (2005); Lu & Ramamurthy (2011a); Lin et al. (2006);

Source: author

Review of various organizational agility definitions in the scientific literature allows identifying common themes and building blocks of organizational agility. In the simplest form, enterprise agility can be defined as organization's ability to identify changes in the environment and respond quickly. Some authors (Swafford et al., 2006; Sambamurthy et al., 2003; Ren et al., 2009; Raschke & David, 2005; Narasimhan et al., 2006) identify agility as organizational capability – something that an organization is capable to do with its resources. In organizational agility context, it refers to organization's ability to identify changes and ability to respond to them. *Ability to respond* to the changes in the environment refers to the know-how, experience, and knowledge of the organization and its decision makers. Dove (1999) refers to this ability as 'knowledge management'. *Unexpected change* is also present in many definitions of organizational agility (Ren et al., 2009; Meredith & Francis, 2000; Lu & Ramamurthy, 2011a; Lin et al., 2006; Brown & Bessant, 2003 (Nagel & Dove, 1991)) as 'competitive market opportunities' (Sambamurthy et al., 2003), 'dynamic and continuous change' (Sarkis, 2001); and referred as changes arising from competitor's actions, consumer preferences, regulatory or legal changes, economic shifts, technological advancements etc. (Overby et al., 2005). *Ability to respond* or 'seize' (Sambamurthy et al., 2003), 'reconfigure' (Sharifi & Zhang, 2001) is an ability to act in response to the changes and in the situation dictated by the environment and internal resources and abilities. Identification of abilities that help organizations to respond to the environmental changes and their evaluation is one of the purposes of this dissertation.

Overby et al., (2005) adds a strategic element to the process of sensing the changes and responding to them. Response to the changes has to be *appropriate and efficient* and factor in the quality and cost of the actions. The response has to support organizational goal (e.g. market share increase, international expansion, strengthening competitive position, etc.) and adjust to the change so that it helps in advancing towards these goals. On the other hand, the pursuit of short-term market opportunities may distract the organization from long-term strategic focus. Such short-term market opportunities can be risky, capital-intensive, or unprofitable. According to Overby et al., (2005), the *appropriate* response also involves an element of speed. For agile organizations speed of response to unexpected changes is very important, especially in the event of technological shifts, changes in consumer preferences, new regulations, etc.

Using rigorous and comprehensive conceptualization of organizational agility construct, Singh & Sharma (2013) conclude that organizational agility is the organizational capacity to vary flexibility and speed of their market offering within sense-response framework; capability to execute strategic moves choosing between flexibility and speed dimensions. Organizational agility should not be confused with strategic flexibility, dynamic capabilities for change, or considered as the static property of organizations. Organizational agility is a dynamic construct that should constantly be updated and maintained.

Literature review reveals lack of organizational agility definition that can be applied to wide range of industries, that includes both external and internal organization aspects, that emphasises speed and efficiency and has strategic context. Therefore, a more cohesive and unifying organizational agility definition is needed. Literature analysis of the attempts to define organizational agility shows highly fragmented and polar approaches. Agility defini-

tion is influenced by the context of the research. Many definitions are highly focused to narrow industries or business process areas. For example early definitions focus to manufacturing processes, new products and internal organizational aspects. Later definitions start to include wider business concepts, such as knowledge, internal capabilities. However, they are still applicable only to narrow set of industries. Other definitions focus entirely on external factors and customers, forgetting about the need for internal changes in the organization to respond to these external challenges. Some definitions, on contrary, focus on only internal organizational aspects, disregarding external pressures. Author of this dissertation proposes to combine different fragmented elements of organizational agility definition into a more unified and cohesive concept, that can be applied to different type of organizations in various business segments. Common directions and themes can be identified in the organizational agility literature and unified concept can be presented by building on main agility themes by preceding authors. Author of this dissertation proposes the following definition: *organizational agility is an organizational ability to recognize unexpected changes in the environment and appropriately respond in a swift and efficient manner, by utilizing and reconfiguring internal resources, thus gaining competitive advantage in the process.*

Before moving to the discussion of agility research directions and frameworks, it is important to define the context of this dissertation – high-growth companies. There is a number of different definitions used to identify high-growth companies, also known as ‘gazelles’. The term ‘gazelle’ was pioneered by David Birch, who found that high-growth firms are responsible for most of the employment growth (Birch, 1981). Several meta-studies of ‘gazelle’ companies identify several reasons for distinctions in gazelle definitions (Parker, Storey, & van Witteloostuijn, 2010). First is the selection of the appropriate growth measurement metric. Various gazelle studies use sales growth, employment, financial stability, management perceptions, and other metrics to distinguish high-growth companies from regular ones (Acs, Parsons, & Tracy, 2008; Davidsson & Henrekson, 2002; Delmar, Davidsson, & Gartner, 2003; Moreno & Casillas, 2007; Schutjens & Wever, 1999). The most common metric, however, is sales and employment growth. The second reason for different ‘gazelle’ definitions is the identification of growth scale; in other words, what is high growth. Here the studies show different approaches in measurement as well, some indicate that high growth is doubling of sales over the year (Littunen & Tohmo, 2003; Smallbone, Leig, & North, 1995), while others use more conservative estimates of 20-30% annual growth (Honjo, 2004). Other reasons for differences in ‘gazelle’ definitions are influenced by the time period, over which the growth is measured and the frequency of measurement. Organization for Economic Co-operation and Development (OECD) apply gazelle term to companies with an annual average growth in employment is more than 20% over the 3-year period and with over 10 employees at the beginning of the period. ‘Gazelle’ companies should also be no older than 5 years (OECD, 2002).

Heterogeneity of definitions for high-growth companies and measurement methods complicates the analysis and comparison of different sets of data. The decision lies on which data to use to measure company growth and which measure of growth to apply. Most of the definitions use sales turnover and/or employment numbers to measure company growth (Mitusch & Schimke, 2011). The most important growth-indicators are as

follows: Absolute, which measures turnover growth or employment growth as the differences between the first-year share/size and the last-year share/size; Relative growth, which measures turnover growth or employment growth as the division between the first-year share /size and the last-year share/size. Or so-called Birch index, which measures turnover growth or employment growth as the combination and multiplication of absolute and relative growth indicators. To continue with organizational agility literature analysis, research directions and domains have to be identified.

1.3. Agility research directions and domains

Many frameworks and models analyze agility and its characteristics in a different context, therefore they differ in content and structure, which leads to organizational agility definition issues. Some of the frameworks and definitions do not apply to the whole organization, others are too narrow and cover specific industry. Literature review reveals that there is no consensus about the construct of agility, which makes the empirical research difficult (Wendler, 2013). In order to build the basis for empirical research, further distilling of the agility theory is needed and agility domain with applicable frameworks has to be selected. Based on Wendler (2013) and literature review, different agility frameworks can be categorized under four domains: agile manufacturing, agile software, agile workforce and agile organization/enterprise.

For most of the domains, agility frameworks are interrelated and have similar themes: organizational culture, workforce, customers, organizational abilities, technology, which are represented in each separate domain with an emphasis on that particular domain (Wendler, 2013). For example, studies in both agile manufacturing and agile software development domains analyze the effect of the agile workforce, however, with former, the emphasis is on manufacturing organization employees, while the latter focuses on software developers. Therefore, it is important to distinguish domains and discuss them as separate areas of research. It allows to simplify and focus already the multidimensional concept of agility and act as a development process which grows into encompassing organizational agility domain.

The early agility frameworks focusing on *agile manufacturing* were identified by Sharifi & Zhang (2001) as Agility Drivers, Agility Capabilities, and Agility Providers. Agility Drivers being the outside forces initiating the changes in the business environment. Agility Capabilities, such as speed, flexibility, know-how, are the abilities that companies must have in order to effectively respond to the environmental changes (agility drivers). While providers being the tools or means, such as technology, specialists, that help to utilize agile capabilities (Sharifi & Zhang, 2001). Vázquez-Bustelo et al. (2007) used similar categories for their model explaining agility framework: agility drivers, agility enablers, and outcomes. Vázquez-Bustelo et al. (2007) further split agility enablers into human resources, value chain integration, concurrent engineering, technologies and knowledge management (Wendler, 2013). Although both drivers, capabilities and enablers are used in early agility research, author of the dissertation argues, that important aspect of agility practices is missing. Also, early agility research is focused on narrow context on manufacturing companies.

Dubey & Gunasekaran (2014) identified six frameworks of agile manufacturing domain: technologies, empowerment, customer focus, supplier relationship, flexibility, and organizational culture. Technologies allow the organization to share the information more efficiently, improves sensing and responding abilities (Gunasekaran, 1999). According to Dubey & Gunasekaran (2014), technologies are most important enablers in agile manufacturing framework. Manufacturing automation, robotics helps to improve speed and enhances dynamic flexibility. Workforce empowerment helps to improve communication and coordination (Vázquez-Bustelo et al., 2007; Vinodh & Devadasan, 2011), which in turn increases productivity and minimizes waste. Technologies and workforce empowerment should be closely tied together in order to achieve customer focus. The enabling and unifying factor for this is organizational culture and flexibility. Organizational culture fosters the communication channels, ability to make decisions and use technologies. To achieve customer satisfaction, organizations should act swiftly and accurately, which is achieved via proper communication and coordination and new technologies adaptation. Manufacturing systems flexibility combined with efficient supplier relationships allows more effective adaptation to the changing market situation and needs of the customers. All the above six frameworks for agile manufacturing are dependent on each other and should work in cohesion (Dubey & Gunasekaran, 2014). In later studies, various authors bring in the concepts of external factors, such as suppliers and business network, however they are still analyzed through the perspective of manufacturing organizations. This makes agility concept hard to apply to wider context of organizations and evaluate different attributes, that may not be relevant to manufacturing dimension.

Other frameworks under agile manufacturing domain were introduced by Yusuf et al. (1999), with core concepts of Competence Management, Capability of Reconfiguration, Knowledge-driven Enterprise, and Virtual Enterprise. These four concepts were further divided into thirty-two attributes of agile manufacturing. Meredith & Francis (2000), presented the framework for agile manufacturing called “Agility wheel” with four sections (quadrants): agile strategy – focusing on strategic aspects of agility; agile processes – organizational processes that support agility; agile linkages – focusing on external network; and agile people – management and employees of the organization. Each of Agility wheel quadrants was divided into four subsections, called policies or practices, that agile organization should possess or aim towards. Supply chain agility importance for the agile manufacturing framework was discussed by Agarwal et al. (2007) and (Kisperska-Moron & Swierczek, 2009), with former researchers characterizing supply chain agility into Market, Information and Process Integration and Planning; while later focusing on a framework build of the four factors: Customers, Relation with Suppliers and Competitors, and intensity of IT use (Wendler, 2013). Agility attribute approach adds to the organizational agility research by identifying main elements and combining organizational structure, human resources, external network, and processes. Although agile practices are not evaluated, such framework based on main organizational attributes is good foundation for further development,

The most recent agility domain focusing on *Agile software development* started with a group of collaborators developing “Agile manifesto” (Beck et al., 2001). Although over time many agile software development methods were introduced, such as Extreme program-

ming, Scrum, Feature-Driven development, Dynamic system development, adaptive software development, Crystal and Lean software development (Chow & Cao, 2008) - mostly all of them started with 'Agile Manifesto'. The newly structured principles of developing software reignited interest in the agility concept within the organizations. Focusing on software development, Agile manifesto emphasizes four key values that cover a wide scope of organization elements: individuals and interactions, working software, customer collaboration, and responding to change. These four values as opposed to processes and tools, comprehensive documentation, contract negotiation, and following a plan, triggered a renewed interest of agility within the organization and its benefits.

Conboy et al. (2005) emphasize the ability of the agile methods to handle requirement changes and propose the framework for agile software development consisting of two parts: potential sources of change and agile activities to address those changes. Sources of change identified as: customers (requirements, budget constraints), technology (new development tools, processes), social factors (cultural, political issues), overhead (new policies), competition (new applications); while agile activities identified as change creation, production, reaction and learning (Conboy et al., 2005). After the introduction of agility concept in software development, other agility frameworks focusing on this domain followed (Wendler, 2013). A critical success factor approach for agile software development was taken by Chow & Cao (2008) and Misra et al. (2009), where both publications concentrated on identifying and measuring organization's performance. Chow & Cao (2008) presented thirty-six success factors in five dimensions: Organizational, people, process, technical, project. Although only six success factors were identified as critical: correct delivery strategy, proper practice, high-caliber team, good project management process, agile-friendly team environment and a strong customer involvement. Misra et al. (2009) on the other hand focuses on the practicality and perspective of project manager over three dimensions: reduced time, reduced cost, increased quality. When addressing success factors for agile software development researchers distribute them into two categories: people factors and organizational factors. The most important factors being: customer satisfaction, collaboration and commitment, decision time, corporate and societal culture, control, personal characteristics and training and learning (Misra et al., 2009). Although, these examples of agility research is focused on the narrow IT and software development industry context, it analyses wider perspectives and includes organizational elements and factors that can be used in further development of a more unified theoretical model for organizational agility.

Chan & Thong (2009) developed a conceptual framework based on knowledge management perspective and discussed the various factors on acceptance of agile methodologies. They classified factors into ability-related (i.e. self-efficacy, experience, training and external support), motivation related (i.e. career, management support, voluntariness, subjective norm, and corporate culture), and opportunity-related factors (i.e. teamwork, communication, shared understanding and arduous relationship). Understanding and acceptance of agile methodology are facilitated by including agile methodology characteristics: usefulness, ease of use, compatibility, result demonstrability, maturity (Chan & Thong, 2009). According to their framework, agile methodologies are influenced by knowledge management outcomes: knowledge creation, knowledge retention, and knowledge transfer.

Knowledge management concept is directly related to human resource agility. Knowledge management perspective is important for further analysis into capabilities and practices related to human resources and how they adapt to the changes moving organizational agility level forward.

Workforce agility domain is least empirically researched out of the four agility domains, although all of them have a workforce as an important element in the framework. The relationship between organizational agility level and its performance (growth) is the context of this dissertation. Agile workforce as an integral part of agile organization and catalyst. According to Sherehiy et al. (2007), agility cannot be achieved without empowering employees, leveraging their skills and knowledge. Workforce agility provides a number of benefits for an organization: quality improvement, better customer service, improvement of learning (Hopp & Oyen, 2004). Environmental changes require workforce adaptation and response: improving procedures, adding additional process capabilities, adjusting the schedule, migration to new systems and processes (Dove, 1993). There is an agreement that agile workforce not only helps organizations to adapt to changing environment more effectively, but also improves its performance.

Crocitto & Youssef (2003) emphasizes the importance of people in attaining agility and success in organizations. They present the model of organizational agility, where leadership is essential and act as a foundation in accepting change and fostering learning. Term 'agile management' is used and represents a leadership ability to create agility vision and mission, motivated by the rewards system which helps not only accept and adapt to change but also instigate changes for competitive advantage (Crocitto & Youssef, 2003). Other authors, Hopp & Oyen (2004) developed comprehensive Agile Workforce Evaluation framework. It consists of strategic and tactical assessment structures that help to evaluate system factors. Strategic assessment framework helps to evaluate whether workforce agility should be applied in an organization, while tactical framework helps to assess the environment and how cross-training can be applied in given environment. The transition from strategic to tactical level is performed with the help of workforce agility infrastructure, which offers high-level structure and consists of cross-training skill pattern, worker coordination policy and team structure.

Literature review on workforce agility (Breu et al., 2002; Dyer & Shafer, 2003; Griffin & Hesketh, 2003; A. Gunasekaran, 1999; Plonka, 1997; Sherehiy et al., 2007) allows to summarize the number of shared attributes of agile workforce: proactive, fast, adaptive, knowledgeable, collaborative, resilient. Agile workforce exhibits proactive behavior allowing them to interact with the changing environment. Being comfortable with change, new ideas and new technologies, agile workforce are able to assume multiple roles and functions, as well initiate and improvise changes before they even occur in the environment. Speed being an important characteristic of agility is also present in the agile workforce and is represented by a speed of adaptation and information access. Adaptive dimension is based on changing oneself to better fit the evolving environment and includes: interpersonal and cultural adaptability, constant learning of new skills; requires flexibility to assume multiple roles, change easily between different tasks and teams (Sherehiy et al., 2007). Knowledge is one of the most important enablers of the agile workforce, as it promotes the generation of

new ideas, accepting new responsibilities, knowledge of new IT systems and technologies, processes and strategies, ability to learn and develop, which as result increases agility. Ability to collaborate and work in teams also increases workforce agility, as it promotes knowledge sharing, self-direction, and empowerment. Resilience refers to an ability to function well under stress and involves positive attitude to the changes, tolerance to the uncertainty, different methods, opinions, and approaches (Sherehiy et al., 2007). Main discussed organizational research directions and domains are summarized in Table 3.

Table 3. *Agility research directions and domains*

Research Domain	Studied Concepts	Authors
Agile Manufacturing	Agility Drivers, Agility Capabilities, and Agility Providers	Sharifi & Zhang (2001)
	Agility drivers, agility enablers and outcomes	Vázquez-Bustelo et al. (2007)
	Technologies, empowerment, customer focus, supplier relationship, flexibility, and organizational culture	Dubey & Gunasekaran (2014)
	Competence Management, Capability of Reconfiguration, Knowledge-driven Enterprise and Virtual Enterprise	Yusuf et al. (1999)
	Agile strategy, agile processes, agile linkages, agile people	Meredith & Francis (2000)
	Customers, Relation with Suppliers and Competitors, IT use	Kisperska-Moron & Swierczek (2009)
Agile Software development	Agile software development, Agile manifesto	Beck et al. (2001)
	Extreme programming, Scrum, Feature-Driven development, Dynamic system development, adaptive software development, Crystal and Lean software development	Chow & Cao (2008)
	Potential sources of change and agile activities to address those changes: change creation, pro-action, reaction and learning	Conboy et al. (2005)
	Critical success factor approach for agile software development: reduced time, reduced cost, increased quality	Misra et al. (2009)
	knowledge management outcomes: knowledge creation, knowledge retention, and knowledge transfer	Chan & Thong (2009)
Agile workforce	Quality improvement, better customer service, improvement of learning	Hopp & Oyen (2004)
	Agile workforce effect on performance	Dyer & Shafer (2003)
	Agile management, leadership influence on agility	Crocitto & Youssef (2003)
	Interpersonal and cultural adaptability, constant learning of new skills, resilience of workforce	Sherehiy et al. (2007)

Source: author

Development of organizational framework, which is unified and applicable to different organizations is a difficult challenge. Organizational agility frameworks are not yet clearly defined and conceptualized. Literature analysis reveals that some of the approaches to organizational agility are too broad and imprecise, that involves different definitions, practices, and technologies used in the industry over the last two decades (Sherehiy et al., 2007).

This approach synthesizes agile manufacturing, flexible production technologies, Just-in-Time production, Total Quality Management, lean manufacturing, workforce empowerment under the same coverage of agile organization concept. The idea is that only agile organization is able to utilize various new methods and technologies and take the most advantage of it. Based on this approach it is clear why organizational agility concept was and is somewhat confusing and difficult to classify. On the other hand, the second approach to organizational agility is much narrower and more focused and distinguishes it from all other organizational methods. An agile organization is different from lean manufacturing, TQM, JIT or even agile manufacturing concepts, as it covers the whole organization, while these concepts are only a collection of operational techniques and methods that mostly apply to manufacturing organizations. The agile organization extends the manufacturing concept and encompasses different organizational elements, goals, and objectives, allowing them to adapt to unexpected and fast changes in a dynamic business environment.

The three discussed agility domains are well researched; however, they mostly focus on their own respective field. A large number of publications cover agile manufacturing, agile software development, and agile workforce perspectives. However, there is a lack of studies addressing the conceptualization and development of integrated and holistic agile enterprise concept. Although enterprise agility concept started together with agile manufacturing idea development, the most interest organizational agility gained only recently – after the increased attention to the agile software development concept. Literature analysis reveals increasing interest in the effects of agility on the entire organization, not only on separate functional or structural areas. However, scientific literature is still fragmented into different organizational agility research domains that utilize narrow concepts applicable in the context of specific industry or organizational function. Literature review reveals the gaps in research of organizational agility, especially theoretical concepts that can be applied to wider context of organizations. Lack of holistic theoretical approach to study organizational agility makes it difficult to empirically evaluate and compare agility levels, factors, and processes between various organizations from different sectors or countries. This calls for more unified organizational agility theoretical model and holistic approach. In order to unify the organizational agility concept, more thorough analysis of organizational agility study frameworks is needed, which is discussed in the following section.

1.4. Organizational agility frameworks

Literature analysis shows that most of the organizational agility research could be divided into 3 main approaches or frameworks, based on the dimensions and focus they use. Each framework has a similar approach to agility in organization and concepts to describe it. One camp of the researchers (Alberts & Hayes, 2003; Baškarada & Koronios, 2018; Bottani, 2010; Cai, 2013; Charbonnier-Voirin, 2011; Dyer & Shafer, 1998; Eshlaghy et al., 2010; Giachetti et al., 2003; Jackson & Johansson, 2003; C. T. Lin et al., 2006; Ren et al., 2009; Sharifi & Zhang, 2001; Yusuf et al., 1999) use the framework of agility *enablers and capabilities* which help organizations to achieve agility. The second group of researchers (Aburub, 2015; Carvalho, Sampaio, Rebentisch, Carvalho, & Saraiva, 2017; Charbonnier-

Voirin, 2011; Gehani, 2010; Goldman et al., 1995; Sherehiy et al., 2007; Vázquez-Bustelo et al., 2007) try to identify main *practices* that agile organizations use in their daily operations. Third group of researchers (Atapattu, Sedera, & Ravichandran, 2014; Dove, 2005; Dyer & Shafer, 2003; Holsapple & Li, 2008; Lu & Ramamurthy, 2011a; Nijssen & Pauwe, 2012; Popovič, Hackney, Tassabehji, & Castelli, 2018; Sambamurthy et al., 2003; J. Singh & Sharma, 2013; Wright & Snell, 1998) developed the framework based on *sense-response dimensions*. Sense-response framework sees organizational agility through the two perspectives: abilities to identify opportunities and ability to act upon them in an efficient manner. All three approaches are discussed in more detail in the following sections. Discussion of each approach helps to construct a more holistic and inclusive model of organizational agility in further sections of this dissertation.

1.4.1. Enabler-capability dimension

The main purpose of agility in an organization is to better adjust to change and gain competitive advantage and to take opportunities from changes in the environment and thrive in uncertainty and unpredictability. Therefore, agile enterprises need a set of capabilities and enablers to respond to such change. The framework of enablers and capabilities is based on the premise that agile organization can achieve competitive advantage in changing the environment. Author of this dissertation thinks that this framework can approach organizational agility subject from two dimensions: static and dynamic. Static dimension refers to the question “What organizational *has* that makes it agile?” and focuses on the structural aspects of the organization. While dynamic dimension attempts to answer the question “What organization *is able* to do, in order to be more agile?” and focuses on abilities of the organization. Both dimensions are mutually dependable on each other. The organization cannot be agile if it only relies on the structural element. Having newest technology or organizational structure will not provide the benefit if it is not properly utilized in order to respond to changing the environment. While having knowledgeable employees and ability to be agile will be ineffective if organizational structure is not flexible enough and restricting. Therefore, both dimensions are important and should be used and developed together when aiming for higher organizational agility level.

Enablers and capabilities framework has roots in agile manufacturing, where established processes and activities have to be changed often to adjust to the changes in customer demand or market conditions, therefore e.g. flexibility of the processes is one of the enablers that organization *has*. Different researchers use different terms to identify the features of the agile organization *has* and call them enablers, attributes, providers, levers etc. Author of this dissertation uses term ‘enabler’, as it more accurately describes the context (according to Cambridge Dictionary (2016) “*enabler*, noun. – Something or someone that makes it possible for a particular thing to happen or be done”)

Yusuf et al. (1999) bases essential organizational agility enablers on main competitive foundations of agility: speed, flexibility, innovation, proactivity, quality, and profitability. Using this framework agility has three dimensions: elemental, micro and macro agility. Elemental agility refers to organizational resources – people, equipment, technologies, etc.

Micro-agility dimension covers internal characteristics of organization, abilities, and structure that fosters agility. The third dimension focuses on the outside of the organization and how agile and flexible is its network. Based on four core concepts, Yusuf et al. (1999) present a list of different organizational agility enablers based on ten decision domains such as integration, competence, team building, technology, quality, change, partnership, market, education, and welfare. It can be argued that these decision domains include both enablers – what organization *has* and practices that organization *does*. For example, cross-functional teams – what organization *has*, goes hand in hand with continuous training and development – what organization *does*. Therefore, organizational agility is a set of both enablers and practices, which author of this dissertation discusses in the next section. In order to put everything together is a difficult challenge for an organization and involves different aspects of the strategic and organizational nature with experienced and skilled decision makers in the middle.

Agility enablers are used as leverage to achieve agile capabilities (Bottani, 2010; Eshlaghy et al., 2010; Gunasekaran, 1999). Gunasekaran (1999), discusses seven enablers of agile manufacturing: virtual enterprise formation tools and metrics, physically distributed teams and manufacturing, rapid partnership formation tools and metrics, concurrent engineering, integrated product, production, business information system, rapid prototyping tools, and electronic commerce. Similalry, Eshlaghy et al. (2010) identify twelve enabler factors of organizational agility based on literature review. Some of the enablers, such as rapid prototyping, improved manufacturing technology, concurrent engineering, only relate to manufacturing organizations. Other enablers can be applied to a wider organization and used rather universally. Organizational structure itself can be considered an enabler, the less formal, less complex and less centralized it is – the more agile it can be when adapting to external changes, this includes flexibility of processes and internal/external cooperation (Eshlaghy et al., 2010). The leadership of an organization that enables agility should be future and goal oriented and fosters organizational culture, which promotes participation and risk tolerance. Employees take a crucial role in organizational agility. In order to enable agility development, organizations should empower their employees to make decisions, improve and be open to change. Organizations motivational system should promote job satisfaction and organizational commitment. Forming into efficient teams should also be encouraged as it promotes knowledge and skill sharing and cooperation which in turn improves agility level in the organization, as skillfull and knowledgeable employees are able to adapt to achange more easily and effectively.

Charbonnier-Voirin (2011) uses a framework, combining all three concepts of organizational agility: enablers (called levers), agile practices and agile capabilities. Similarly to agile enablers, agile levers support the development and implementation of agile practices. In agreement with other researchers (Dyer & Shafer, 1998; Sharifi & Zhang, 2001), Charbonnier-Voirin (2011) identifies four groups of reconfigurable agility levers that promote organizational agility development and can be utilised when need arises to adapt to changes or take advantage of opportunities: structure of organization, processes, technology and human resources. Literature analysis allows summarising the main enablers of agile organization based on different authors in Appendix B.

Organizational agility enablers should have certain characteristics in order to be agile. For example, the supply chain is not an agile enabler by itself, however, the flexible supply chain is an agile organizational enabler. The most important components for most enterprises are an organization, human resources, processes, technology, and networks. These are main building blocks for most of the organizations. An agile organization is not an exception. However, in order to reach agility, these organizational building blocks (or enablers) have to have agile characteristics. Sherehiy et al. (2007) present characteristics for agile enterprise based on two enablers: organization and workforce. Characteristics of the agile organization are divided into five groups: authority, rules and procedures, coordination, structure, HRM practices. While workforce characteristics are divided into three groups: proactivity, adaptivity, and resiliency. For each of those groups in both categories, Sherehiy et al. (2007) list a set of characteristics, which are listed in Table 4. Author of this dissertation proposes that agile enterprise consists not only of organizational and workforce dimensions. Other building blocks of the organization, such as network, processes, and technology should have agile characteristics as well. In order to respond to external changes, the organization should have an agile external and internal network, that is able to adapt together to the changing environment. Internal networks should also be flexible, responsive, communicate and share the experience. Processes have to be simple and adaptable enough and easily changeable. Processes in the agile organization should concentrate on both sensing of external changes and respond to them in a fast and efficient manner. Technology should also have agile characteristics, such as the flexibility to allow for easy integration of new processes and adaptation for new products and services. For growing organizations technology must be easily scalable and configurable, in order to adapt to increased requirements and pressures. Rest of characteristics are listed in Table 4.

Table 4. *Organizational agility enabler characteristics*

Enterprise dimension	Enabler	Agility enabler characteristics
Organization	Authority	<ul style="list-style-type: none"> • Decentralized knowledge and control • Fewer power differentials • Less adherence to authority and control • Loyalty and commitment to project or group • Authority tied to tasks • Authority change when tasks change • Wide span of control
	Coordination	<ul style="list-style-type: none"> • Informal and personal coordination • Delegation of tasks and decision-making • Network communication • Goal-directed
	Structure	<ul style="list-style-type: none"> • Flat, horizontal, matrix, networked or virtual structure • Teamwork, cross-functional linkages • Loose boundaries among function and units

Enterprise dimension	Enabler	Agility enabler characteristics
Human resources	Proactivity	<ul style="list-style-type: none"> • Anticipation of problems related to change • Solution to change related problems • Personal initiative
	Adaptivity	<ul style="list-style-type: none"> • Interpersonal and cultural adaptability • Spontaneous collaboration • Learning new tasks and responsibilities • Professional flexibility
	Resiliency	<ul style="list-style-type: none"> • Positive attitude to changes, to new ideas, technology • Tolerance to uncertain and unexpected situation • Coping with stress
	Practices	<ul style="list-style-type: none"> • Employee empowerment and involvement • Job rotation and enrichment • Autonomy in decision-making • Information and knowledge access • Teamwork • Multifunctional teams • Multiple skills training • Workforce development and training • Differentiation and diversity development
Network	Internal	<ul style="list-style-type: none"> • Scalable and downgradable • Sharing information • Promoting communication and learning • Reconfigurable
	External	<ul style="list-style-type: none"> • Flexible • Open and responsive to change • Able to adapt and change in a speedy manner • Open communication channels • Having similar goals
Processes	Sensing	<ul style="list-style-type: none"> • Open for change • Promoting and concentrating on external environment developments • Few rules and procedures • Low level of formal regulation • Informally organized
	Responding	<ul style="list-style-type: none"> • Easily adaptable and reconfigurable • Scalable • Simple to implement • Fluid role definitions
Technology		<ul style="list-style-type: none"> • Modular • Flexible • Upgradable • Easily replaceable • Low cost • Scalable

Source: Adapted from Sherehiy et al. (2007)

Organizational agility characteristics can also be based on the main concepts of organizational agility, such as flexibility or speed, and applied to different areas of the organization. For example, flexible product model or the flexible workforce, flexible structure. Sherehiy et al. (2007) in their comprehensive study summarise the following characteristics required for organizational agility: flexibility, competency, responsiveness, speed, the culture of change, integration and low complexity. They consider flexibility as an ability to pursue and change in between different strategies and tactics; responsiveness – ability to identify different opportunities and threats and respond to them; all organizational actions towards change and adaptation should be done in a time efficient manner; culture of change refers to the organizational environment that supports and promotes change; integration and low complexity refers to organizational characteristics that allow for easy adaptation to change. Agility enabler characteristics is an important element in organizational agility research as it emphasises the importance of agile properties for agile enablers. In order to be agile organization should possess agile enablers that are flexible, easily changeable, skillful, scalable, etc. Regular resources without agile characteristics may not be useful for overall organization agility as they may be difficult to change and adapt to new requirements.

Another side of enabler-capability dimension are *agile capabilities*. Agile capabilities refer to whether the organization is able and *can do* what is necessary in order to be more agile. Agile capabilities allow organizations to respond effectively to change and reach competitive advantage. Various researchers use different terms to name those capabilities: responsiveness, quickness, innovation, knowledge management, learning (Charbonnier-Voirin, 2011; Dove, 1999; Sharifi & Zhang, 2001). Charbonnier-Voirin (2011) groups different aptitudes into three key organizational agility capabilities. First one - the ability to mobilize a rapid response to change – is based on reactive flexibility and refers to an ability to organize existing resources. In order to benefit from this capability, the organization has to have flexible resources that are open for reconfiguration. Second capability – aptitude to read the market - refers to the organizational ability to see the changes in the market and identify the opportunities. This capability is related to the sensing ability, in the sense-response framework, discussed in later sections. It highly depends on individual abilities of decision makers, their skill, and experience to identify the changes and opportunities. The third capability in Charbonnier-Voirin (2011) framework – aptitude to integrate organizational learning, refers to the organizational capacity to align employee skills and experience with those of organization. It also involves storing and sharing of information and experience, communication and cooperation that allows the organization to improve its agility capabilities.

When discussing capabilities in the manufacturing sector Yusuf et al. (1999) identify main core skills or competencies that allow manufacturing organization to adapt to the fast-changing environment: core competence management, virtual enterprise, capability for reconfiguration, and knowledge-driven enterprise. These core concepts can be extended to enterprise level agility. Core competence management refers to the competencies of individuals working in the organization and includes their skills, knowledge, attitude, and experience. Management of these competencies involves corporate culture that promotes

learning and sharing of experience, as well as the organization of work in a way that cooperation and collaboration are promoted. Virtual enterprise competence allows sharing the competencies via cooperation and coordination. As discussed later in the sense-response framework, organizations should be ready and have skill and knowledge of how to re-configure its resources in order to focus and realign with the available opportunities and changes. To achieve this competence organization, have to develop a strategic and organizational architecture that allows for flexibility, speed, and proactivity when responding or pro-acting to changes. All these abilities will not have a long-term effect if the organization will not be able to learn, collect and share its experience. This leads to the knowledge-driven enterprise, which emphasizes the importance of knowledge in gaining competitive advantage and differentiating from other organizations. This competence generally refers to the abilities to convert internal and external information into knowledge and solutions for customers (Yusuf et al., 1999). According to Alberts & Hayes (2003), agile organizations should be able to: maintain effectiveness across a range of tasks, situations and conditions (robustness); recover from or adjust to environmental changes (resilience); react to changes in timely manner (responsiveness); employ multiple ways to succeed and move seamlessly between them (flexibility); do new things and invent new ways of doing old things (innovation); change work processes and organization itself (adaptation). In practice, these organizational agility capabilities are often interdependent – when one capability is underperforming, the others are much more difficult to achieve.

Other authors identify similar organizational capabilities that help organizations to deal with challenges arising from environmental change, and summarize them according to four principles: responsiveness, competency, flexibility/adaptability, and quickness/speed (Eshlaghy et al., 2010; Giachetti et al., 2003; C. T. Lin et al., 2006; Ren et al., 2009; Sharifi & Zhang, 2001; Yusuf et al., 1999). Responsiveness refers to the organizational ability to identify changes and respond quickly. Competency involves knowledge and experience that helps to approach the environmental changes and respond efficiently and effectively. Flexibility refers to the ability to reconfigure existing resources to match the changing requirements, adapt to the change, and reach organizational goals. The fourth principle of organizational agility capabilities refers to the ability to act fast. It is especially important in fast-changing markets and industries, which highly depend on technological advancements or have constant changes in client preferences. Although named differently they are based on organizational ability to cope with external and internal changes and take advantage of them.

Organizational agility is not a goal in itself, but rather an instrument to adapt to the ever-changing environment, customer needs, maintain competitive advantage which in the end results in better performance of the organization (Jackson & Johansson, 2003). According to Jackson & Johansson (2003), agility corresponds to several capabilities found in three dimensions of an organization: manufacturing, product, and market. Meaning that agility cannot be achieved when concentrating on only one dimension. They divide agility capabilities itself into four dimensions: product-related change capabilities – to adjust to changes in consumer tastes; change competency within operations – to deal with changes in production process; cooperation internally and externally – ability to work together with

external partners and internally as a team when responding to the changes in the environment; people, knowledge, and creativity – relate to decision-makers, who put all other capabilities together.

Macro perspective on the organizational capabilities can identify organizational agility as a higher-order dynamic capability itself, which can enhance performance by effectively adjusting organization to environmental changes (Cai, 2013). According to Cai (2013), organizational agility is composed of only two capability groups: knowledge management capability and information technology capability. Knowledge management is defined by firm's ability to manage product, customer and managerial knowledge. Product knowledge refers to product and services development experience; customer knowledge – correctly identifying needs and preferences of consumers and changes in them; and managerial knowledge refers to the skills and ability to manage a company (Cai, 2013; Tanriverdi, 2005). Information technology organizational agility capability is categorized into IT objects, IT knowledge and IT operations. This lower-order capability supports the agility process. Although this organizational agility framework by Cai (2013) is based on capabilities that organization should develop, it is highly related to the sense-response framework discussed later. Both knowledge management and information technology capabilities promote organizational ability to identify the threats and opportunities in the market and to respond to these environmental changes in most efficient and beneficial manner. Author of the dissertation argues, that macro level dynamic capabilities concept application to organizational agility research is not providing the necessary distinction needed for organizational agility evaluation as it does not consider the necessary elements such as enablers and practices and only focuses on capabilities dimension. Moreover, according to Arndt & Jucevicius (2013) the dynamic capabilities concept is highly fragmented and unclear by itself. This makes the stand-alone dynamic capabilities concept application problematic for already multidimensional concept of organizational agility and requires the support of other dimensions – enablers and practices.

One of the most inclusive enabler-capabilities frameworks for organizational agility was presented by Sharifi & Zhang (2001), where four main aspects of agility in manufacturing organizations were identified: agility drivers; strategic abilities; agility providers; and agility capabilities. Their model is based on two main factors: responding to changes, exploiting changes and taking advantage of opportunities (Dove, 1996). Although the model was developed for manufacturing companies, it can be applied more universally when discussing organizational agility. Agility drivers represent the environmental changes and external forces that push business to adapt in order to compete. They result from the changes in the marketplace, competition, customer preferences, technology or social factors. In order to respond to these changes, adapt and take advantage of opportunities, organizations need to identify whether they have the necessary agile capabilities and agility providers. Sharifi & Zhang (2001) identify four agile capabilities: responsiveness, competency, flexibility, and speed. They are essential abilities that company needs in order to effectively respond to changes. Agility providers are identified as means by which those capabilities can be obtained and grouped into the business organization itself, technology, people, innovation, tools, practices, and methods (Sharifi & Zhang, 2001).

Table 5. Agile capabilities

Capability dimension	Capability group	Terminology used	Authors
Sensing	Awareness	<ul style="list-style-type: none"> • Reading the market • Scanning 	Charbonnier-Voirin (2011);
	Competence	<ul style="list-style-type: none"> • Innovating • Core competence management • Knowledge-driven enterprise • Knowledge management • Market capitalizing • Competency • Robustness • Responsiveness 	Charbonnier-Voirin (2011); Yusuf et al. (1999); Cai (2013); Sharifi & Zhang (2001); Alberts & Hayes (2003); Eshlaghy et al. (2010); Giachetti et al. (2003); Lin et al. (2006); Ren et al. (2009)
Response	Reconfiguration	<ul style="list-style-type: none"> • Mobilizing rapid response • Responsiveness • Flexibility • Resilience • Adaptation 	Charbonnier-Voirin (2011); Sharifi & Zhang (2001); Alberts & Hayes (2003); Eshlaghy et al. (2010); Giachetti et al. (2003); Lin et al. (2006); Ren et al. (2009)
	Learning	<ul style="list-style-type: none"> • Embedding organizational learning • Knowledge-driven enterprise • Information technology capabilities 	Charbonnier-Voirin (2011); Yusuf et al. (1999); Cai (2013);
	Coordination	<ul style="list-style-type: none"> • Virtual enterprise • Operational adjustments • Speed • Product-related change capabilities 	Yusuf et al. (1999); Cai (2013); Alberts & Hayes (2003); Jackson & Johansson (2003)
	Cooperation	<ul style="list-style-type: none"> • Responsiveness • Cooperation internally and externally 	Sharifi & Zhang (2001); Eshlaghy et al. (2010); Giachetti et al. (2003); Lin et al. (2006); Ren et al. (2009); Jackson & Johansson (2003)

Source: author

Literature analysis allows grouping the main abilities of agile organizations in Table 5. Author of the dissertation, based on the literature analysis distinguishes two main dimensions of the capabilities: sending and response dimension. As discussed in the preceding sections of the dissertation, the sensing dimension refers to organizational capability to notice and identify the changes in the environment in the form of threats or opportunities. The main sensing capabilities can be split into awareness and competence groups. First group of sensing capabilities – awareness, refers to organizational capability to understand the environment, by constantly scanning for changes and opportunities. Second sensing capabilities group – competence, refers to organizational capability to understand the changes in the environment and how they apply to the organization or industry. By developing sensing capabilities, organization can improve the competitive advantage in innovation and new business opportunities.

Second capabilities dimension refers to organization's ability to respond to the market changes. Author of the dissertation splits response dimension into four capability groups: reconfiguration, learning, coordination and cooperation. Reconfiguration capabilities refer to organization's ability to change existing structure, processes, and functions to mobilize its resources in order to adapt to the new challenges caused by changes in the environment. Learning capability allows organizations to learn from internal processes and utilize skills and knowledge of their employees. Coordination capability refers to management of change within organization, via communication, setting priorities, empowering employees. While cooperation capabilities refer to the external partners and business network, and organization's ability to involve this network in it's process of adaptation.

Enabler and capabilities framework is highly important for organizational agility process. Both enablers and capabilities work together by enhancing and compensating each other. Effective organization utilises both enablers and capabilities to change the agility level of organization. This utilization process refers to actions and practices that organization takes daily to strenghten and improve agility level and is discussed in the next section.

1.4.2. Organizational agility practices and processes dimension

This approach towards organizational agility asks a question "What organization *does* to be agile". Not exactly a framework in the sense of structured approach to study agility, however an important dimension and focus, as it emphasizes the utilization of enablers and capabilities in improving organizational agility. The focus lies on the practices and processes of the organization aiming towards agility, although there is a lack of consensus in the literature. For example, Yusuf et al. (1999) use enablers and practices as synonyms. They offer a general list of enablers under ten domains: the introduction of new products, the formation of partnerships, continuous improvement, short conception/production of deadlines, decentralized decision-making, response to market requirements, etc. These enablers can be turned into actions or practices, e.g. formation of partnerships is not a static ability, but rather an action which utilized people and networking skills to form successful partnerships.

Some researchers (Vázquez-Bustelo et al., 2007) think of agility practices and enablers as synonyms. They identify five groups of practices used in agile manufacturing organizations. The first group of practices develops highly trained, motivated and empowered team members. Agile organizations rely on systematic implementation and integration of advanced technologies in design, manufacturing and operational functions. The third group of practices in agile organizations relates to the internal organization of the operations and external relations. Agile organization integrates and coordinate value delivery chain as well as cooperate and integrate internal operations between organization's internal units and external network of agents (suppliers, customers, partners, shareholders, etc.). Agility in manufacturing organizations highly depends on practices in product development and design. The final group of agility practices relates to knowledge management and learning (Vázquez-Bustelo et al., 2007). This involves cooperation, sharing of skills, training and learning from past experiences.

Author of this dissertation argues that it is important to distinguish the framework of enablers and framework of practices. Enablers or characteristics is what abilities, features,

and capabilities organization has. However, it does not mean that organization is actually using those agility enablers in order to become agile and achieve competitive advantage while adapting to the fast-changing environment and seizing market opportunities. The action or practice is what distinguishes agile organizations from the rest, as it utilizes those enablers and characteristics that organization has. Agile abilities and enablers can be wasted if not properly used. Or they can be too costly or time-consuming. At the same time, an organization might not have any of the necessary agility enablers and still be able to aim towards and improve organizational agility level by practice alone. Therefore, constant practicing of agility is much more important than just mentioning or identifying it as another organizational enabler.

Goldman et al. (1995) identify four dimensions that organizations should aim towards in order to stay competitive and achieve agility. The dimensions can be interpreted as activities or practices that organization should perform continuously: enrich the customer, cooperate, organize for change, and leverage the impact of people and information. Enriching the customer practice focuses on the delivering value and solutions to customers rather than another new product or service. This practice requires constant adaptation to ever-changing customer tastes and preferences as well as responding to competitive forces. Second practice – cooperation, refers to the ability to deliver the value and solutions as fast and as efficient as possible. This involves cooperation not only internally between various business functions, but also externally with suppliers and partners. In order to stay competitive organization has to promote agility in the internal and external network. Adaptation to the fast-changing environment and network agility requires maintaining flexible internal organization and structures. Processes and functions have to be agile and enhance the adaptation process. The practice of utilization of existing knowledge, information, and technologies through empowering employees via continuous training provides organizations necessary abilities to achieve agility and competitive advantage (Sherehiy et al., 2007). All three processes are impossible without proper organizational culture, experience, and knowledge. Organizations promote workforce education and improvement of necessary skills in order achieve agility.

Similarly to Goldman et al. (1995), Charbonnier-Voirin (2011) identifies practices that are important in the agile organization and structure them into four main categories: practices directed towards mastering change, practices promoting the value of human resources, cooperative practices, and practices to create value for customers. The practices directed towards mastering change allow organizations to develop skills and experience necessary to react or pro-act to the changes in the environment; to communicate and share knowledge more efficiently within the organization. This practice helps to improve the process of identifying opportunities and threats arising from the changes in the environment. Second practice in Charbonnier-Voirin (2011) framework is somewhat related to the first one but directed more towards the development and empowerment of human resources. This practice allows organization employees to accept responsibility and have autonomy in the decision-making process. This practice allows fast response to the changes and is essential in fast-changing environments. It also encourages learning process from external as well as internal sources. The first two practices are not possible without the third practice of cooperation. This practice

is crucial in reducing response times and promoting innovation. Cooperation practice should involve both internal and external dimensions. Internally cooperation between employees and functional units improve sharing of the experience, reduce decision-making time and streamlines the processes, which allow for faster adaptation to the changing environment. External cooperation is important in reducing lead time and improving the efficiency of the value delivery from supplier to the end user. This leads to the fourth practice of enriching the customer and value creation. The most important aspect of this practice is the organizational ability to meet and exceed customer needs. As the customer needs are constantly changing, organizations must adapt their value delivery process and improve agility.

In order to implement the agility-based strategy, Gehani (2010) recommends to use the following actions and implement practices based on them: front-line decision-making empowerment, cross-functional team sharing, modular integration of available technologies, delayed design specification, product succession planning, enterprise-wide integration of learning. Empowerment of employees allows the organization to shorten the decision-making time, reduces delays, improves response and delivery times. In process employees are more involved and motivated, the organization is more agile in responding to changes and customers are satisfied due to improved service. Another source for delays in the value delivery process is organizational structure and separation of functional areas. Usually, each business unit has their own procedures, which delays production and delivery times. Improving cross-functional team sharing can reduce lead times, improve communication and help streamline the value delivery process. Technologies used in the organization should be as modular as possible. When new technologies are available in the market, organizations should be able to integrate them fast in the existing processes without delaying the production line or service delivery. Organizations should be able to adapt new technologies without the need to redesign the whole operation. In order to respond to market changes faster, organizations should implement rapid prototyping and delay design specifications and detailed descriptions, which delay the product or service introduction and testing process Gehani (2010). Another possible practice for agility improvement could be product succession planning. Instead of introducing the product with numerous features, that require extensive development and testing, organizations could start with lesser versions of the product and use succession planning to add additional features in later stages of product life cycle. The last action offered by Gehani (2010) is related to the practice of learning and unlearning on an ongoing basis, storing experience within the organization, thus reducing future mistakes or unnecessary delays. According to Sherehiy et al. (2007) starting with general and enterprise-wide goals, separate smaller goals or sub-goals can be established. The main domains where organizations should focus on developing goals for achieving agility can be customer satisfaction, cooperation, learning and knowledge management, and development of a culture of change. Based on these domains Sherehiy et al. (2007) identifies several sub-goals, or global strategies for organizations that should be practiced in developing organizational agility: enrich the customer; cooperate to enhance competitiveness; continuously train and leverage the impact of people, knowledge, creativity; continuously monitor the environment for opportunities, update and revise business strategies.

Based on literature review and discussion of frameworks, author of the dissertation identifies main practices in the process of organizational agility and presents them in Table 6.

Table 6. *Agile practices*

Practices dimension	Practices group	Practices examples	Authors
Organizational practices	<ul style="list-style-type: none"> • Structure • Processes • Resources 	<ul style="list-style-type: none"> • internal organization of the operations and external relations. • implementation and integration of advanced technologies • organize for change • practices directed towards mastering change • modular integration of available technologies • continuously monitor the environment for opportunities • update and revise business strategies 	Vázquez-Bustelo et al. (2007); Goldman et al. (1995); Charbonnier-Voirin (2011); Gehani (2010); Sherehiy et al. (2007)
Employee empowerment practices	<ul style="list-style-type: none"> • Skill sharing • Learning, • Motivation • Knowledge management 	<ul style="list-style-type: none"> • developing highly trained, motivated and empowered team members. • knowledge management and learning. • leverage the impact of people and information • practices promoting the value of human resources • front-line decision-making empowerment • enterprise-wide integration of learning • continuously train and leverage the impact of people, knowledge, creativity 	Vázquez-Bustelo et al. (2007); Goldman et al. (1995); Charbonnier-Voirin (2011); Gehani (2010); Sherehiy et al. (2007)
Customer enrichment practices	<ul style="list-style-type: none"> • Value proposition • Innovation • Product flexibility and features • Customer support 	<ul style="list-style-type: none"> • product development and design. • Enrich the customer • practices to create value for customers • delayed design specification • product succession planning 	Vázquez-Bustelo et al. (2007); Goldman et al. (1995); Charbonnier-Voirin (2011); Gehani (2010); Sherehiy et al. (2007);
Cooperation practices	<ul style="list-style-type: none"> • Supply chain adaptability • Network flexibility • Distribution 	<ul style="list-style-type: none"> • cooperative practices • cross-functional team sharing • cooperate to enhance competitiveness 	Goldman et al. (1995); Charbonnier-Voirin (2011); Gehani (2010); Sherehiy et al. (2007)

Source: author

Based on literature analysis, author of the dissertation identifies four main dimensions of organizational agility practices: organizational, employee empowerment, customer enrichment and cooperation. Organizational practices refer to the wider business practices that organization performs involving its structure, processes, management and resources, in order to make organizational more agile. Employee empowerment practices refer to

developing, training and enabling organizational human resources and making them more agile and acceptable of change. Customer enrichment is focused to external dimension of organization and refers to organizational practices that help to accommodate customer needs and changes in demand more effectively, thus making organization more agile. Cooperation practices are externally oriented as well and focus on making organizational network more agile and able to adapt to changes.

Organizations may not have necessary enablers or capabilities to become agile by simply activating them. Organizational agility is a process and needs to be changed constantly in order to adapt to constantly changing the environment. Thus high organizational agility level becomes a goal and organizations set different strategies in achieving these goals in a most efficient and effective way. By acting towards these goals, organizations start to utilize, develop or invent different enablers and capabilities necessary for organizational agility.

1.4.3. Sense-response dimension of organizational agility

The overview of both: enablers-capabilities framework, and practices approach, reveals some commonalities. Most of the researchers, discussing organizational agility using these frameworks rely on two main dimensions: sensing dimension and response dimension. The process of change is highly influenced by these dimensions. A catalyst for change, or organizational agility driver, usually occurs externally. Whether it is a change in customer tastes, competitor behavior or industry changes, they all influence organization from outside. In order to take advantage of these changes and utilize them as opportunities, first organizations must be able to recognize them and acknowledge. This ability or act of recognition by itself highly depends on the organizational abilities and people skills, experience and know-how.

Sense-response framework stands out of other frameworks (enabler-capability and practice) as it encompasses both of the previously discussed frameworks into a cohesive structure, based on constant process and action. According to Singh & Sharma (2013), sense-response framework can be explained by the concept of the magnitude of variety change (flexibility) and rate of generating a variety of change (speed). The flexibility component represents a structural dimension of organizational change and shows the degree to which organization is able to *respond* by changing its practices, products, services or processes. While second concept – speed, represents how fast organization can *sense* the market changes and adapt to them (Singh & Sharma, 2013).

Sensing dimension in sense-response network focuses on the abilities to see the external changes. It is directed outwards of the organization. This dimension is highly dependant on experience and abilities of decision-makers in the organization and their personal abilities. Lu & Ramamurthy (2011a) refer to this dimension of organizational agility as market capitalizing agility, as it focuses not only on collecting and processing external and internal information but also on the internal abilities. The organization reaches agility when it can effectively match external changes in the market and customer needs with internal abilities to meet those changes and needs.

Dove (2005) identifies three core elements for enterprise agility: knowledge management, which refers to timely and focused awareness for the need to change; value-proposi-

tioning skills, which help to prioritize and choose among alternatives; and the third one a response ability, which allows changing the processes in the organization. First two, refer to sensing dimension of the sense-response framework. Focused knowledge management enhances awareness of the business environment and its changes and facilitates identification of available opportunities. According to Dove (2005), knowledge management provides awareness by constantly analyzing and being aware of internal organizational and external market data, which act as sensors for opportunities and changes in the market. The data by itself is not useful and to be turned into information it must be relevant, timely, accurate and applicable to content. This transformational process from data to information and finally to knowledge can only be performed with the help of competent and experienced employees and decision makers of the organization, who know internal abilities and can match them to external opportunities. Through assessing and refining data and information and connecting information with the right decision makers allows individuals to learn in real-time and further increase sensing capabilities of the organization.

Ability to choose among several alternatives of action can also be attributed to sensing ability. Dove (2005) refers to value propositioning skill as an ability to make an intelligent choice, based on insight. This skill refers to an ability to see from the perspective of the decision maker. How the decision is made, which enablers of alternatives are valued, what is important and how value is perceived. The process of evaluating choice alternatives depends not only on the person making a choice – decision maker but also on the person who is presenting the alternatives. The process of choosing between different alternatives involves various skills: knowledge development, perception influencing, ROI development, communication and trust building skills (Dove, 2005).

One of the organizational capabilities in Nijssen & Paauwe (2012) research – fast learning, refers to environmental sensing and knowledge how to utilize the received information and take advantage of opportunities. Similarly, to the scalable workforce, knowledge has to align with organizational goals and environmental opportunities, in other words – have the right knowledge at the right time. Agile organization at the same time needs to create knowledge: manage, adapt, distribute and apply it. Knowledge creation consists of three building blocks: tacit knowledge – the one that is tied to our senses, like intuition; explicit knowledge – the one that is passed to us through teaching, experience sharing, etc.; and knowledge conversion, which refers to the process of how tacit and explicit knowledge interacts. Organizations, in order to achieve agility, have to take advantage of a capability of fast learning through knowledge alignment (collecting information through monitoring environment) and knowledge creating (sharing, discussing, documenting knowledge, and experimenting/simulating with it) (Nijssen & Paauwe, 2012).

Similarly, based on the sense-response framework and utilizing ideas of entrepreneurship and strategic management, Holsapple & Li (2008) advocate organizational agility construct based on two dimensions: alertness to changes and response capabilities to changes. The alertness refers to the opportunity-seeking capability from both internal and external sources, while response dimension refers to the internal organizational capabilities to change the processes. Two capabilities describe alertness: strategic foresight and systemic insight (Sambamurthy et al., 2003). Strategic foresight is the ability to anticipate the changes in the

marketplace, technology or general business environment. Ability to see potential moves of the competitors and identify opportunities from the changes. Strategic foresight is developed through knowledge, experience, and skills. While systemic insight is an ability to put the external information about the upcoming changes and opportunities with the internal capabilities. Systemic insight enables organizations to measure the attractiveness and feasibility of the market opportunities through the lens of internal abilities (Sambamurthy et al., 2003).

To achieve high organizational agility level just sensing abilities are not enough. Once organization realizes that it has to change and adapt to the new environment using sensing abilities, it has to have abilities that empower the internal change. These abilities can vary from one organization to another, however, some commonalities exist. *Response dimension* in a sense-response framework focuses on the internal abilities of the organization to respond to the environmental changes. Lu & Ramamurthy (2011b) call it operational adjustment agility as it focuses on an internal maneuvering to provide fast response to changes and is reactive in nature. Response-ability involves various dimensions within the organization and with its partners and is complex in nature, as it involves various levels and dimensions of the organization. Organizations should have a flexible structure, which allows shifting resources easily. Organizational culture should encourage change and empower employees to adapt to the new strategy. The external network should also support organizational agility. Suppliers, outsourced services, partners and other members of the external organizational network should be able to adapt to the changing demands and promote agility.

According to Dove (2005), response-ability has three core enabling elements: the culture of change proficiency, system response architecture, and process for change management. Change proficiency refers to organization's culture and an ability to discuss and practice change within the organization. Communication through all the levels of organizational structure is essential in facilitating organizational culture for change and agility. The culture of change proficiency response dynamics involves both reactive change and pro-active change. Reactive change refers to corrections of mistakes and rectifying a problem, changes to daily activities and performance adjustments (variation), responding to changes in capacity (expansion or contraction); and reconfiguration of resources and processes. The pro-active change includes creation or elimination of some aspect of the organization, such as product or service, culture, knowledge and skills; improvement of competences and performance factors; migration and fundamental transition to new infrastructure; modification of existing capabilities and adding or subtracting new ones (Dove, 2005). The second element of response-ability refers to the system architecture. The main design principles for the agile organizational system are reusability, reconfigurability, and scalability. Principles enabling reusability rely on distinct and self-contained modules, which are cooperating for the same purpose. Such modules share similar standards and are compatible as well as reusable. Principles enabling scalability rely on standards that increase module compatibility as well as elasticity. In order to achieve efficient reconfiguration of existing organizational elements, the principles of interaction, commitment, control, and self-organization must be followed (Dove, 2005). The third response ability enabling element in Dove (2005) framework refers to change management. Organizational abilities for change have to be developed and maintained with assigned strategic and tactical re-

sponsibilities. Change management is divided into two responsibilities: business systems engineering, which plans and initiates changes in policy, knowledge, processes; and change project management, which manages and implements procedures, develops knowledge, integrates processes and technology (Dove, 2005).

Nijssen & Paauwe (2012) use organizational agility framework based on sense-response dimensions. Organizational agility is presented through three capabilities: scalable workforce, fast organizational learning, and highly adaptable organizational infrastructure. The first capability refers to competency to reconfigure and transform the workforce when the need arises and refers to response dimension of the organization. Workforce scalability allows the organization to keep the workforce aligned with business goals and transform it freely from one composition to another. As organizational goals and aims change based on the market dynamism, thus workforce has to adapt and assume new configurations (Dyer & Shafer, 2003). According to Wright & Snell (1998), organizational effectiveness requires both strategic fit and flexibility of the workforce. Workforce scalability depends on workforce alignment (fit) and workforce fluidity (flexibility). Workforce alignment means that organization has the right number of employees, they are organized in the most efficient and effective manner and performing at their best in line with organizational goals. Workforce alignment is achieved through practices of open workforce planning, creating a shared mindset and increasing employee participation. While workforce fluidity is how easily can employees change and adapt to new market situations; how fast they learn and apply new skills and behaviors (coordination flexibility). Workforce fluidity is achieved through building relations with outsourced HR partners, job rotation, competence and skill training, allowing flexibility and decision freedom (Nijssen & Paauwe, 2012).

Highly adaptable organizational infrastructure is related to the response dimension of organizational agility. When an organization has the agile and scalable workforce and is able to apply the knowledge it has or learns from changing the environment, one of the obstacles towards the agility is organizational resources. Dyer & Shafer (2003) identify three components of organizational infrastructure that are important for agility: organizational design, business processes, and supporting technologies. The organizational design has to be fluid, horizontal, have limited supervision and boundaries, while business processes have to be flexible and have limited set routines and rules. Technologies should be easily adaptable to the changing organizational design and processes. They should support organizational change and allow for flexibility while being easily adjustable or replaceable.

Responsive capabilities refer to the ability to select available actions and enable those actions. When the change occurs in the environment or organization pro-actively identifies opportunities it has to select the appropriate action to take from the alternative ones. Decision makers have to evaluate available opportunities, coordinate and integrate with the rest of the functional areas and outside partners, learn from the experience and reconfigure available resources if necessary (Holsapple & Li, 2008).

Although this dimension is not singled out in organizational agility research, many of the agility definitions have one or few elements that emphasize the importance of qualitative elements of organizational agility. Organizational agility on its own will not be of value to the company if it is too expensive and costs exceed the benefits of being agile. *Effective-*

ness dimension gives a framework to achieve a high level of organizational agility practicality. Organizational agility will not be effective and practical if processes take too long to implement compared to market conditions, which change faster than organization is able to adapt. Therefore, such organizational agility effectiveness measures as cost, speed, quality, and scope, must be considered when establishing organizational agility framework (Dove, 2006). All actionable alternatives for change and adaptation have to be evaluated through these measures of effectiveness. Cost of an alternative has to be considered and least costly options should be preferred. Costs of the agile response should not exceed the benefits of such change. Speed is also essential in organizational agility process. Often organizational changes are complex and involve different stages of strategic and structural levels, which often takes considerable amounts of time. Alternative actions for change should be faster than the environmental change, otherwise, organization will always be late and catching up newest developments in the market. Quality of the alternative has to be considered as well and refers to the overall result of the change - time, cost, as well as completeness and organizational integration of the change. Scope refers to the organizational capability to involve different aspects of the organization and integrate them in the change process, as compared to changing limited area or function of the organization with a fixed set of pre-defined options (Dove, 2005).

Holsapple & Li (2008) measure organizational agility effectiveness using four elements: timeliness, flexibility, relevance, and affordability. Timeliness is different from speed as it refers to the delivery of the change at the most appropriate time, while speed only focuses on the time it takes to make a change. Flexibility refers to the ability to choose different available options and adapt to unanticipated changes. Both timeliness and flexibility show the degree of agility in the organization. In a fast-changing environment, the outcome and success of organization highly depend on the ability to identify opportunities in the market (sense) and be able to take action (response). However, these two abilities are not enough. Change has to come at the right moment (timeliness) and the organization has to be flexible in evaluating and selecting the most appropriate alternative. Even with well-developed agility abilities, organizations have to consider the costs (affordability) and relevance of the change. Being able to identify the opportunity and change to adapt to it will not be efficient if the change costs too much or is not in line with long-term goals (Li, Chung, Goldsby, & Holsapple, 2008).

Several other researchers identified similar qualitative dimensions for organizational agility: cost efficiency, quality improvement, dependability, flexibility (Vokurka & Fliedner, 1998); speed quality, flexibility, innovation, proactivity, profitability (Yusuf et al., 1999). Although these researchers do not identify these qualitative dimensions as a separate dimension of organizational agility. Rather these qualities are used interchangeably with other capabilities or target qualities for any organization that aims towards agility.

Author of this dissertation identifies organizational agility as encompassing perspective for both sense and response dimensions. Without the qualitative dimension, sense and response abilities lose its usefulness and applicability in business situations. An organization with a high level of agility, that fail at this dimension eventually may fail competitive race in a fast-changing environment. On the other hand, organizational agility based on only one

qualitative dimension can act as a competitive strategy. For example, agility to adapt to the fast-changing market environment based on only cost criteria can be effective even when other elements such as speed, quality are not reached to their potential.

Organizational agility within sense-response framework (Figure 3) can be described as a process of events, with sensing ability as a first step (sub-process). Once external threats or opportunities are identified, the organization has to identify whether it can cope with these changes: are external changes applicable to the organizational existing status and future strategic goals; are these changes potentially benefit an organization; can organizational actually do something about those changes. The ability to utilize internal and external organizational resources (capabilities and enablers) in response to environmental changes is a second sub-process in the sense-response framework. The organizational response is highly dependent on its capabilities and enablers. Once the decision to act towards an external change is made, the organization uses its capabilities and enablers to respond to the opportunity or threat. This complex process of evaluation and effective action to external stimuli is the basis for successful agile organization, based on the sense-response framework.

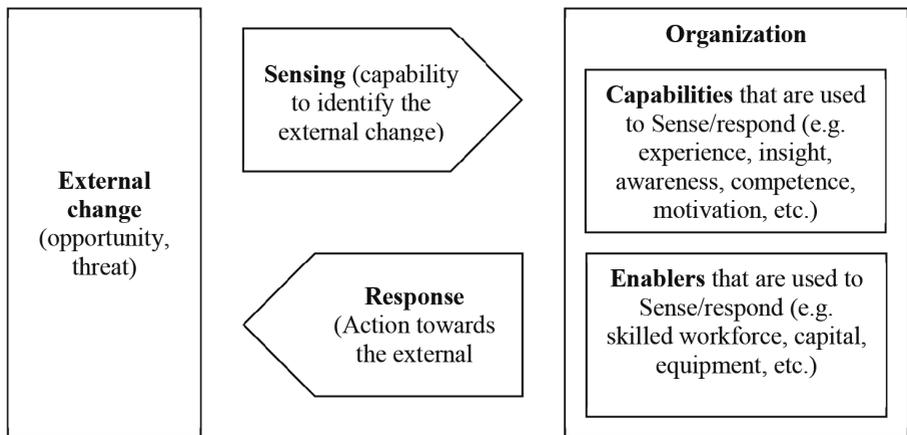


Figure 3. *Sense-response framework*
Source: author

Author of this dissertation argues that all three organizational agility frameworks (enabler-capabilities, practices, and sense-response) are not separate from each other but are interdependent. Each of them depends on the core abilities and enablers organization has. For example, organizational agility practices cannot be performed without proper infrastructures (enablers) and know-how (capabilities). In the same way, sense-response framework is in essence shifting focus towards organizational capabilities. Capability to identify shifts and changes in the environment, and capability to respond to these changes by utilizing applicable enablers which organization has. The three organizational agility frameworks are interdependent. Therefore, instead of selecting the preferred framework to approach organizational agility, author of this dissertation proposes to combine them

under sense-response framework with capabilities, enablers and practices as structural elements of this framework. This unified theoretical model of organizational agility is presented in the following sections of this dissertation.

1.5. Organizational agility typology

One of the goals of this dissertation is to identify how this typology applies to the high-growth companies. What type of organizations dominate in a high-growth environment and what characteristics such organizations have? Based on the sense-response framework, organizational agility typology could be presented. Author of this dissertation builds upon the organizational agility typology by Overby et al. (2005) and Singh & Sharma (2013). Both approaches use sense-response framework, although they present the typologies differently. Overby et al. (2005) use different sense and response capabilities of the organization and divide agile firms into four groups or quadrants: lost/leaping; limited; languid/lazy; agile. While Singh & Sharma (2013) propose a typology based on capacity that different agile organizations have and group them into four groups based on the two-dimensional framework: innovators, disrupters, indifferent and adaptive. Although Singh & Sharma (2013) insist that organizational capabilities and capacity should be separated, their typology relies only on one concept – organizational capacity for agility. They define agility capacity as the magnitude of flexibility within which organization can execute competitive actions, while capability is required for becoming agile. Both organizational capacity for agility and capability to act in this capacity are important and should be combined when attempting to present organizational agility typologies.

Author of this dissertation proposes to combine organizational agility typology approaches offered by Overby et al. (2005) and Singh & Sharma (2013) into a more unified framework based on *both* capabilities and capacities of organizations. On the x-axis, we plot the capabilities that organization has and uses them to adjust and adapt to the changing environment or agility drivers. One of the most important capabilities for organizational agility is to correctly identify the opportunities and threats in the environment. This identification of external agility drivers, their applicability to organizational goals and abilities to act is called sensing. In a volatile environment, sensing ability relies on important agility quality – speed. Capability to sense the environment in an effective and speedy manner is one of the most important organizational agility prerequisites. However, as discussed in preceding enabler-capability framework discussions, organizational agility enablers are equally important in attaining agility. The capacity for change is influenced by the internal and external organizational enablers and their flexibility to respond to the changing environment. Capacity is listed on the y-axis, which represents flexibility of organizational resources and the level of response.

Thus, the proposed model of organizational agility typology combines both capacity and capability of organizations within the sense-response framework and is presented in Figure 4.

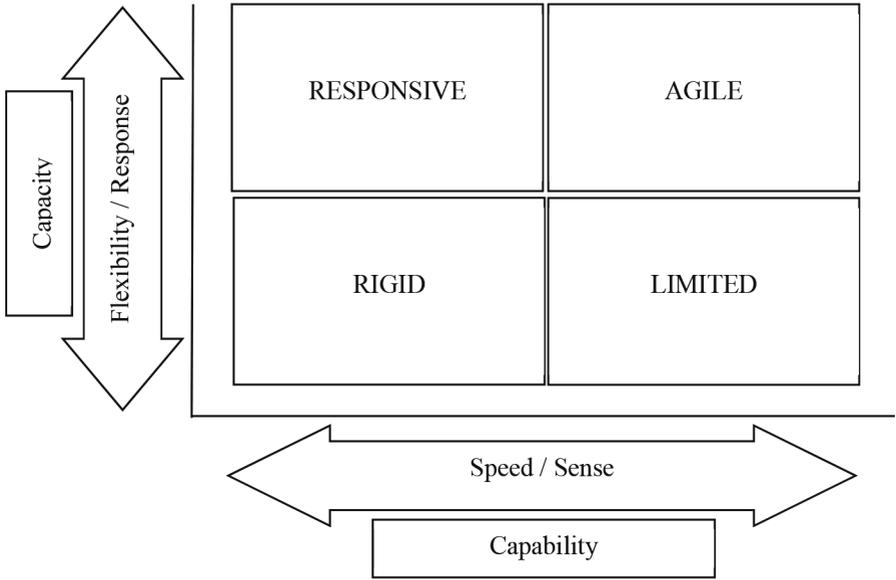


Figure 4. Organizational agility typology
 Source. author, based on Overby et al. (2005); Singh et al. (2013)

Organizations’ agility level depends on main two dimensions: the capability to sense the changes in a speedy manner and capacity to respond to them. This corresponds to the organizational agility model proposed by the author of this dissertation. This model combines two frameworks: enabler-capabilities and sense-response. Author of this dissertation distinguishes four main types of agile organizations depending on the combination and level of flexibility/response and speed/sense dimensions: rigid, responsive, agile, and limited.

Rigid organizations in agility sense, have lowest levels of flexibility/response capacity and speed/sense capabilities. Such organizations are unable to adapt to the fast-changing environment due to inability to identify the changes, lack of experience and skills. Rigid organizations usually have enablers (technologies, equipment, processes, etc.) that are not flexible and hard to change or adapt. Rigid organizations may choose not to adapt to the changes due to existing share or position in the market (e.g. monopolies). Any change in the market is perceived as a threat to the existing status quo.

Limited agility organizations have well-developed agility capabilities. Such organizations have knowledgeable employees, who are able to sense the changes in the market. Organizational culture in such enterprises promote and encourage change and actively look for opportunities in the market. However, such organizations are limited by their resources and lack the capacity to change. The flexibility of organizational resources, product-development, technology, supply chain, etc. is low. Overby et al. (2005) call high sensing

and low response organizations as languid or lazy, while Dove (2006) calls them catatonic. Such characteristics identify organizations as capable to change, but *unwilling* to do so. In disagreement, author of this dissertation characterizes limited organizations as *unable* to change due to various restrictions and limitations on their operations, organization, processes, network or structure. In a competitive environment, limited agility organizations fail to respond due to various deficiencies in product development, supply chain, strategic decision-making, risk aversion, resource rigidity, poorly integrated processes, or agency problems (Overby et al., 2005).

Responsive type of organizations in agility dimension have a high capacity to respond to the environmental changes and high resource flexibility and adaptability. However, such organizations lack the capability to sense the changes and act on them in a speedy manner. Singh & Sharma (2013) identify such organizations as innovators, due to their competitive strength in capacity to change, but at the cost of reduced rate of change. While Overby et al. (2005) call them lost or leaping, due to their strong response abilities, but the inability to identify correct opportunities to pursue. Lack of sensing ability might be a result of insufficient experience or knowledge accumulated in the company, especially when venturing new business areas and opportunities. This lack of experience might be attributed to such factors as reliance on outsourcing providers, which slows the experience gaining process; lack of integration, which reduces the information flow and knowledge sharing within the organization; and competitive complacency – being comfortable with status quo and unwillingness to see the opportunities (Overby et al., 2005).

Agile organizations have a high capacity for change and respond, flexible resources and high capabilities to sense the opportunities and adjust to changes in a speedy manner. Agile organizations, according to Overby et al. (2005), have well-developed agile capabilities in different areas of internal and external operations, that allow them to detect the environmental changes. While flexible capacity and efficient resource reorganization, allows such organizations to allocate necessary means to adapt to these changes.

By correctly understanding their agility typology, organizations can identify their weaknesses easier and attempt to compensate, by concentrating on the practices and actions that improve them. The most potential for improving organizational agility level lies in the types located in the lower right and upper left quadrants. Responsive agility type organizations can move towards the agile enterprise by working on and improving their sensing abilities. Foremost this can be done by increasing knowledge gaining, retaining and sharing. By involving new experts in the change process, sharing the know-how and training existing employees can improve the sensing capabilities. Limited type of organizations should work on improving their capacity for change. Capacity improvement can involve changing of the processes, equipment, capital base, structure and other resources. Improving capacity is often more expensive, complicated and time-consuming, compared to improving capabilities. The least potential for organizational agility lies within the rigid type of organizations. Such organizations have to work on both capacity and capability improvement. On the other hand, if the rigid organization is motivated and committed to becoming agile enterprise, it will see the most benefit from becoming agile.

1.6. Organizational agility drivers

Before presenting organizational agility theoretical model, it is important to overview the reason or catalyst for agility, as changes in external environment influence internal organizational processes and elements used to adapt to these changes. As it was discussed before, organizations aim towards being more agile in order to adapt to changing the environment and thus gain competitive advantage. Several researchers call this catalyst or antecedent as 'agility drivers' (Sharifi & Zhang, 2001; Yusuf et al., 1999). Organizations embrace agility strategies as a solution and response to environmental pressures. Main categories for agility drivers are based on their source: market-related changes – macroeconomic shifts, industrial shifts, shrinking lifetime of the products; competition based – globalization, internationalization, new product development and introduction to the market; customer related – changes in preferences and expectations, customization, speed delivery, availability of alternatives; technology-induced – new production and manufacturing, processes improvements, new industries; social factors – environmental protection, workplace shifts, legal issues (Ren et al., 2009; Sharifi & Zhang, 2001; Yusuf et al., 1999). External or internal changes open up an organization for vulnerabilities or opportunities, depending on how prepared organization is for a change. If the organization is not able to adapt to the changes, has rigid structure and processes, not sufficiently trained employees, or lack change capability altogether, it is exposed to the competitive forces and often fall behind the companies that are more agile and adaptable. However, if the organization is ready for change, has flexible structure and processes, highly trained employees and right culture, the market changes become opportunities to strengthen its competitive position and gain market share.

Author of the dissertation, based on literature analysis, identifies five main influences and sources for change and external pressure on organization to adapt (Table 7). These are major external structural changes that provides opportunities or poses a threat for organization's survival. Changes in the market – refers to the changes in the structural changes in the environment such as shift in consumer demand, product lifecycle and pricing changes. Competition drives organizations to adapt by bringing to the market new products, entrance of new market participants. Consumers are another source of changes and pressures on organizations to adapt. Changes in fashion or expectations can be considerable influence on organization. Technology driven changes refer to innovations and new technological advances, which changes competitive landscape and forces organizations to adapt new technologies or innovations to maintain or gain market share. Social factors also influence organizations to adapt, mainly through economy changes that affect consumers and legislative changes that may affect how organizations do business. The outcome of these external pressure drives organizations to adapt. Agile organizations, adapt easier to these external pressures by utilizing previously discussed agility enablers, capabilities and practices. Less agile organizations struggle with the changes in the environment caused by the drivers which results in lost competition and reduced results.

Table 7. Agility Drivers

Source	Reason for change
Market	Changes in Market Structure Changes in demand, needs/desires, fashion Fragmentation and Saturation of the market Power of buyer Product model proliferation Product lifecycle Price consciousness
Competition	Changes in competition environment Changes in competitor responsiveness Substitutes for products
Customer preferences	Changes in customer desires needs and wants Changes in expectations for price, quality, delivery time Changes in customer requirements homogeneity/heterogeneity
Technology	Technological changes New technology introductions
Social factors	Environmental pressures Changes in legislature and policies Changes in economy

Source: author, based on Sharifi and Zhang (2001)

In order to reach success in highly volatile environment organizations should be agile and efficiently adapt to: highly dynamic and unpredictable changes in the environment; highly populated and competitive markets with scarce resources (high hostility and competition); established relationships and cooperation between firms and their suppliers, clients, distributors and competitors (high complexity); and varied products, business lines, customers (high diversity) (Vázquez-Bustelo et al., 2007). The environment is a source of turbulence and uncertainty, which pressures organizations to adapt and find solutions to anticipate those changes and turn threats into opportunities (Eshlaghy et al., 2010). Agility drivers vary for different organizations and markets, however main motivators for change occur from several main sources and changes in competition, environment, social factors, technology, market, politics, customer needs and changes in the supply chain.

Organizational agility drivers usually come as a result of external changes – market, customers, competitors, etc. The motivation to increase organizational agility level can originate within the organization as well. Unsatisfactory results and low performance in certain business units or organization as a whole can also be a driver to rethink its strategy and choose agility as a possible solution for performance improvement. In order to be aware of such internal drivers for change and need for increased agility in an organization, its leaders should foster an organizational culture and environment where agility is considered as an asset for an organization. Processes, structures, and technologies have to be routinely evaluated for the ability to adapt to changes; employee skills have to be constantly trained and evolved utilizing newest methods and technologies.

1.7. Organizational agility theoretical model

This section aims at solving 3rd goal of this dissertation: develop a theoretical model for the evaluation of organizational agility level. The development of a unified and holistic organizational agility framework is a challenging task. There are several issues with current organizational agility frameworks. As discussed in preceding sections of this dissertation, the first problem arises from definition and conceptualization of the agility itself. Then issues with different domains, approaches, and frameworks complicate this task even further. Each different domain identifies agility concept differently, use enablers, characteristics, capabilities, practices, that are important for that particular industry or domain. Although preceding discussion of different organizational agility frameworks reveals some similarities. One of the goals of this dissertation is to build upon those similarities between domains, frameworks and their parts and attempt to construct a more unified and universal framework that can be applied to different types of organizations, regardless of their industry or business model.

As a first step of the theoretical model - causes and reasons for organizational agility should be established. For the purposes of simplifying and making model applicable for a wider range of organizations, agility drivers can be narrowed down to five main categories: changes in the market, competition, customers, technologies and social factors (Eshlaghy et al., 2010; Sharifi & Zhang, 2001). These agility drivers pressure organizations to adapt to the changing environment thus maintaining or gaining competitive advantage.

There is no single set of organizational agility enablers that will fit every organization. However, based on the literature review we can identify common organizational enablers that can be applied universally. Enablers play important role in development of organizational agility (Charbonnier-Voirin, 2011). Enterprise infrastructure consists of adjustable levers used in implementing successful agile practices and can be deployed when the environment changes: structure and organization; processes; technology, human resources and network (Charbonnier-Voirin, 2011; Dyer & Shafer, 2003; Sharifi & Zhang, 2001; Yusuf et al., 1999). These enablers work together with organizational agility capabilities, by enhancing each other and compensating the weaker or less agile components of the organization.

All five enablers of the enterprise should have certain characteristics that make those enablers agile. Foremost, structure and organization should be flexible and open to change. Components of the organizational structure should be easily adaptable to the external and internal agility drivers. Agile structure and organization should have informal, flat, horizontal; with goal-oriented leadership, decentralized knowledge and control, which allows to accept risks and concentrate on teamwork (Eshlaghy et al., 2010; Sherehiy et al., 2007). Processes in the agile organization should be flexible, consist of few rules, procedures and have adaptable role definitions (Sherehiy et al., 2007). Processes should concentrate and sense external environmental developments and promote adaptation to these changes. According to Sherehiy et al. (2007), human resource agile enabler of the organization should be proactive, adaptable, resilient, be able to collaborate, take personal initiative and responsibility, cope well with stress and unexpected changes. To develop these skills, organizations should promote employee empowerment and involvement, job rotation and enrichment (Sherehiy et al., 2007). Agile organizations should maintain flexible and adaptable networks, both internal and ex-

ternal. Internal networks should rely on teamwork, information and knowledge sharing. External partners, such as suppliers, contractors, distributors, etc., should be able to adapt to the changes in the business environment together with the agile organization. The fifth enabler of agile organizations – technology, should have similar flexibility characteristics as the rest of enablers. In addition, in order to adapt to the fast-changing environment, technologies should be modular, easily scalable and downgradable and have efficient cost structure.

The third component of the theoretical organization agility model consists of organizational capabilities that are interdependent with organizational enablers. Interdependency of organization agility enablers and capabilities are represented in the form of enhancing or compensating each other. For example, organization lacking some equipment or technology (enabler) to adapt to changing business environment, can compensate for the abilities of its employees (capabilities). In the same way, organizational agility enablers can be enhanced by organizational capabilities – e.g. technology combined with capable workforce can provide a very strong competitive advantage for the organization and ability to adapt to changing the environment.

Agile organization capabilities can be summarised into two main groups, based on the sense-response framework: sensing capabilities and response capabilities. Sensing capabilities refer to organizational abilities to sense external environment for threats and opportunities. One of sensing capability is awareness, which allows the organization to notice and anticipate changes in the environment. Awareness capability should also concentrate on the internal organizational ability to address the external changes. This second sensing capability – competence, relies on organizational experience and knowledge. It allows the organization to evaluate internal abilities to cope or take advantage of external changes. For example, the organization sees the change in consumer tastes (awareness) and needs to adjust its product line (response), however, its current equipment and experience make it impossible to act on these changes (competence).

The second group of organizational agility abilities is response capabilities. Response capabilities refer to the organizational ability to act (respond) to the changes in the environment. Author of this dissertation uses three capabilities based on dynamic capabilities theory (Sambamurthy et al., 2003; Teece, 2010): reconfiguration, learning, coordination and cooperation capabilities. According to Sambamurthy et al. (2003), response capabilities to opportunities and threats arising from changes in environment depend on the organizational ability to select appropriate actions and ability to enable those actions. Reconfiguration capability refers to organizational ability to adjust workforce, recourses and assets, partners, and processes in order to change and adapt to changing the environment, both internally and externally. Learning capability refers to organizational ability to learn from its experience, accumulate and share know-how and develop employee skills in order to face the changes in the market. Learning capability also covers internal know-how and ability to utilize external knowledge, which is an important factor in the innovation process. Last two capabilities – coordination and cooperation are similar in scope. Former one applies to coordination of internal resources – ability to motivate employees, mobilize for change, develop and foster change culture. Cooperation capability searcher for the support from the external organizational network during the change process. It involves coordinat-

ing partners, suppliers, distributors, etc. for the objective to improve organizational agility and its ability to adapt to changing the environment.

Agile organization enablers and capabilities work together via compensation and enhancement to move the organization forward. This process leads to actions that agile organization takes in order to efficiently change and adapt to the environment. These individual actions grow into agile practices. Agile organizations take the organizational assets (enablers and capabilities) and combine them into effective and meaningful activities and practices, that increase organizational agility level. Based on literature analysis (Charbonnier-Voirin, 2011; Gehani, 2010; Goldman et al., 1995; Sherehiy et al., 2007; Vázquez-Bustelo et al., 2007), main organizational practices focus on four dimensions: organization itself, employees, customers, and partners. Organizational practices aim at the development and increasing flexibility and adaptability of organizational structure, processes, and technology. If certain organizational enablers lack agility, organizational practices should be focused on improving the characteristics of those enablers or developing capabilities required for organizational agility.

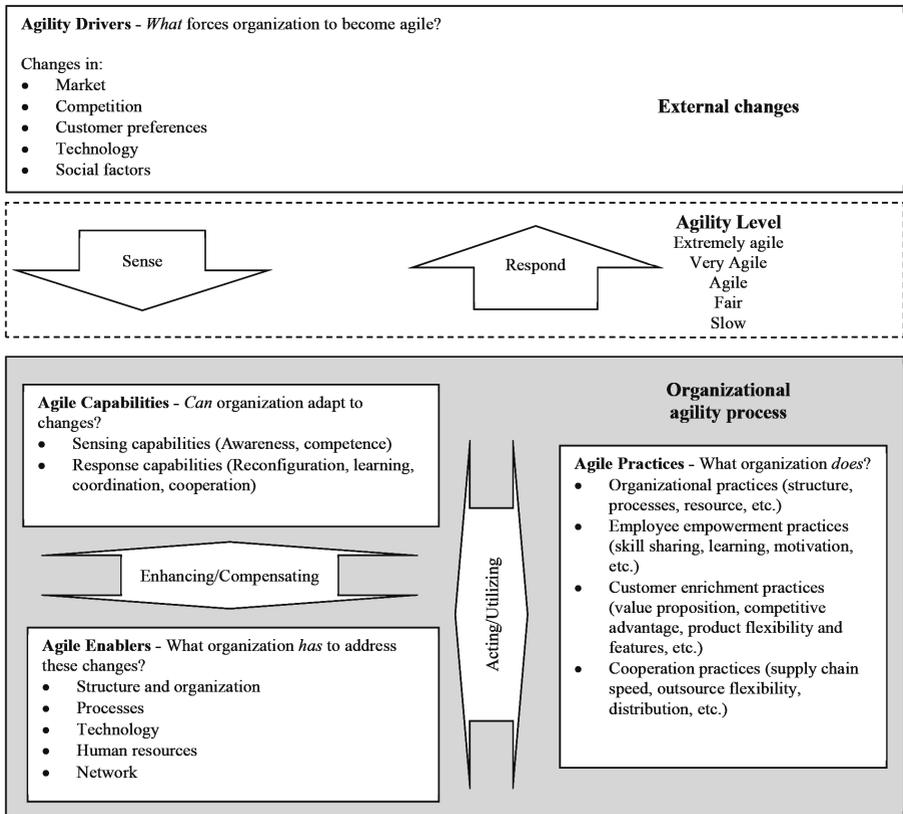


Figure 5. Theoretical organizational agility evaluation model
Source: author

Theoretical organizational agility evaluation model (Figure 5) can be applied as a process roadmap or a flow for decision making. Organizational adaptation starts as with the change in the environment through agility drivers. Once the change is sensed and recognized, decision-makers should take inventory of current situation in the organization by answering the questions 'what resources we have to address the changes in the environment' and 'do we have necessary abilities to utilize those resources and adapt to the changes?'. Once the inventory is established, organization decision makers should respond to the environment drivers by utilizing these of enablers and capabilities. The response is represented by action or practice, which leads to an outcome, such as the development of new product, or change in procedures. This process of adaptation to the environmental changes increases organizational agility level further through experience sharing. As business environment is constantly changing, the agile organization is also constantly applying its enablers, capabilities, and practices to adapt to these changes. Agility level determines how efficiently and quickly organization responds to the external changes, threats and opportunities. Organizations that are agile will adapt and take advantage of market changes better, compared to slower counterparts which can fail to adapt.

In summary of the first section of the dissertation, it can be concluded that the ongoing discussion in scientific literature on the subject of organizational agility is highly fragmented. Scientific literature reveals that even 'agility' term is used interchangeably with term 'flexibility', which only complicates focused study into organizational agility concept. Author of this dissertation discusses the differences between these two terms and proposes distinction based on criteria of scope, situation characteristics, response rate, outcome and type of change. Thus, establishing the main differentiating factors between agility and flexibility are that former applies to whole organization and its business network, deals with unpredictable changes in the environment, has fast response rate and unknown outcome.

Disagreements in scientific literature continues when defining organizational agility. Many authors approach agility concept from different directions, frameworks and contexts. Narrow definitions are used, that apply to specific industry context (e.g. manufacturing), functional area (e.g. supply chain) or take into consideration only limited internal or external factors (e.g. employee skills). Literature analysis establishes the need for a unified organizational agility definition that can be applied to wide context of organizations, regardless of the industry or business profile. Author of this dissertation proposes to unified definition of organizational agility as an organizational ability to recognize unexpected changes in the environment and appropriately respond in a swift and efficient manner, by utilizing and reconfiguring internal resources, thus gaining competitive advantage in the process.

Further analysis of organizational agility research literature reveals main directions and approaches to organizational agility concept by scientific community. Author of this dissertation systemizes these directions into three frameworks: capabilities-enablers framework, sense-response framework and practices framework. Most of the research of organization agility is based on one or another framework. Author of this dissertation proposes to combine some of the concepts and study organizational agility under sense-response framework, by utilizing organizational capabilities, enablers and practices as framework elements.

Dissertation author concludes first dissertation section by presenting theoretical organizational agility evaluation model based on sense-response framework. External changes or agility drivers influence and pressure organization to adapt. By utilizing sensing capabilities (awareness and competence) organization can identify these opportunities and threats. Organizational agility process involves three main elements: capabilities (awareness, competence, reconfiguration, learning, coordination and cooperation), enablers (structure and organization, processes, technology, human resources, network) and practices (organizational, employee empowerment, customer enrichment, cooperation). These elements act together by enhancing and compensating each other. The outcome of organizational agility process is increased agility level which allows to respond to the external changes in more efficient and speedy manner. This makes organization more agile and responsive to changes. Presented theoretical model can be applied in studying organizational agility in most types of organizations, regardless of the industry they operate in, business model or structure. Theoretical organizational agility evaluation model can be used by researchers to compare agility level between different types of organizations and provides opportunity to study agility in a wider scope by involving multiple organizations. Following sections of this dissertation applies theoretical model and tests it empirically.

2. ORGANIZATIONAL AGILITY MEASUREMENT METHODOLOGY

The second part of the dissertation attempts to solve 4th goal of the dissertation: Analyze organizational agility level assessment methods and formulate methodology its measurement. Organizational agility research is social science area research, where researchers use qualitative or quantitative methods. In order to achieve desired goals, research method must be carefully and correctly selected. In this dissertation, qualitative methods are used to determine the factors that influence organizational agility level, while quantitative methods are used for analyzing the research data.

Methodology section of the dissertation is divided into 3 main parts:

1. Methods used by different researchers for determining organizational agility level are analyzed;
2. Methodology for measurement of organizational agility is formed;
3. Hypotheses are formed and methods for testing of these hypotheses are selected.

2.1. Methodologies used for assessing organization agility level

There is no consensus on the organizational agility level measurement approach in scientific literature and researchers distinguish different components of agility (Hasan, Sarkis, & Shankar, 2012). Regardless, researchers seem to agree that organizational agility is one of the most important factors in ensuring organization's ability to adapt to changing the environment (Cegarra-Navarro et al., 2016; Mehdibeigi, Deghani, & Yaghoubi, 2016; Phillips & Wright, 2009; Samdantsoodol, Cang, Yu, Eardley, & Buyantsogt, 2017). This, in turn, has a positive impact on successful organizational development (Potkány, 2015; Todericiu, Fraticiu, & Grama, 2013). For this reason, research in organizational agility is an important area of study, that causes discussion and questions. The discussion shows that one of the most important questions to which there is no single answer – what factors influence the agility level of organizations and what factors weight in creating agile organization.

There have been a number of attempts and different approaches to measuring organizational agility level in the past. According to Yauch (2011), many organizational agility methodologies are too specific on one or another aspect of 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 variety of methodologies make the concept of organizational agility diverse and vague.

One of the first discussions of agility measurement was started by Dove (2005). He developed a set of metrics that should be used in measuring agility level – cost, time, quality and scope. According to Dove (2005), an agile organization should address all four metrics. Dove (2005) does not combine measures into one single enterprise agility metric, instead, he analyses changes proficiency using a collection of assessments of different business practices (Yauch, 2011). Change proficiency concept was further developed by Metes et al. (1998), who used balanced scorecard method to evaluate different agility dimensions.

Sharifi & Zhang (2001) introduced agility assessment model, which was based on two approaches – the first one determined the need for agility in the company, while the second approach measured the existing agility level. Sherehiy et al. (2007) also used several step approaches for implementing agility in various organizations. The first step of their framework evaluates the nature of the organizational environment. The second step assesses organizational agility level. The gap between environment requirements and organizational abilities in terms of adaptation to that environment presents a plan for improvement.

One of the more thorough agility evaluation methods was proposed by Yauch (2011), where the quantitative index of agility and conceptualized agility as a performance outcome was introduced. It combines both internal successes of the organization and volatile environment. This model uses operational measures and external parameters to determine agility in manufacturing organizations (Shaarabh, 2014). Other researchers (Hoek, 2001; Lin et al., 2006; Tsourveloudis & Valavanis, 2002; Yusuf et al., 1999) propose indexes to evaluate the agility capabilities (Charbonnier-Voirin, 2011). These researchers use set of indicators (e.g. reaction time, capacity to change, the rate of innovation, research expenditures, etc.), which help to estimate the costs and response time in firms undergoing change.

To approach impreciseness, vagueness, and multidimensionality of the organizational agility concept, (Tsourveloudis & Valavanis, 2002), designed “If-Then” rules based on fuzzy logic (Yang & Liu, 2012). They combined all organizational infrastructures (production, market, people, and information) as agile characteristics and their parameters to determine the agility level of the entire organization. Similar use of fuzzy logic was further developed by other researchers (Ganguly et al., 2009; Lin et al., 2006; Yang & Li, 2002). Yang & Li (2002) uses fuzzy logic and Multi-Criteria Decision Making (MCDM) to measure supply chain agility. Their model introduces Fuzzy Agility Index (FAI), which is used to evaluate agility in the organization. Ganguly et al. (2009) use fuzzy logic as well, by measuring responsiveness, market share, and cost-effectiveness in order to measure the level organizational agility (Shaarabh, 2014).

Organizational agility level measurement models have their shortcomings (Ganguly et al., 2009). Many of them are concentrating only on specific industry of organizations, in particular – manufacturing sector, where they analyze what manufacturing organization can do to enhance their agility (Ganguly et al., 2009; Jackson & Johansson, 2003; S. L. Yang & Li, 2002; Yauch, 2011; Yusuf et al., 1999). Others evaluate agility in a context of business process or area – e.g. supply chain agility (Ren et al., 2009; Sharifi & Zhang, 2001; Hoek, 2001), human resource agility (Breu et al., 2002; Shafer, 1997), information technologies (Kassim & Zain, 2004), process (Arteta & Giachetti, 2004). Some of the research is only based on theoretical assumptions and not validated empirically (Goldman et al., 1995; Shafer, 1997; Sherehiy et al., 2007). Other measurement models are tested only in a single organization (Tseng & Lin, 2011). Some measurement models can be applied to a wider range of organizations and are more holistic (Tsourveloudis & Valavanis, 2002; Yauch, 2011). Different organizational agility level measurement methods with their advantages and drawbacks are summarized in Table 8. Model shortcomings are evaluated based on the model's usefulness for achieving aims of this dissertation.

Table 8. Agility level measurement methods

Authors	Model description	Domain and Context	Advantages	Shortcomings ¹
Breu et al. (2002)	Evaluation of workforce agility with ten variables. Evaluation of each indicator in terms of speed and in terms of the level of adoption.	Human resources	-Wide sample tested (540 managers)	-Workforce specific -Concentrating only on capabilities
Goldman et al. (1995)	Agility diagnostic tool in the form of a list of questions organized into four categories of agile practices	Manufacturing	-Structured -Set of questions	-Based only on agility practices -Not tested empirically
Kassim & Zain (2004)	Scale of measurement of the contribution of systems and information technologies to developing agility	Information technologies	-Easy to use	-Measures only IT influence on agility
Lin et al. (2006)	Fuzzy agility index of a supply chain and fuzzy performance importance index for each agile supply chain attribute. Evaluation by a committee of experts of the weight of these attributes and of the rate of performance for each attribute.	Supply chain	-Uses fuzzy logic to avoid ambiguity -Identifies areas for improvement	-Evaluates only supply chain agility
Sherehiy et al. (2007)	Model estimates need for agility assesses the current situation, and determines required capabilities and relevant practices to achieve agility.	Agile manufacturing	-Easy of computation -Provides tools for improving agility	-No empirical validation -No quantifiable agility measurement
Shafer (1997)	Organizational Agility Index developed from case studies using (1) indicators evaluating the need for agility and indicators of frequency (2) the adoption of an agile strategy, (3) agile dimensions, (4) agility levers, (5) human resource activities (6) people role, and (7) people attributes	Human Resources	-Based on case study and practitioners' perspective	-Mostly concentrated on the effects of HR on agility -not empirically validated
Ren et al. (2009)	Model uses Analytical Hierarchy Model to identify agility capabilities and to calculate agility index	Supply chain	-Ease of calculation of agility capabilities	-Evaluates only supply chain agility
Jackson & Johansson (2003)	Model uses 3 steps: (1) evaluating market trends; (2) analysis of strategic objectives; (3) determining capabilities	Production system	-Ease of computation -Identifies capabilities that need to be improved	-Evaluation based on crisp values -A quantifiable index is not proposed

Authors	Model description	Domain and Context	Advantages	Shortcomings ¹
Hoek (2001)	The model evaluates five characteristics for agility – customer sensitivity, virtual integration, process integration, network, integration, and measurement. Agility is measured by averaging individual characteristics.	Supply chain	-Ease of computation	-Evaluation based on crisp values
Yang & Li (2002)	The model uses fuzzy logic approach to calculate agility. Evaluation index is used to measure agility based on weighted sum of attribute ratings and capabilities.	Manufacturing	-uses fuzzy logic - ease of computation and evaluation	-number of evaluated capabilities is limited
Arteta & Giachetti (2004)	Model is based on evaluating organization complexity, by measuring resources used in that process.	Process and resources	-determines the complexity of the organization	-does not propose methods to improve agility -complex and difficult to measure
Yauch (2011)	Agility is measured as performance outcome. Environmental volatility and organization success are used to calculate agility.	Manufacturing	-holistic approach -applies to different types of industries	-does not propose methods to improve agility
Tsourveloudis & Valavanis (2002)	This model combines production, market, HR, and IT as agile characteristics using ‘If-Then’ rules. Overall agility is measured based on company’s performance.	Enterprise	-uses fuzzy logic to determine agility -applies to the whole organization	-model is complex - ‘if-then’ rules are inflexible

Source: author, based on Charbonnier-Voirin, (2011); Shaarabh, (2014)

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 agile enterprise (Charbonnier-Voirin, 2011). Evaluation tools have not usually been tested and supported by empirical results (Sherehiy et al., 2007). According to (Charbonnier-Voirin, 2011), constructing a comprehensive measuring tool for organizational agility level is a major issue from both practical and theoretical perspectives. From a theoretical perspective, it encourages future research into organizational agility, while managerial perspective will gain insights into successful growth companies and provide an actionable model.

¹ For the goals and context of this dissertation

To sum up, it could be stated that 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 (Shaarabh, 2014). The different types of organizations over various industries complicate this task even further. There are scientists who emphasize the need to have suitable quantitative measurements in order to determine the agility of enterprise (Dubey & Gunasekaran, 2014; Gren, Torkar, & Feldt, 2015).

One of the goals of this dissertation is to present comprehensive and holistic measurement process, which can be applied to different types of organizations regardless of the industry they operate in. To achieve this goal, dissertation author adapts fuzzy logic method developed by Lin et al. (2006). Lin et al. (2006) use fuzzy logic method in the narrow context of supply chain agility. Author of this dissertation selected a fuzzy logic approach of evaluating the organizational agility level of the enterprise in order to overcome the problem of vagueness and imprecision. To measure organizational agility level, 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. Therefore, in order to minimize the risk of responses distortion, it is necessary to take into consideration these uncertainties (Sehra, Brar, & Kaur, 2012; Zhang & Liu, 2010). Several researchers, who analyze organizational agility level are using fuzzy numbers logic as well (Bottani, 2009; Jain, Benyoucef, & Deshmukh, 2008; Sangari, Razmi, & Zolfaghari, 2015; Sherehiy et al., 2007; Zandi & Tavana, 2011). Therefore, the responses of surveyed experts for this dissertation are evaluated using fuzzy numbers.

Fuzzy logic is especially suitable for social research, in particular management. Empirical assessments of organizations and their inner operations often are based on questioning top managers and basing the analysis on their answers. Each respondent has their interpretations of the concepts used in management. For example, such management terms as job satisfaction, skillful employees, efficient processes, effective supplier network and others are highly subjective and evaluation of these concepts can be biased to the interpretation of the respondent. In order to reduce uncertainty, author of this dissertation uses the fuzzy logic method and adapts it to the theoretical organizational agility evaluation model, presented in previous sections of this dissertation. The fuzzy logic evaluation of organizational agility level is chosen due to several advantages (Lin et al., 2006):

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 level. 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.

Dissertation author argues that fuzzy agility method can be modified to fit the presented contextual model of organizational agility in the preceding sections of this dissertation. Expanded methodology for evaluating organizational agility level in a wider context of whole organization, regardless of the industry is proposed. Organizational agility level measuring model based on the fuzzy logic is described and tested it in a dynamic set of organizations – high-growth companies. The measurement model and empirical findings are presented in the following sections.

2.2. Fuzzy Agility Index method for measuring agility level

Fuzzy Agility Index methodology is described in more detail below, but before analyzing fuzzy numbers, it is necessary to define them. Fuzzy number $\tilde{A} \in \mathfrak{R}$ is called fuzzy triangular number, if its function $\mu_{\tilde{A}}(x) : \mathfrak{R} \in [0; 1]$ is equal (Lima Junior, Osiro, & Carpinetti, 2014; Liu, Zhang, & Zhang, 2014; Pandey, Khare, & Shrivastava, 2012):

$$\mu_{\tilde{A}}(x) = \begin{cases} \frac{x-l}{m-l}, & \text{if } l \leq x \leq m; \\ \frac{u-x}{u-m}, & \text{if } m \leq x \leq u; \\ 0, & \text{otherwise,} \end{cases} \quad (1)$$

where:

$\mu_{\tilde{A}}(x)$ – membership function;

m – median value;

l – lower bound of the fuzzy number \tilde{A} ;

u – upper bound of the fuzzy number \tilde{A} .

In this dissertation, triangular fuzzy number is $\tilde{A} = (l, m, u)$ and its function is depicted in Figure 6.

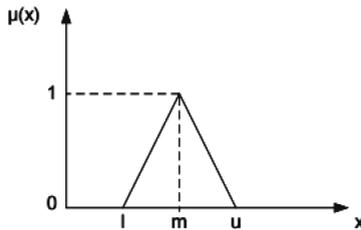


Figure 6. Triangular fuzzy number

Source: Bangian, Ataie, Sayadi and Gholinejad, (2011)

According to Lin et al. (2006), 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 combine the ratings and the weights to obtain a Fuzzy Agility Index (FAI) of an agile enterprise. Later, Fuzzy Agility Index is used to analyze possible improvements and steps an organization can take towards increasing agility. Author of this dissertation enhances Lin et al. (2006) organizational agility level measurement framework by adding two parameters from a theoretical model as discussed in preceding sections – agility enablers and agility practices. Visual representation of organizational agility level evaluation framework is provided in Figure 7.

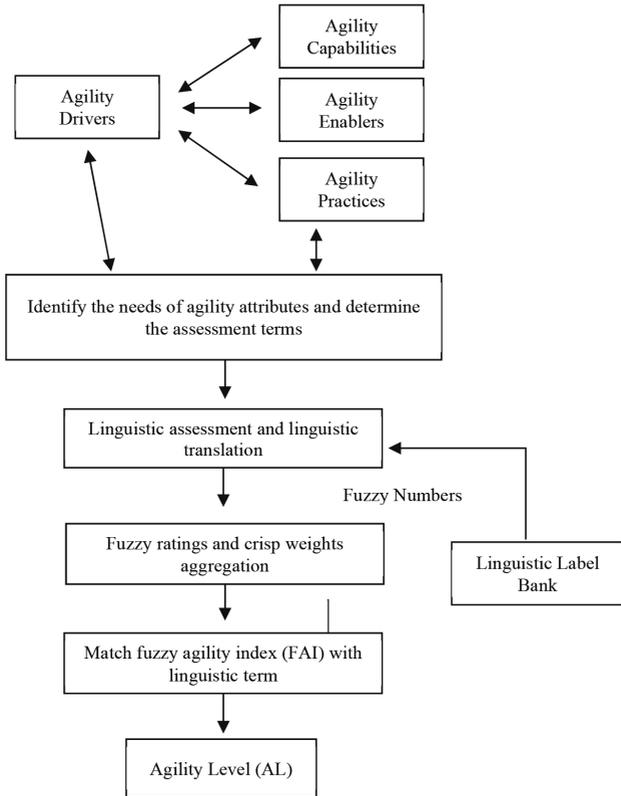


Figure 7. Organizational agility level measurement model
 Source: adapted from Lin et al. (2006)

Steps of organizational agility level evaluation framework (Lin et al., 2006):

1. *Select criteria for evaluation.* Based on analysis of theoretical aspects of organizational agility presented in part one of this dissertation, and theoretical organiza-

tional model, the applicable organizational agility enablers, capabilities and practices are selected. Table 9 summarizes organizational agility attributes, which are used to evaluate organizational agility level in high-growth companies. Each dimension consists of certain attributes, that are formed into groups (Table 9). Dimensions, attribute groups, and attributes are coded, as presented in Table 9.

Table 9. *Organizational agility dimensions and attributes*

Dimension	Attribute group	Agility attribute
Enablers (AC ₁)	Structure and processes (AC ₁₁)	<ul style="list-style-type: none"> • Simple organizational culture and decision-making (AC₁₁₁) • Easily changeable business process (AC₁₁₂)
	Human resources (AC ₁₂)	<ul style="list-style-type: none"> • Qualified and competent personnel (AC₁₂₁) • Flexible and open to change employees (AC₁₂₂)
	Network (AC ₁₃)	<ul style="list-style-type: none"> • Easily accessible needed resources (finances, specialists, technologies, etc.) (AC₁₃₁) • Effective supplier, distributor, and business partner network (AC₁₃₂)
	Technology (AC ₁₄)	<ul style="list-style-type: none"> • Easily changeable technology and information system (AC₁₄₁)
Capabilities (AC ₂)	Awareness and competence (AC ₂₁)	<ul style="list-style-type: none"> • Ability to sense changes and identify new business opportunities (AC₂₁₁) • Ability to implement important changes in the organization (AC₂₁₂)
	Reconfiguration (AC ₂₂)	<ul style="list-style-type: none"> • Ability to change organizational resources (employees, equipment, assets, etc.) (AC₂₂₁)
	Learning (AC ₂₃)	<ul style="list-style-type: none"> • Ability to share knowledge and empower employees (AC₂₃₁)
	Coordination (AC ₂₄)	<ul style="list-style-type: none"> • Ability to quickly develop and introduce new products/services to the market (AC₂₄₁)
	Cooperation (AC ₂₅)	<ul style="list-style-type: none"> • Ability to outsource, expand and change business partner network (AC₂₅₁)
Practices (AC ₃)	Organizational (AC ₃₁)	<ul style="list-style-type: none"> • Constant search for new business and development opportunities (AC₃₁₁) • Constant analysis and adaptation to internal and external changes (AC₃₁₂)
	Employee empowerment (AC ₃₂)	<ul style="list-style-type: none"> • Continuously increasing employee competence and qualifications (AC₃₂₁) • Constant sharing of knowledge and information within organization (AC₃₂₂)
	Customer enrichment (AC ₃₃)	<ul style="list-style-type: none"> • Constant improvement of products/services based on customer needs (AC₃₃₁)
	Cooperation (AC ₃₄)	<ul style="list-style-type: none"> • Constant improvement of business network and its support (AC₃₄₁) • Constant monitoring of business partner quality and effectiveness (AC₃₄₂)

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.

One of the main data collection methods used in social science research is a questionnaire. The questionnaire is used in this dissertation to obtain information from experts – company directors. The questionnaire is a collection of formalized questions used to obtain information from respondents (Dikčius, 2011). To collect the necessary data, a sample of respondents, who reflect entire population, is interviewed. When conducting a survey, it is important to select an appropriate survey form. For example, Dikčius (2011) identifies the following survey forms:

- Survey by telephone;
- Personal interview;
- Survey by post;
- A survey by electronic means.

In order to collect research data for this dissertation, a telephone survey was used. The telephone survey has following advantages (Dikčius, 2011; Knox & Burkard, 2009; Opdenakker, 2006):

- Survey by telephone requires fewer costs compared to personal interview or survey by post and provides opportunity to directly communicate with respondent
- A survey by telephone allows researchers to communicate with respondents from any region. Respondent accessibility is much higher, which allows applying survey results to the entire population.
- Survey by telephone allows to improve data collection quality (e.g. sample can include respondents who have reading or writing challenges)

Performing questionnaire method, it is important to determine sample that will reflect the entire population. The respondent number in the sample is calculated by applying following Slovin’s formula (2).

$$n = \frac{N}{1 + Ne^2} \quad (2)$$

where:

n – sample size;

N – population size;

e – margin of error.

The questionnaire used for the purposes of this dissertation consisted 21 statements. First 20 statements in the questionnaire were structured to reflect the selected agility attributes (Table 9) from 3 dimensions – enablers, capabilities, and practices.

Each of 20 statements consisted of two questions. First question asking to evaluate agility attribute importance weight and second asking to evaluate performance rating:

1. "How this statement is important for company's agility". With the following choice of answers: Critical, Very important, Important, Rather Important, Rather Unimportant, Unimportant, Completely Unimportant, Do not Know.
2. "How do you rate it in your organization?" With the following choice of answers: Excellent, Very Good, Good, Satisfactory, Unsatisfactory, Bad, Very Bad, No opinion.

Last questionnaire statement was related to organizational agility drivers and asked respondents "What factor forces your organization to adapt most?". Respondents had to evaluate 4 statements with the scale from 1 to 5 (1 - lowest influence, 5 - highest). Full questionnaire is presented in Appendix N.

Company director 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, author of this dissertation will 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 10). 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 11).

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.

Author of this dissertation uses fuzzy numbers to evaluate importance weights and performance rating of agility attributes.

Table 10. Linguistic variable for performance rating of the agility attributes

Linguistic variable	Code	Fuzzy number (\tilde{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 11. Linguistic variable for importance weights of the agility attributes

Linguistic variable	Code	Fuzzy number (\tilde{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)

Approximate the linguistic terms by fuzzy numbers. Applying approximate reasoning of fuzzy sets theory by Klir & Yuan (1995) the linguistic value can be approximated by a fuzzy number. The approximation will be specific for the context of this dissertation – 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.

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 (3).

(3)

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

where:

FAI – organization's Fuzzy Agility Index;

W_{ij} - fuzzy importance weight of the agile attribute ij ;

R_{ij} - performance rating of the agile attribute ij .

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 (Vinodh & Devadasan, 2011). Euclidean distance – is a distance measure (Merkys & Bubelienė, 2016). In other words, the Euclidean distance between point x and point y is the shortest distance between the two points; in a plane or in a three-dimensional space, it is the straight line connecting the points (Bilevičienė & Jonušauskas, 2011; Rudzkienė & Burinskienė, 2007). It is used in fuzzy num-

bers 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 12.

Table 12. *Agility Levels*

Agility Level (AL)	Code	Fuzzy number (\tilde{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 (4).

(4)

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

where:

d – Euclidean distance;

FAI – fuzzy agility index;

AL – agility level.

2.3. Formation of hypotheses and selecting testing methods

Hypotheses are tested after agility level for the surveyed organizations is determined. Based on theoretical organizational agility aspects analysis, it was observed, that the high-growth organizations need to adapt to the changing environment, therefore it has to be agile. Author of the dissertation argues that high-growth companies are affected by considerable changes and most of them should have higher than average agility level in order to adapt. It allows to form the first hypothesis to be tested:

H₁: Majority of high-growth companies' agility level is 'very agile'.

Analyzed companies belong to different industries and are affected by external changes in different manner. Changes in marketplace, competition and other agility drivers, combined with business specifics, product lifecycles, seasonality and other factors, influence organizations in various industries differently. Therefore, organizations are affected by specifics of their industry have different agility level. Author of the dissertation proposes that

industries which are affected most by changes in consumer demand and habits, such as wholesale or retail trade, are more agile than other industries, which are more inertial, such as construction, manufacturing or transportation. To confirm this premise, the following hypothesis is formed:

H₂: Companies in ‘wholesale, retail trade and repair of motor vehicles’ industry are more agile than in construction, manufacturing and transportation industries.

Scientific literature analysis revealed, that organizational agility level is affected by internal factors. Author of the dissertation in the preceding sections, argues that organizational agility enablers, capabilities and practices should be studied together as they are interdependent of each other and proposes organizational agility theoretical model based on this premise. Author of the dissertation argues that organizational agility is affected by them together and not a single group factor as suggested in other authors’ research. Based on this premise, the following hypothesis is formed:

H₃: Organizational agility level is influenced by following enabler, capability and practice factors: networking and product development, human resources, organizational awareness and competence, the flexibility of resources and processes, organizational structure.

To test the first hypothesis (H₁), cluster analysis is applied. Cluster analysis means the grouping of data in order to incorporate homogeneous data into a group (cluster). Al-Wakeel et al. (2017), Pourkamali-Anaraki & Becker (2017) define clustering as the grouping of data into a certain number of groups, when the elements of those groups are similar to each other. Therefore, cluster analysis is applied in order to classify available data into several groups so that the elements of each group demonstrate similar characteristics. The thesis 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;
- K-means method;
- Two-step method.

K-means method is the most frequently used clustering method (Celebi, Kingravi, & Vela, 2013; Cui, Zhu, Yang, Li, & Ji, 2014). When using this method, the following steps are performed (Mickevičius, Krilavičius, & Morkevičius, 2014):

1. objects are divided into k initial clusters;
2. the distance from each object to the cluster centers is calculated;
3. the object is assigned to the nearest cluster;
4. the cluster centers are recalculated;
5. steps 2 to 4 are repeated until there is no more redistribution.

This method, however, has shortcomings, one of the most fundamental of which is the need to pre-determine the number of clusters. The number of clusters is determined by the agility level of the organization, which, in its turn, is determined using a 5-level scale. That is, organizations which have the same agility level are included into one cluster. In order to test the results of clustering procedure on significance level, Pearson chi-square test is used.

Two-step clustering is the method of grouping the data of two stages. At the first clustering stage, the so-called sub-clusters are formed of data. At the second stage, the sub-clusters

are merged into clusters. One of the advantages of this method is that the number of clusters is selected automatically. Therefore, the two-step method allows not only selecting the optimal number of groups but also identifying the most important factors which influence the optimal number of groups. In addition, the method allows analyzing the characteristics that determine the assignment of the data to certain groups (Саргсян, Геворгян, & Кочинян, 2016). In order to verify the significance of clustering procedure Pearson chi-square test is used.

The clusters formed for the testing of the first hypothesis (H_1) are used in testing the second hypothesis (H_2). For hypothesis H_2 testing SPSS comparing column proportion method is used. The column proportions tests are used for determination of the relative ordering of categories of the columns categorical variable in terms of the category proportions of the rows categorical variable (IBM Knowledge Center, 2014). In fact, for each pair of columns, the proportions are compared with the calculation of the z -test.

To verify the third hypothesis (H_3) factor analysis is applied. Factor analysis is broadly used in social sciences. Factor analysis can be defined as the sum of statistical methods, the purpose of which is to replace the population of attributes describing the observed phenomenon with a set of several factors (Šimanskienė & Paužuolienė, 2012). In other words, factor analysis helps to simplify sets of complex data. For study data processing, researchers studying the agility of organizations, apply exploratory factor analysis (EFA) (Panda & Rath, 2016; Wendler, 2014, 2016). Factor analysis is performed in four stages (Pukėnas, 2009):

1. The data are verified for suitability for factor analysis.
2. The number of factors is determined.
3. The rotation and interpretation of the factors.
4. The estimation of the factor values.

In verifying the data for suitability for factor analysis, the following criteria are used (Pukėnas, 2009; Williams, Onsman, & Brown, 2010):

- Bartlett's Test of Sphericity (BTS). This criterion tests the data for homoscedasticity. In other words, Bartlett's Test of Sphericity relates to the significance of the study and shows the validity and suitability of the respondents' answers collected. For factor analysis to be suitable, the BTS should be less than the selected significance level α . The BTS is calculated using the formula presented below (5).

(5)

$$BTS = \frac{(N - k) \ln s_p^2 - \sum_{i=1}^k (n_i - 1) \ln s_i^2}{1 + \frac{1}{3(k-1)} \left(\sum_{i=1}^k \frac{1}{n_i - 1} - \frac{1}{N - k} \right)}$$

where:

$N = \sum_{i=1}^k n_i$;

k – number of samples;

n_i – sample size;

s_i^2 – sample variance.

- Kaiser-Meyer-Olkin Measure (KMO). This measure tests whether the partial correlation coefficients among the variables are small. If the KMO measure value is small, then the factor analysis of the variables under consideration is not effective. The KMO should be within the range between 0.5 and 1. The KMO is calculated with the application of the formula (6),

(6)

$$KMO = \frac{\sum \sum_{i \neq j} r_{ij}^2}{\sum \sum_{i \neq j} r_{ij}^2 + \sum \sum_{i \neq j} a_{ij}^2}$$

where:

r_{ij} – the correlation coefficient of the variables X_i and X_j ;

a_{ij} – the partial correlation coefficient of the variables X_i and X_j .

To determine the number of factors, a Scree Plot image/plot is used. On the axis of abscissas (X), factors are indicated by significance; on the axis of the ordinates (Y), respective eigenvalues of these factors are indicated. The factors on the plot which is beyond the point where the sharp drop of the curve goes into gradual decrease are considered as insignificant (Ledesma, Valero-Mora, & Macbeth, 2015; Oh & Patton, 2017).

For the rotation and interpretation of factors, a factor weight matrix is drawn up and rotation is performed using the method of *Varimax with Kaiser Normalization*. Varimax method “Varimax minimizes the number of variables that have high loadings on each factor” (Banni et al., 2010). In order to extract maximum variance from the dataset with each component thus reducing a large number of variables into a smaller number of components, the principal components analysis (PCA) is used (Yong & Pearce, 2013). Abdi and Williams (2010) describe PCA as “a multivariate technique that analyses a data table in which observations are described by several inter-correlated quantitative dependent variables”.

Factor values are calculated in accordance with the formula (7) (Yong & Pearce, 2013).

(7)

$$X_j = \sum_{j=1}^m a_{ij}F_j + e_j$$

where:

$j = 1, 2, \dots, p$ (p – number of variables);

X_j – variable represented in latent factors;

F_j – underlying factors;

$a_{j1}, a_{j2}, \dots, a_{jm}$ – factor loadings which denote that the factor loading of j^{th} variable on the 1st factor (m – number of underlying factors);

e_j – specific or unique factor.

Additionally, one-way analysis of variance (ANOVA) is used in order to test Hypothesis H_3 . A one-way ANOVA is a measure that is used to compare the means between the groups (Azizi, Skutella, & Shahverdi, 2017; Olaitan et al., 2017). Since the groups based on organizational agility level are formed, one-way ANOVA is used in order to determine whether there are any statistically significant differences between the means of these groups and factors used to determine agility level in the company. In fact, this will allow to identify statistically significant factors and reveal the possibilities for improvement in organizational agility level. However, before using ANOVA it is necessary to conduct a test of homogeneity of variance as ANOVA could be used for homogeneous variables only. In order to verify ANOVA results Test of Homogeneity of Variances is used. For non-homogeneous variables, the robust test should be used.

3. EMPIRICAL ASSESSMENT OF ORGANIZATIONAL AGILITY

The third part of the dissertation attempts to solve 5th goal of the dissertation: verify the application of the model in Lithuanian high-growth companies. This section of the dissertation is divided into 3 parts:

1. Sample of the studied companies is selected and described;
2. Agility level is measured in sample companies using FAI methodology;
3. Raised hypotheses are tested.

3.1. Sample selection and description

An empirical study into organizational agility was conducted during September 2016. The list of high-growth Lithuanian companies was obtained from “Gazele” project implemented by the business daily newspaper “Verslo Žinios” analytics department (Verslo Žinios, 2016). “Gazele” project is intended for small and medium-sized businesses. Its purpose is to provide information relevant to the growing businesses, draw the attention of the public to new market participants, rally them and encourage them to share the experience of efficient operations (Verslo Žinios, 2017). 4,041 businesses were on “Gazele” list in 2015 (Verslo Žinios, 2016).

The “Gazele” list included the following data: company name, company code, turnover, profit, industry, address, and region. Telephone numbers, director names, financial results, and other missing data for the surveyed companies were added using *Registru centras* (2016), Verslo Žinios (2016) and other public sources.

3576 companies were selected from “Gazele” 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) Company has been in the same industry for the accountable period (2011-2014)
- h) Company provided valid contact information and name of director

In order to confirm the hypotheses, all the companies under consideration were grouped by industries. Such grouping was necessary because companies in different sectors develop at a different pace. In other words, innovation levels differ from sector to sector, therefore, comparisons of companies from different industries is difficult. All the companies under consideration were grouped into nine industries, using European Community’s statistical classification (Eurostat, 2008), *Appendix C*:

- agriculture, forestry, and fishing;
- construction;
- financial and insurance activities;

- human health and social work activities;
- manufacturing;
- professional, scientific and technical activities;
- real estate activities;
- transportation and storage;
- wholesale and retail trade; repair of motor vehicles and motorcycles.

Figure 8 shows the distribution of ‘Gazele’ companies by industry type.

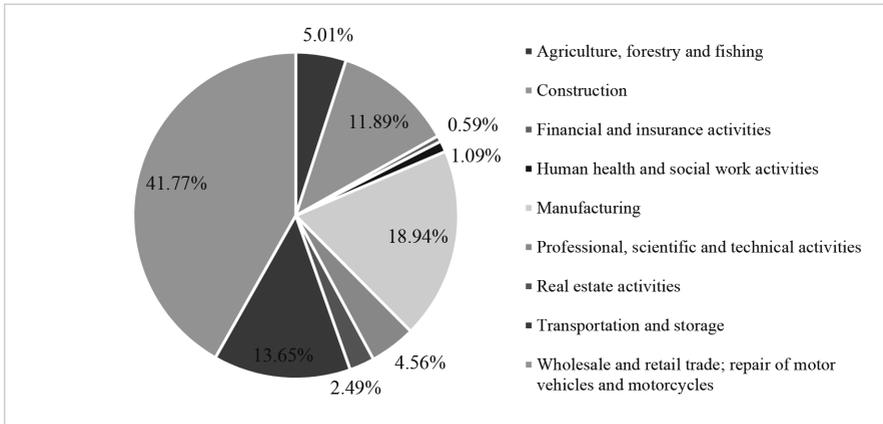


Figure 8. *Distribution of ‘Gazele’ companies by industry type*
Source: author

As shown in Figure 8, companies in the wholesale and retail trade sector and the repair of motor vehicles and motorcycles sector account for the largest part of companies selected for the study (over 40%). Furthermore, companies in the construction, manufacturing and transportation and storage sectors each account for more than 10% of the selected companies. It is important that representatives of all industries are surveyed in the study.

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. 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. The testing of the hypotheses defined in the methodology part of the dissertation is described below.

The distribution of the surveyed companies by industries is shown in Figure 9 below.

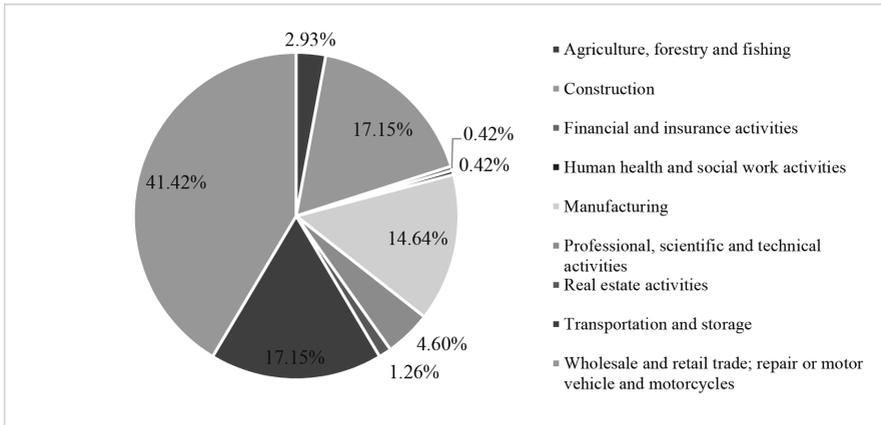


Figure 9. The distribution of the surveyed companies by industries
Source: author

As shown in Figure 9, the majority of all surveyed companies fall within four industries. These are a wholesale and retail trade; repair of motor vehicles and motorcycles, which accounts for 41% of all the surveyed companies. The transportation and storage sector and the construction sector comprise 17.15% of the companies each. The manufacturing sector covers more than 14% of the companies. A comparison of Figure 8 and Figure 9 shows that the distribution of the surveyed companies by industries in percentage terms is almost the same as the distribution of the selected companies by industries in percentage terms. More detailed information about the companies selected for the survey is presented in Table 13.

Table 13. Company distribution by types of industry

Industry		Frequency	Percent	Valid percent	Cumulative percent
Valid	Agriculture, forestry and fishing	7	2.9	2.9	2.9
	Construction	41	17.2	17.2	20.1
	Financial and insurance activities	1	0.4	0.4	20.5
	Human health and social work activities	1	0.4	0.4	20.9
	Manufacturing	35	14.6	14.6	35.6
	Professional, scientific and technical activities	11	4.6	4.6	40.2
	Real estate activities	3	1.3	1.3	41.4
	Transportation and storage	41	17.2	17.2	58.6
	Wholesale and retail trade; repair or motor vehicle and motorcycles	99	41.4	41.4	100.0
	Total	239	100.0	100.0	

Source: author³

As shown in Table 13, all the companies under consideration operate in nine sectors, however, their distribution is uneven. Numbers of companies falling within the relevant industry category are shown in the Frequency column. Distribution of the companies in percentage terms is presented in the Percent column. The Valid Percent column shows the frequency companies without missing data in percentage terms. The percentage values presented in the Cumulative Percent column have been calculated by adding the percentage from the line above, starting from the top of the table. One can see that values in the Percent and Valid Percent columns coincide, which means that information on companies without missing data is used for the analysis.

As shown in Table 13 and Figure 9 the distribution of companies by industries is uneven. There are sectors with a small number of companies, therefore, it is not expedient to analyze these sectors as the results obtained will not represent the entire population. Therefore, four industries are analyzed below, namely

- construction;
- manufacturing;
- transportation and storage;
- wholesale and retail trade; repair of motor vehicles and motorcycles.

Both ‘Gazele’ and surveyed companies are represented unevenly between Lithuanian regions. As seen from Figure 10, the distribution correlates to the size of the regions. i.e. the bigger the region, the more companies are represented in both lists. The biggest region that has most companies represented in both “Gazele” and “Surveyed companies” lists is Vilnius region. It represents over 40% of high-growth and surveyed companies. While such regions as Šiauliai, Panevėžis, Alytaus, Marijampolės, Tauragės, Utenos, Telšiai, each have less than 6% representation. This indicates that most high-growth companies are concentrated in three biggest regions – Vilnius, Kauno and Klaipėdos.

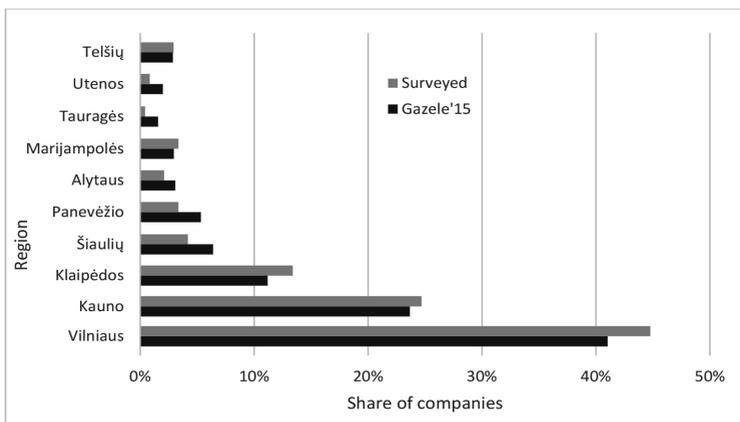


Figure 10. Regional representation of ‘Gazele’ and surveyed companies

Note: Gazele 2015 N=4041; Surveyed N=239

Source: author

Revenue growth rate of both “Gazele” and surveyed companies is shown in Figure 11. The majority (1884 companies or 46.6%) of “Gazele” companies had revenue growth rate in the range of 20-50% during years 2011-2014. While those “Gazele” companies that responded to survey (surveyed companies) on average had higher growth compared to all “Gazele” companies. As shown in Table 14, average revenue growth of “Gazele” companies was close to 70%. At the same time, surveyed companies on average grew 165% (Table 14).

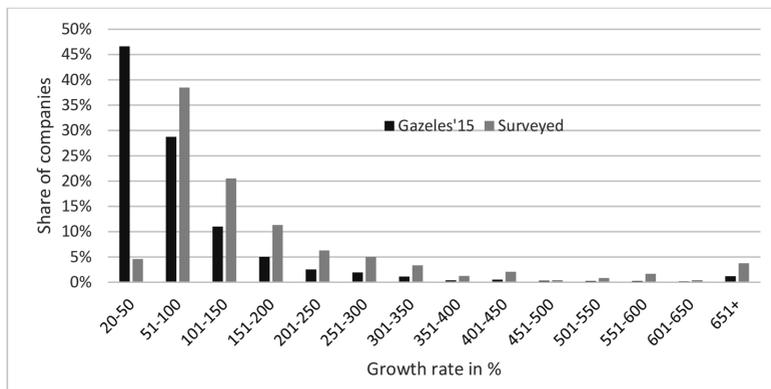


Figure 11. Revenue growth rate of ‘Gazele’ and Surveyed companies

Note: Gazele, N=4041; Surveyed, N=239

Source: author

The difference in growth rate is also seen from Figure 11 – majority (92 companies or 38%) of surveyed companies had revenue growth rate in the range of 51-100% during years 2011-2014. Average revenue of 4041 companies in ‘Gazele’ list in the year 2011 was 2.2 mil. EUR, while in 2014 average revenue reached 3.74 mil. EUR (Table 14). At the same time, 239 surveyed companies’ average revenue in the year 2011 was 1.46 mil. EUR, while in the year 2014 average revenues reached 3.87 mil. EUR. (Table 14). Regardless of the difference in revenue growth, surveyed companies’ empirical results reflect the entire population of all ‘Gazele’ companies, as determined using Slovin’s equation (2).

Table 14. Financial results for “Gazele” and Surveyed companies

	Gazele Companies (N=4041)				Surveyed Companies (N=239)			
	Revenues 2011, Eur	Revenues 2014, Eur	Growth 2011-2014, %	Net Profit 2014, Eur	Revenues 2011, Eur	Revenues 2014, Eur	Growth 2011-2014, %	Net Profit 2014, Eur
Total	8,880.98	15,116.68	70%	969.38	348.59	924.59	165%	50.48
Mean	2.20	3.74	70%	0.24	1.46	3.87	165%	0.21
Median	0.91	1.65	82%	0.08	0.68	1.71	151%	0.08

Source: author

Figure 12 shows the distribution of revenues for surveyed companies. 239 surveyed companies achieved average growth of 165% (median 151%) between the year 2011 and 2014.

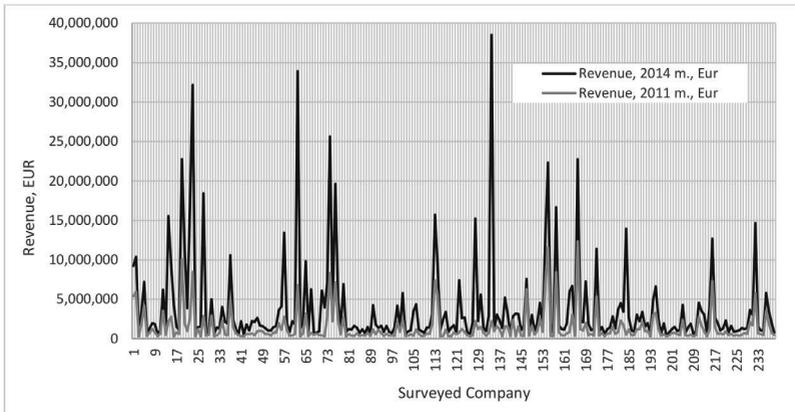


Figure 12. *Surveyed companies' revenue*
 Note: Surveyed, N=239
 Source: author

The year 2014 was profitable for both 'Gazele' and surveyed companies. 4041 'Gazele' companies in 2014 have reached a total net profit of 969 mil. EUR, with an average net profit of almost 239,887 EUR and median net profit 79,891 EUR (Table 14). 239 surveyed companies in the year 2014 have reached a total net profit of 50 mil. EUR. Similarly to 'Gazele', surveyed companies' average net profit for 2014 was 211,218 EUR, and median 77,736 EUR. (Table 14). Figure 13 shows the distribution of net profit in 2014 for surveyed companies.

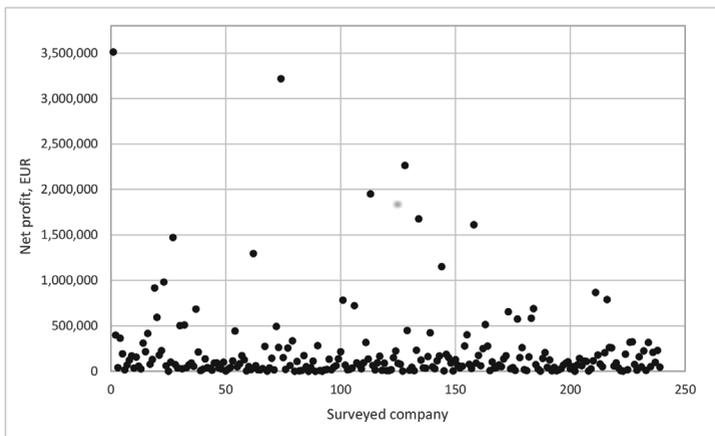


Figure 13. *Surveyed companies' net profit for 2014*
 Note: Surveyed, N=239
 Source: author

In summary, the surveyed companies can be described as follows: majority belongs to wholesale and retail trade industry, and most are from biggest Lithuanian regions. In 2011 had average revenue of 1.46 mil EUR and in 2014 3.87 mil. EUR. Majority of surveyed companies' revenue grew in the range of 51-100% between 2011 and 2014. In 2014 they received an average net profit of more than 200 thousand EUR.

3.2. Measurement of organizational agility level

Before testing dissertation Hypotheses, organizational agility level for each company needs to be calculated using Fuzzy agility index methodology described in part 2 of the dissertation. For demonstration purposes, evaluation of organizational agility level will be presented only for one studied company (respondent 1), while the calculation of agility level in rest of 238 studied companies will be shown in Appendices. Studied company names are coded for the confidentiality purposes.

After collecting responses via telephone survey using linguistic terms, performance ratings and importance weights of agility attributes for Company 1 (Respondent 1) are listed in Table 15. A full list of all surveyed companies' agility attribute importance weights in linguistic terms is presented in Appendix D. Full list of performance ratings in linguistic terms is presented in Appendix E.

Table 15. *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 10 and Table 11 to fuzzy numbers (\tilde{A}) and presented in Table 16. A full list of surveyed companies' agility attribute importance weights in fuzzy numbers is presented in Appendix F, while performance ratings in Appendix G.

Table 16. 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 (3). Full calculation sequence is presented in Appendix H.

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

Fuzzy Agility Index for Company 1 is (4.36, 5.72, 7.16). Similar FAI calculations are done for all remaining 238 respondents and are presented in Appendix I.

Next, using Euclidean Distance Formula (4), the Fuzzy Agility Index for Company 1 is matched with Agility Level (Table 12).

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

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

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

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

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

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 and presented in Appendix J.

3.3. Hypotheses testing

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 (H₁)** 'Majority of high-growth companies' agility level is 'very agile' ; the companies were divided into clusters based on the degree of agility. As already mentioned in the second section of the dissertation, three methods were used for this purpose:

- Euclidean distance method;
- K-means method;
- Two-step method.

Clustering procedure results using Euclidean distance method are presented in Table 17.

Table 17. Cluster analysis using Euclidean distance method

		Agility					
		A		VA		EA	
		count	%	count	%	count	%
Industry	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 and motorcycles	22	47.8	62	42.2	15	65.2

Source: author'

As indicated in Table 17, 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 18 below.

Table 18. Pearson Chi-Square Tests for Euclidean distance method

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

Results are based on nonempty rows and columns in each innermost subtable.

a. More than 20% of cells in this subtable have expected cell counts less than 5.

Chi-square results may be invalid.

Source: author

As evident from Table 18, $p > 0,05$ (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 19.

Table 19. Cluster analysis using K-means method

		Agility					
		A		VA		EA	
		Count	%	Count	%	Count	%
Industry	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 and motorcycles	30	51.7	46	37.1	23	67.6

Source: author

As can be seen from Table 19, 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 20).

Table 20. 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

Table 20 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. To ensure reliability of results, one more method, namely, the Two-step method is used. The results obtained by this method are presented in Table 21.

Table 21. Cluster analysis using Two-step method

		Agility					
		A		VA		EA	
		Count	%	Count	%	Count	%
Industry	Construction	10	18.2	29	22.8	2	5.9
	Manufacturing	10	18.2	23	18.1	2	5.9
	Transportation and storage	7	12.7	27	21.3	7	20.6
	Wholesale and retail; repair of motor vehicles and motorcycles	28	50.9	48	37.8	23	67.6

Source: author

Based on the results provided in Table 21, it may be concluded that also in this case the companies of the industries concerned were divided into three clusters: agile (A), very agile (VA) and extremely agile (EA). In the same manner, as for the previous methods, the Pearson chi-square test was carried out in order to verify statistical significance of this method the results whereof are presented in Table 22.

Table 22. Pearson Chi-Square Tests for Two-step method

Industry	Agility	
	Chi-square	13.895
	df	6
	Sig.	0.031 ^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

As evident from Table 22, $p < 0,05$ (Sig. $<0,05$), which leads to a conclusion that the chi-square test is suitable for the verification of the statistical significance of the results $\chi^2 > \chi^2_{tbl}$, kai $\chi^2_{tbl} = 12,59$, $\alpha = 0.05$. Summarized results obtained through the clustering procedure are presented in Table 23.

Table 23. Summarized clusterization results

Method	Agility level (4 industries)				
	Slow	Fair	Agile	Very agile	Extremely agile
Euclidean distance	0	0	46	147	23
K-Means	0	0	58	124	34
Two-step	0	0	55	127	34

Source: author

An analysis of the data in Table 23 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 growth period have seen major changes in 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 favorably, 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.

Thus, 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*.

Hypothesis (H_2) – "Companies in 'wholesale, retail trade and repair of motor vehicles' industry are more agile than in construction, manufacturing and transportation industries", is tested next. Clusters formed during the testing of the first hypothesis (H_1) are used for testing hypothesis (H_2). For the testing, a comparison of the column proportions is used. The results are presented in Table 24.

Table 24. Comparisons of Column Proportions^a

		Agility level		
		A	VA	EA
		(A)	(B)	(C)
Industry	Construction			
	Manufacturing			
	Transportation and storage			
	Wholesale and retail trade; repair of motor vehicles and motorcycles			B

Results are based on two-sided tests with significance level 0.05. For each significant pair, the key of the category with the smaller column proportion appears under the category with the larger column proportion.^a

a. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using Bonferroni correction

Source: author

For the tests associated with 'wholesale and retail trade; repair of motor vehicles and motorcycles', B key appears in the C column. No other keys are reported in other columns. Thus, the proportions of companies which are *extremely agile* are greater than the proportion of the companies which are *very agile*. It can be explained by dynamism 'wholesale

and retail trade; repair of motor vehicles and motorcycles'. Comparing all four analyzed industries, from the business perspective, 'wholesale and retail trade; repair of motor vehicles and motorcycles' industry has the highest seasonality effect. Customer preferences are most dynamic and dependent on many external factors. Construction, manufacturing, transportation, and storage - all the remaining sectors are slower to adapt to the changing environment due to their business nature. For example, the construction industry is involved in long-term projects which last several years and depends on substantial investments. Manufacturing industry depends on long-term investments into equipment, turnover capital, machinery, and labor. 'Transportation and storage' also has long-term investments into warehouses and heavily transport. Business cycles of construction, manufacturing, transportation, and storage, are relatively long and don't change on annual basis considerably. and repair sector business cycle is much shorter, dependent on seasonality, fashion, consumer tastes. This industry is much more sensitive to demand and supply forces and highly affected by competition. In construction, manufacturing, transportation and storage industries barriers to entry are very high due to considerable investment requirements and running costs. In wholesale and retail trade and repairs sector, the barriers of entry are considerably lower, thus making competition much more difficult. All these reasons affect wholesale and retail trade and repairs sector. In order to gain competitive advantage and hold it, companies in this industry must be more agile and adapt faster to the changes in consumer preferences and competitive pressures.

The results of the analysis lead to a conclusion that the second hypothesis (H_2) - "Companies in 'wholesale, retail trade and repair of motor vehicles' industry are more agile than in construction, manufacturing and transportation industries" - has been confirmed.

Third hypothesis (H_3) 'Organizational agility level is influenced by following enabler, capability and practice factors: networking and product development, human resources, organizational awareness and competence, the flexibility of resources and processes, organizational structure' is tested next. As already mentioned in the methodological part of the thesis, factor analysis is used for the testing of the hypotheses. However, prior to making the calculations, data is suitability for the factor analysis has to be confirmed. For this purpose, Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin Measure are used. The results of the tests are presented in Table 25.

Table 25. *KMO and Bartlett's Test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.878
Bartlett's Test of Sphericity	Approx. Chi-Square	1348.222
	df	190
	Sig.	0.000

Source: author

It could be seen from Table 25, that Kaiser-Meyer-Olkin Measure is equal to 0.878 which is greater than 0.5. It indicates that the sample is adequate for factor analysis. What is more, the p -value (Sig.) is $0.000 < 0.05$ and $\chi^2 > \chi^2_{tbl}$, ($\chi^2_{tbl} = 223.16, \alpha = 0.05$). Hence factor analysis is considered to be an appropriate technique for the data analysis.

The number of factors has to be determined next. A scree plot is used for this purpose (see Figure 14). The scree plot helps to determine the number of factors to retain. The point of interest is where the curve starts to flatten. It can be seen that the curve begins to flatten between factors 5 and 6. It is also notable that factor 5 onwards have an eigenvalue of <1, so only 5 factors have been retained.

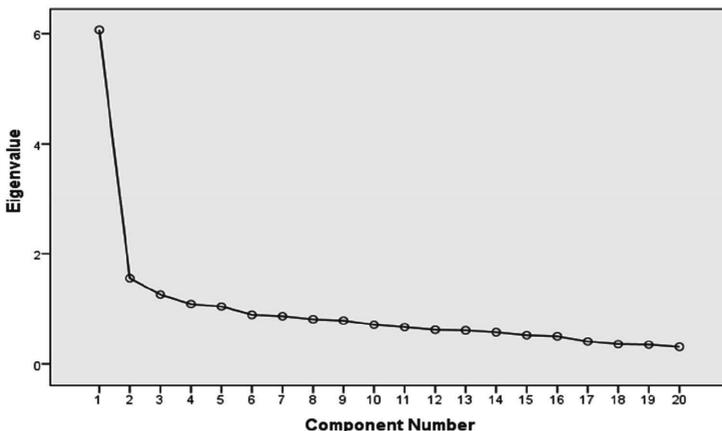


Figure 14. Scree Plot
Source: author

The number of factors determined from Figure 14 is five. In order to determine the group to which each attribute belongs, coefficients of correlation between each variable (factor) and each group are calculated using SPSS statistical software. Rotation process helps to reduce the number of factors on which the variables have high loadings and makes interpretation of the analysis easier. The results are presented in Table 26.

Table 26. Rotated Component Matrix^a: Agility Attributes

Attributes	Component				
	1	2	3	4	5
Constant monitoring of business partner quality and effectiveness	0,799				0,170
Constant improvement of business network and its support	0,707		0,239	0,127	0,178
Ability to quickly develop and introduce new products/services to the market	0,627	0,261	0,121	0,274	
Ability to outsource, expand and change business partner network	0,510			0,126	0,474
Constant analysis and adaptation to internal and external changes	0,506	0,135	0,419	0,165	
Qualified and competent personnel	-0,147	0,715		0,164	0,236
Continuously increasing employee competence and qualifications	0,258	0,683		0,279	

Attributes	Component				
	1	2	3	4	5
Constant sharing of knowledge and information within organization	0,371	0,612		-0,181	0,195
Constant improvement of products/services based on customer needs	0,480	0,494	0,197	0,190	-0,232
Flexible and open to change employees	0,201	0,403	0,396	0,113	0,194
Effective supplier, distributor and business partner network	0,138	-0,159	0,759	0,161	0,149
Ability to share knowledge and empower employees	0,142	0,450	0,562		
Ability to implement important changes in the organization	0,184	0,485	0,525	0,189	
Ability to sense changes and identify new business opportunities	0,240	0,148	0,389	0,313	0,349
Ability to change organizational resources (employees, equipment, assets, etc.)	0,194	0,105	0,128	0,699	-0,103
Easily changeable business processes	0,112	-0,101		0,604	0,419
Easily changeable technology and information systems	0,119	0,462	0,119	0,572	
Easily accessible needed resources (finances, specialists, technologies, etc.)		0,154	0,276	0,399	0,105
Simple organizational structure and decision making		0,168	0,101		0,713
Constant search for new business and development opportunities	0,427	0,253	0,226		0,522

*Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.^a
a. Rotation converged in 7 iterations.*

Source: author

The next step is to look into the content of attributes that group under the same component and find common theme that these attributes share. To assign the attributes under consideration to specific factors, strongest correlations between the relevant factors and attributes have to be identified. The strongest correlations are marked in grey (see Table 26). Based on initial methodological grouping between agility enablers, capabilities and practices, and statement commonalities and weighting of the statements, the extracted factors are named as follows:

- 1st factor – Networking and product development;
- 2nd factor – Human resources;
- 3rd factor – Organizational awareness and competence;
- 4th factor – Flexibility of resources and processes;
- 5th factor – Organizational structure.

Since there are 3 groupings within the data set based on agility level (Agile, Very Agile, Extremely Agile), one-way analysis of variance (ANOVA) is used in order to determine whether there are any statistically significant differences between the means of these internal factors and factors used to determine agility level in the company. This will allow to identify statistically significant factors and reveal the possibilities for improvement in organizational agility level. Descriptive statistics are presented in Appendix K.

In order to verify whether ANOVA can be used for the data of the study, the Test of Homogeneity of Variances is performed (see Table 27).

Table 27. Test of Homogeneity of Variances: internal factors

	Levene Statistic	df1	df2	Sig.
Factor_1 - Networking and product development	0,051	2	236	0,950
Factor_2 - Human resources	0,342	2	236	0,711
Factor_3 - Organizational awareness and competence	3,065	2	236	0,049
Factor_4 - Flexibility of resources and processes	0,988	2	236	0,374
Factor_5 - Organizational structure	1,693	2	236	0,186

Source: author

Levene's test is used for the verification of the homogeneity of dispersions. As seen in Table 27, for factors 1, 2, 3 and 5 $p > 0.05$ (Sig. > 0.05) (the factors fulfilling the condition of homogeneity are shown in grey). This shows that the groups' dispersion variances are slight, which means that the data is homogenous. Whereas for Factor 3, $p < 0.05$ (Sig. < 0.05), i.e. the data is not homogeneous and a robust test should be used. ANOVA results are presented in Table 28 below.

Table 28. Analysis of Variance (ANOVA): internal factors

		Sum of Squares	df	Mean Square	F	Sig.
Factor_1 - Networking and product development	Between Groups	24,462	2	12,231	16,439	0,000
	Within Groups	175,591	236	0,744		
	Total	200,053	238			
Factor_2 - Human resources	Between Groups	20,302	2	10,151	21,458	0,000
	Within Groups	111,647	236	0,473		
	Total	131,950	238			
Factor_4 - Flexibility of resources and processes	Between Groups	10,115	2	5,057	7,406	0,001
	Within Groups	161,158	236	0,683		
	Total	171,272	238			
Factor_5 - Organizational structure	Between Groups	18,040	2	9,020	11,476	0,000
	Within Groups	185,504	236	0,786		
	Total	203,544	238			

Source: author

An analysis of Table 28 shows that the p -value for all the four factors under consideration is below 0.05, which means that the difference between the means of each group's variables is statistically significant, i.e. it can be concluded that the variances are accidental. The results of the robust test, which is used for non-homogeneous variances, is presented in Table 29.

Table 29. Robust Tests of Equality of Means: internal factors

		Statistic ^a	df1	df2	Sig.
Factor_3 - Organizational Awareness and competence	Brown-Forsythe	22,756	2	124,299	0,000

a. Asymptotically F distributed.

Source: author

The *p*-value (Sig.) shows that the statements differ significantly among different agility groups (see Table 29). Thus, it has been found that the means of the groups under consideration are different. Tukey's HSD test is performed in order to determine the groups the means of which are different. The results of all the pairs under consideration are presented in Table 30.

Table 30. Multiple Comparisons: internal factors

Tukey HSD					
Dependent Variable			Mean Difference* (I-J)	Std. Error	Sig.
Factor_1 - Networking and product development	Agile	Very agile	,37341 [*]	0,13106	0,013
		Extremely agile	,98918 [*]	0,17255	0,000
	Very agile	Agile	-,37341 [*]	0,13106	0,013
		Extremely agile	,61576 [*]	0,15395	0,000
	Extremely agile	Agile	-,98918 [*]	0,17255	0,000
		Very agile	-,61576 [*]	0,15395	0,000
Factor_2 - Human resources	Agile	Very agile	,41217 [*]	0,10451	0,000
		Extremely agile	,89627 [*]	0,13759	0,000
	Very agile	Agile	-,41217 [*]	0,10451	0,000
		Extremely agile	,48409 [*]	0,12276	0,000
	Extremely agile	Agile	-,89627 [*]	0,13759	0,000
		Very agile	-,48409 [*]	0,12276	0,000
Factor_3 - Organizational Awareness and competence	Agile	Very agile	,43155 [*]	0,09735	0,000
		Extremely agile	,91749 [*]	0,12816	0,000
	Very agile	Agile	-,43155 [*]	0,09735	0,000
		Extremely agile	,48594 [*]	0,11434	0,000
	Extremely agile	Agile	-,91749 [*]	0,12816	0,000
		Very agile	-,48594 [*]	0,11434	0,000
Factor_4 - Flexibility of resources and processes	Agile	Very agile	0,14418	0,12556	0,485
		Extremely agile	,61843 [*]	0,16530	0,001
	Very agile	Agile	-0,14418	0,12556	0,485
		Extremely agile	,47424 [*]	0,14748	0,004
	Extremely agile	Agile	-,61843 [*]	0,16530	0,001
		Very agile	-,47424 [*]	0,14748	0,004
Factor_5 - Organizational structure	Agile	Very agile	,39354 [*]	0,13471	0,011
		Extremely agile	,84394 [*]	0,17735	0,000
	Very agile	Agile	-,39354 [*]	0,13471	0,011
		Extremely agile	,45040 [*]	0,15823	0,013
	Extremely agile	Agile	-,84394 [*]	0,17735	0,000
		Very agile	-,45040 [*]	0,15823	0,013

^{*}. The mean difference is significant at the 0.05 level.

Source: author

As seen in Table 30 the variances between the means are statistically significant for almost all the pairs. Statistically insignificant variances are observed only in the 'agile – very agile' pair falling within the fourth factor/group *Flexibility of Resources and Processes*.

All other pairs are statistically significant. Thus, it can be concluded that the more agile is the company, the more relevant are the following factors:

- Organizational structure.
- Flexibility of resources and processes.
- Organizational awareness and competence.
- Human resources.
- Networking and product development.

Organizational structure is very important and encompassing factor for organizational agility. Organizational structure refers to the company ability to efficiently allocate, coordinate and control resources, to direct them towards the achievement of company's goals. Organizational structure has to be flexible and adaptable in order to accommodate external changes by reorganizing company resources internally. Without flexible and adaptable organizational structure companies will not be able to effectively coordinate the change.

The flexibility of resources and processes factor is mutually dependent on the organizational structure and both influence organizational agility level. Organizational structure influence on agility level of the company will not be effective without flexible and agile resources and processes. For example, an organization will not be able to adapt to increased demand and grow if it will have limited ability to attract additional investments and hire a qualified workforce. At the same time, internal processes have to be flexible as well in order to accommodate the increased workforce, production capacity or more complicated products.

'Organizational awareness and competence' is also an important factor for organizational agility level and refers to the ability of the company to notice the changes in the market, competition, consumer preferences. Awareness is organization's sensing ability to identify threats and growth opportunities. Competence refers to the organization's ability to act on these threats and opportunities. Without competence, experience, and know-how, the organization will not be able to realize its full potential and be agile enough to adapt fast to the changes and take advantage of the new opportunities.

Therefore, human resources are very important factor of agility of the company. Organizational awareness, competence, ability to coordinate, control and direct change - all rely on human resources and their experience and qualifications. Without experienced managers, company will not be able to receive efficient guidance and direction for a change. Without competent engineers, company will not be able to implement new technology and adapt production to meet increased demand.

'Networking and product development' is important to organization's agility level due to its external dimension. Many organizations depend on their environment, network, partners, suppliers, distributors. For example, manufacturing company will not be fully agile if its supplier is not agile and not able to adapt to changes, such as increased demand, delivery schedule or pricing. At the same time, wholesaler distributor will not be agile and successful if its network of retailers can adapt to changing consumer preferences. Product development has both internal and external dimensions and is important for agility level of the company. Externally companies have to see the trends in the market and changes in consumer preferences in order to adapt to the changing demand and adjust their product

line accordingly. Internally companies have to reorganize their resources, technology, processes and other factors in order to quickly and efficiently change their product or service offering.

To ensure that the analysis is sufficiently deep, the importance of both factors and attributes for the agility of the companies is considered. The descriptive statistics of the attributes is provided in Appendix L. The Test of Homogeneity of Variances is performed to verify the attributes' homogeneity; its results are presented in Table 31.

Table 31. *Test of Homogeneity of Variances: Attributes*

	Levene Statistic	df1	df2	Sig.
Simple organizational structure and decision making - Importance	0,861	2	236	0,424
Easily changeable business processes - Importance	5,292	2	236	0,006
Qualified and competent personnel - Importance	4,370	2	236	0,014
Flexible and open to change employees - Importance	3,270	2	236	0,040
Easily accessible needed resources (finances, specialists, technologies, etc.) - Importance	2,999	2	236	0,052
Effective supplier, distributor and business partner network - Importance	0,335	2	236	0,716
Easily changeable technology and information systems - Importance	1,158	2	236	0,316
Ability to sense changes and identify new business opportunities - Importance	3,936	2	236	0,021
Ability to implement important changes in the organization - Importance	1,058	2	236	0,349
Ability to change organizational resources (employees, equipment, assets, etc.) - Importance	0,568	2	236	0,567
Ability to share knowledge and empower employees - Importance	0,091	2	236	0,913
Ability to quickly develop and introduce new products/services to the market - Importance	3,121	2	236	0,046
Ability to outsource, expand and change business partner network - Importance	0,910	2	236	0,404
Constant search for new business and development opportunities - Importance	1,435	2	236	0,240
Constant analysis and adaptation to internal and external changes - Importance	0,636	2	236	0,530
Continuously increasing employee competence and qualifications - Importance	0,512	2	236	0,600
Constant sharing of knowledge and information within organization - Importance	1,088	2	236	0,338
Constant improvement of products/services based on customer needs - Importance	0,085	2	236	0,918
Constant improvement of business network and its support - Importance	0,588	2	236	0,556
Constant monitoring of business partner quality and effectiveness - Importance	0,027	2	236	0,973

Source: author

An analysis of the results presented in Table 31 involves a selection of the attributes characterized by the homogeneity of dispersions. These attributes are shown in grey in

the table and ANOVA can be applied to them. For other attributes under consideration, dispersions are non-homogeneous and the robust test needs to be applied to them. The ANOVA results are presented in Table 32.

Table 32. ANOVA: Attributes

		Sum of Squares	df	Mean Square	F	Sig.
Simple organizational structure and decision making - Importance	Between Groups	20,778	2	10,389	9,355	0,000
	Within Groups	262,084	236	1,111		
	Total	282,862	238			
Easily accessible needed resources (finances, specialists, technologies, etc.) - Importance	Between Groups	14,943	2	7,471	4,857	0,009
	Within Groups	363,049	236	1,538		
	Total	377,992	238			
Effective supplier, distributor and business partner network - Importance	Between Groups	7,096	2	3,548	2,259	0,107
	Within Groups	370,720	236	1,571		
	Total	377,816	238			
Easily changeable technology and information systems - Importance	Between Groups	29,590	2	14,795	9,753	0,000
	Within Groups	358,000	236	1,517		
	Total	387,590	238			
Ability to implement important changes in the organization - Importance	Between Groups	20,378	2	10,189	12,809	0,000
	Within Groups	187,731	236	0,795		
	Total	208,109	238			
Ability to change organizational resources (employees, equipment, assets, etc.) - Importance	Between Groups	6,930	2	3,465	2,006	0,137
	Within Groups	407,648	236	1,727		
	Total	414,577	238			
Ability to share knowledge and empower employees - Importance	Between Groups	19,680	2	9,840	10,126	0,000
	Within Groups	229,349	236	0,972		
	Total	249,029	238			
Ability to outsource, expand and change business partner network - Importance	Between Groups	19,124	2	9,562	4,977	0,008
	Within Groups	453,370	236	1,921		
	Total	472,494	238			
Constant search for new business and development opportunities - Importance	Between Groups	15,496	2	7,748	5,590	0,004
	Within Groups	327,090	236	1,386		
	Total	342,586	238			
Constant analysis and adaptation to internal and external changes - Importance	Between Groups	9,423	2	4,711	3,623	0,028
	Within Groups	306,929	236	1,301		
	Total	316,351	238			
Continuously increasing employee competence and qualifications - Importance	Between Groups	27,690	2	13,845	12,468	0,000
	Within Groups	262,059	236	1,110		
	Total	289,749	238			
Constant sharing of knowledge and information within organization - Importance	Between Groups	28,366	2	14,183	14,525	0,000
	Within Groups	230,445	236	0,976		
	Total	258,812	238			

		Sum of Squares	df	Mean Square	F	Sig.
Constant improvement of products/ services based on customer needs - Importance	Between Groups	29,236	2	14,618	11,718	0,000
	Within Groups	294,396	236	1,247		
	Total	323,632	238			
Constant improvement of business network and its support - Importance	Between Groups	13,918	2	6,959	5,455	0,005
	Within Groups	301,070	236	1,276		
	Total	314,987	238			
Constant monitoring of business partner quality and effectiveness - Importance	Between Groups	30,089	2	15,044	9,187	0,000
	Within Groups	386,488	236	1,638		
	Total	416,577	238			

Source: author

Table 32 shows that the p -value of two attributes is over 0.05 and the results are statistically insignificant. These attributes are the ability to change organizational resources (employees, equipment, assets etc.) and the effective supplier, distributor and business partner network. The results of the robust test, which is used for non-homogeneous variances, is presented in Table 33.

Table 33. Robust Tests of Equality of Means: Attributes

		Statistic ^a	df1	df2	Sig.
Easily changeable business processes - Importance	Brown-Forsythe	0,487	2	115,563	0,616
Qualified and competent personnel - Importance	Brown-Forsythe	3,088	2	112,466	0,049
Flexible and open to change employees - Importance	Brown-Forsythe	7,940	2	141,443	0,001
Ability to sense changes and identify new business opportunities - Importance	Brown-Forsythe	3,920	2	134,020	0,022
Ability to quickly develop and introduce new products/services to the market - Importance	Brown-Forsythe	12,004	2	163,261	0,000

a. Asymptotically F distributed.

Source: author

The results in Table 33 show that the p -value of the attribute 'Easily changeable business processes' is higher than 0.05, which means that there is no statistically significant relation between the groups. The other attributes are characterized by statistically significant variances between the groups.

In order to find statistically significant relationships between variables and groups a multiple comparisons using Tukey HSD method is conducted. The results are presented in Appendix M.

Analysis of data shows that majority of differences between pair averages are statistically significant. Statistically insignificant differences in averages are observed in pairs that belong to attributes: easily changeable business processes and effective supplier, distributor and business partner network. In other attributes, the statistically significant difference is between all three or two pairs. Results are summarized in Table 34.

Table 34. Results summary: attributes

Attribute	Result
Simple organizational structure and decision making	All 3 differ, the more agile the more important
Easily changeable business processes	No significant difference
Qualified and competent personnel	Differ only agile and very agile
Flexible and open to change employees	Agile differs from other 2 groups
Easily accessible needed resources (finances, specialists, technologies, etc.)	Extremely agile differs from other 2 groups
Effective supplier, distributor, and business partner network	No significant difference
Easily changeable technology and information systems	Extremely agile differs from other 2 groups
Ability to sense changes and identify new business opportunities	Agile differs from other 2 groups
Ability to implement important changes in the organization	Extremely agile differs from other 2 groups
Ability to change organizational resources (employees, equipment, assets, etc.)	No significant difference
Ability to share knowledge and empower employees	All 3 differ, the more agile the more important
Ability to quickly develop and introduce new products/services to the market	All 3 differ, the more agile the more important
Ability to outsource, expand and change business partner network	Differ only agile and extremely agile
Constant search for new business and development opportunities	Differ only agile and extremely agile
Constant analysis and adaptation to internal and external changes	Differ only agile and very agile
Continuously increasing employee competence and qualifications	All 3 differ, the more agile the more important
Constant sharing of knowledge and information within organization	All 3 differ, the more agile the more important
Constant improvement of products/services based on customer needs	All 3 differ, the more agile the more important
Constant improvement of business network and its support	Differ only agile and extremely agile
Constant monitoring of business partner quality and effectiveness	Extremely agile differs from other 2 groups

Source: author

As can be seen in Table 34, there are only three attributes that do not show statistically significant differences between the agile, very agile and extremely agile groups. All other attributes contain statistically significant differences between two degrees of agility.

It has been established, on completion of the analysis of all the factors, their attributes and their importance for the degree of agility of the organization, that the greater the organization's agility, the more important are the internal factors and their attributes, i.e. the degree of agility is determined by the agility attributes. Therefore, it can be stated that the more agile is the company, the more relevant are the following attributes being analyzed (Table 34).

It can be concluded that the third hypothesis (H₃) 'Organizational agility level is influenced by following enabler, capability and practice factors: networking and product development, human resources, organizational awareness and competence, the flexibility of resources and processes, organizational structure.' has been confirmed. Empirical findings indicate that organizational agility is enterprise-wide concept and is affected by most attributes. As literature analysis showed in part one of this dissertation, organizational agility research is still concentrated on narrow aspect of organization, functional area or industry. Organizational agility is approached from either enablers or capabilities, practices are studied separately. Empirical findings in this dissertation confirm dissertation author's proposal to combine all organizational agility attributes into cohesive theoretical model and approach organizational agility study from the perspective of all three attribute groups – enablers, capabilities and practices.

Empirical findings identify main attributes that affect organizational agility in wide range of companies, industries and sizes, and allows to provide some *practical implications*. In order to improve organizational agility level, company managers and owners should be able to measure it first. Organizational agility level measurement methodology and questionnaire presented in this dissertation can be used for this purpose. This can help to identify main factors that affect organizational agility level in particular organization. In the context of this dissertation, empirical findings show main organizational agility attributes that affect agility level and practical implications can be proposed that can be applied to other organizations which seek to improve agility level.

During fast change communication and effective decision making are important for the agility of organization. During periods when an organization is undergoing internal change, its leaders should be able to communicate, direct and control. *Simple organizational structure and decision making* helps to do that more efficiently. Organization should strive to flatten its organizational structure to simplify it and improve decision making. In order to take advantage of opportunities arising from the changes in the market, consumer preference changes, and other factors, the organization needs to be able to identify these opportunities. *High awareness capability* improves organizational agility level and organization leaders should develop a personal and company ability to sense changes and identify new business opportunities. Managers of organizations should practice *constant analysis* and proactive scanning the environment for changes and opportunities. The *practice of constantly scanning* the environment for changes opens up an organization for new business opportunities. Organization managers should pro-actively search for development and growth opportunities in order to improve agility level and align whole organization towards this goal. Such scanning for opportunities and threats goes hand-in-hand with practice of analysis and adaptation to internal and external changes. The *practice of constant adaptation* to changes improves organization's agility level. Employees become more open to change, technology and other company resources are adapted to the changing environment incrementally and become prepared for larger changes when the opportunity arises. Once changes and opportunities are identified, the organization needs to have necessary leaders who are able to lead the change and transformation. *Ability to coordinate, reorganize* and direct the change is important for organizational agility level in order to implement important changes in the organization.

Ability to understand the impact of an external threat and ability to take advantage of opportunity lies in the competence of employees. Therefore, *qualified and competent personnel* is important for organizational agility as it depends on qualifications and know-how of its employees to recognize the need for change and competence to adapt to these changes. Organizational agility depends as well on the *flexibility and willingness to change of its employees*. Employees with diverse background and experience will be more beneficial to organization's agility as they will be able to adapt easier to new tasks and procedures. Organization leaders should improve employee qualification and flexibility in order to raise the agility level in their organization. Organizations should practice *continuous employee competence and qualifications development*. Constant training of employees not only improves their qualifications and competence to perform current duties but also updates them of new and improved ways to perform same tasks. Moreover, constant training prepares employees and opens them for future changes. Organizations should create environment where constant *sharing of knowledge and information* within the organization is possible. Learning organization is important agility attribute. The practice of knowledge and information sharing on new technologies and new processes fosters innovation and improves organizational readiness for change. Being on the edge of knowledge and industry developments improves organizational agility level. Organizational leaders should foster company's *ability to share knowledge and empower employees*. When an organization is growing and changing, employees must be able to adapt quickly to new technologies, processes, products, and structures. Organizational agility depends on such attributes as the flexibility of its resources (HR, technologies, equipment, etc.) however these resources will not change without proper leadership and communication. Organization leaders' and employees' ability to share knowledge, to communicate between each other and delegate and empower employees is important to attribute for organizational agility.

Company's ability to adapt to changes and its agility level depends on how *easily organization can access needed resources* – capital, experts, technologies, etc. Usually, during high growth periods, organizations need additional capital to expand operations and production. When introducing new products, services or expanding to new business areas, organizations need new technologies and qualified personnel who can administer these new technologies. Only access to such resources is not sufficient, organizations should make sure that these resources are flexible enough to adapt when such need arises. These technologies and information systems should be *easily changeable* and adaptable to accommodate organization's drive for innovations. In order to be agile, the organization needs to be *able to change* even not flexible resources (employees, equipment, assets, etc.). For example, should be able to upgrade with the most efficiency outdated technology or re-train unskilled employees. Organizational agility level depends on the ability to innovate, quickly *develop and introduce new products/services to the market*. Changes in the market and consumer preferences must be sensed and responded in a timely manner. The ability to develop new products and services and introduce them to the market, can be a major competitive advantage in a fast-changing environment and improve organizational agility level. Constant improvement of products/services based on customer needs is essential for organizations, especially in retail or wholesale sectors. When innovating and changing

products or services, it is important for an organization to look at customer needs and not limit the development and improvement process only on internal capabilities. Organizational growth and agility depend on constant adaptation to changing environment, and consumer preferences change very often.

Together with internal factors, organizations should improve external factors in order to raise their agility level as well. Some organizations are not able to adapt fast internally – to re-train employees, purchase new equipment or change products. Therefore, it is important for organizations to have a flexible partner network in order to be able to outsource the functions that organizations cannot perform effectively themselves. Managers should *practice constant fostering* of the business network, which can improve organization agility when it cannot adapt to changes on its own. Outsourcing some of the functions or products to partners can boost organization's ability to adapt to growing demand. Other organizations, can adapt internally easily, but externally are dependent on partners (e.g. suppliers, distributors, etc.). Therefore, *constant monitoring* of business partner quality and effectiveness is important for organizations agility. Organizational agility is affected by the agility of its entire business network. If one link in the supply chain is not agile and cannot adapt to growing demand, the whole organization chain becomes inflexible. Therefore, the practice of monitoring and improving business partner quality and effectiveness positively affects organizational agility.

In combination all discussed and analyzed internal and external factors affect organizational agility level. However, such effect is not happening in a vacuum. Organization depends on complex dependability between all factors. Agile enablers, capabilities and practices enhance and compensate each other and work together in improving organization agility level. In order to stay competitive and grow, organization leaders should constantly evaluate their company's agility level, analyze factors that affect their organization and try to improve them.

CONCLUSIONS

The analysis of the scientific literature made in the dissertation has shown that the evaluation of organizations' agility and the determination of the level is a topical issue that is being addressed by different scholars. Organizational agility is a hard-to-measure variable and no unified methodology has been proposed for solving this task. The dissertation analyzes the level of agility of high-growth Lithuanian organizations and makes the following conclusions:

1. Different definitions of organizational agility are found in the scientific literature. Researchers agree that organizational agility is a multi-dimensional concept that requires concentration on the country, market, and the industry in which the organization operates. However, after analyzing the scientific literature and summarizing the views of different scientists on the agility of the organization, this dissertation proposes a general definition of the agility of organizations applicable to organizations operating in different countries, markets and industries. In this dissertation, organizational agility is defined as the organization's ability to recognize unexpected changes in the environment and respond to them quickly and efficiently, using and configuring internal resources, thereby gaining a competitive advantage. The proposed definition helped to reduce the problem of uncertainty of the concept of agility of the organization. In addition, this definition contributes to the theory of organizations' agility, which will help to make progress in scientific agility of organizations in various countries around the world.
2. In order to examine what affects the level of an organization's agility, it is crucial to identify the factors that promote it (agility) and the reasons for the organization's intention to change. Factors promoting agility were distinguished based on the analysis of the scientific literature. In addition, the factors were congregated into four main groups:
 - a) Agility drivers are the factors forcing an organization to stay agile. These factors are market developments; changes in a competitive environment; changes in customer preferences; technological changes; socio-economic changes.
 - b) Agility realization factors are the resources available to the organization to help it (the organization) adapt to change and to be agile. These factors are as follows: organizational structure, processes in the organization, technologies, human resources, networking.
 - c) Agility capabilities are the organization's ability to identify external changes and execute/change its activities accordingly. The following agility options are distinguished: sensing capabilities and response capabilities.
 - d) Agility practices are actions performed by an agile organization before and during the change period. The following agility practices are distinguished: organizational practices, employee motivation practices, the practice of customer enrichment and practices of collaboration with business partners.
3. The dissertation developed a model for assessing the agility of organizations. The model combines the four agility groups mentioned above. Summarizing the scientific literature, the model outlined the external factors that make the organization

change. Moreover, the model thoroughly introduces internal organizational factors that encourage organization to become agile. In other words, the model presents the processes that an organization can complete in order to achieve a certain level of agility. In addition, the analysis of the theoretical model highlighted the areas of production on which the theoretical model proposed in the dissertation is tested. As already mentioned, the dissertation is focused on internal factors' analysis, therefore, these factors are presented in the model more widely. The current module focuses on enablers, capabilities, and practices of agile high-growth organizations. External factors and pressures are difficult to influence, but internal factors can be improved and adjusted. Therefore, it is important for practical and academic reasons to study what internal factors affect the agile organization's ability to adapt faster and more effectively to external changes. The model of organizational agility evaluation is beneficial for practitioners while analyzing their organizational agility level within the internal factors.

4. Three hypotheses have been raised to test the theoretical model:

H_1 : Majority of high-growth companies' agility is "very agile".

H_2 : Companies in the «wholesale, retail trade and repair of motor vehicle industries» are more agile than construction, manufacturing and transportation industries.

H_3 : Organizational agility level is influenced by the following enablers, capability and practice factors: networking and product development, human resources, organizational awareness and competence, resource and process flexibility, organizational structure.

Hypothesis testing is based on a survey where respondents are heads of high-growth Lithuanian organizations. During the survey respondents were asked to evaluate the factors of the organization's agility, which were distinguished during the analysis of the scientific literature. Respondents had to evaluate twenty statements and answer two questions assigned to each statement. The first question was «How much the given statement is important to the agility of the organization?» the second is «How would you assess the level of agility of the organization you are working in.» The following methods were used to evaluate respondents' answers:

- a) The triangular fuzzy numbers method was selected in order to reduce the inaccuracy and uncertainty of responses.
 - b) The Fuzzy Agility Index was used to measure the agility level for each surveyed company.
 - c) Cluster analysis was applied in order to group the companies under consideration into clusters and continue the analysis for each cluster individually.
 - d) Factor analysis was used in order to assign a specific attribute to each agility factor identified.
5. The results of the empirical study showed that all high-growth organizations that participated in the survey considered themselves to be agile, very agile or extremely agile. This may be explained by the fact that the organizations surveyed were taken from the *Gazelle* list of the most successful companies in Lithuania in terms of revenue growth.

An organization cluster analysis was carried out for testing the first hypothesis of the «Majority of high-growth companies» agility is «very agile.» Three methods were used for cluster analysis: Euclidean distance method, K-means method, two-step method. The results of the research showed that the analyzed organizations can be grouped into three clusters, namely «agile organizations», «very agile organizations», «fully agile organizations». In addition, most organizations fall into the second cluster - very agile organizations. Ergo, it can be stated that most high-growth organizations are very agile and the first hypothesis (H_1) has proved to be true.

The clusters created during the cluster analysis were used to test the second hypothesis, «Companies in the wholesale, retail trade and repair of motor vehicles' industries are more agile than in construction, manufacturing and transport industries.» Hypothesis testing was performed using the method of column proportion comparison. An analysis of companies operating in different industries has shown that most agile companies are in the «wholesale and retail trade sector and motor vehicle and motorcycles repair» sector. Thus, it can be stated that the second hypothesis (H_2) proved to be true.

A factor analysis was used to test the third hypothesis. According to the results of factor analysis, the more agile the organization is, the more relevant the following factors are: networking and product development, human resources, organizational awareness and competence, the flexibility of resources and processes, organizational structure. Therefore, it can be stated that the third hypothesis (H_3) proved to be true.

Summarizing the results of the empirical study, it can be claimed that the proposed model for assessing the agility of high-growth organizations has made it possible to identify not only the key factors that encourage organizations to change and become more agile but also the sector in which organizations are most agile and able to adapt to a rapidly changing environment. Despite the fact that model testing was performed on the basis of high-growth Lithuanian organizations, it (model) is universal and can be used in different countries and markets.

Further research directions

In the next studies, it would be worth analyzing the external factors determining the level of agility of organizations and suggesting a model that combines internal and external agility factors. In addition, it would be advisable to develop a methodology that would assess the influence of external factors on the level of organizations' agility and offer an algorithm that would allow organizations to move to a higher level of agility, allowing them to adapt more quickly to socio-economic changes taking place in the market.

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APPENDICES

Appendix A. Organizational agility definitions

Author	Definition
Nagel & Dove (1991)	Manufacturing system with extraordinary capabilities to meet the rapid changing needs of the marketplace (speed, flexibility, customers, competitors, suppliers, infrastructure, and responsiveness), a system that shifts quickly (speed and responsiveness) among product models or product lines (flexibility), ideally in real-time response to customer demand (customer needs and wants).
Brown & Bessant (2003)	The ability of companies to respond quickly and effectively to (unexpected) changes in market demand.
Cho et al. (1996)	Capability to survive and prosper in a competitive environment or continuous and unpredictable changes by reacting quickly and effectively to changing markets, designed by customer-designed products and services.
Dove (1999, 2006)	Ability of an organization to respond efficiently and effectively to both proactive and reactive needs and opportunities in the face of an unpredictable and uncertain environment
Highsmith (2004)	It is the ability to both create and respond to change in order to profit in a turbulent business environment.
Gehani (1995)	An agile organization can quickly satisfy customer orders, introduce new products frequently in a timely manner and get in and out of its strategic alliances speedily.
Goldman et al. (1995)	A comprehensive response to the business challenges of profiting from rapidly changing, continually fragmenting, global markets for high-quality, high-performance, customer-configured goods, and services.
Gunasekaran (1998, 1999)	The capability of surviving by reacting quickly and effectively to changing markets, driven by customer-designed products and services.
Lin et al. (2006)	The decrease in manufacturing costs, increased customer satisfaction, removal of non-value-added activities, and increased competitiveness agile enterprise is quickly able to change and adapt to fluctuating conditions.
Lu & Ramamurthy (2011a)	This agility reflects a firm-wide capability to deal with unexpected changes via rapid and innovative responses firm-wide capability to deal with changes that often arise unexpectedly in business environments via rapid and innovative responses that exploit changes as opportunities to grow and prosper.
Menor et al. (2001)	The core essence of agility in an organization comprised of delivering quality product or services in a cost-effective manner and building a flexibility that enables the organization to respond quickly to external and internal changes.
Meredith & Francis (2000)	The organization's capacity to gain a competitive advantage by intelligently, rapidly and proactively seizing opportunities and reacting to threats.
Narasimhan et al. (2006)	Ability to efficiently change operating states in response to uncertain and changing demands placed upon it.
Prince & Kay (2003)	Aim to meet varied customer requirements in terms of price, specification, quality, quantity, and delivery.

Author	Definition
Raschke & David (2005)	The ability of a firm to dynamically modify and/or reconfigure individual business processes to accommodate required and potential needs of the firm.
Ren et al. (2009)	Agile enterprises are also characterized by “attributes”, sometimes referred to as “capabilities”, which allow companies to promptly respond to changes in business environment.
Sambamurthy et al., (2003)	The ability of a firm to redesign their existing processes rapidly and create new processes in a timely fashion in order to be able to take advantage and thrive in the unpredictable and highly dynamic market conditions.
Sharifi & Zhang (2001)	The ability of enterprises to cope with unexpected changes, to survive unprecedented threats from the business environment, and to take advantage of changes as opportunities.
Swafford et al. (2006)	Agility directly affects company’s capability to produce and deliver new products in a cost-efficient manner.
Yusuf et al. (1999)	Defined agility as ‘a successful exploration of competitive bases (speed, flexibility, innovation proactivity, quality, and profitability) through the integration of reconfigurable resources and best practices in the knowledge-rich environment to provide customer-driven products and services in a fast-changing market environment.’

Source: author

Appendix B Organizational agility Enablers

Author	Enablers
Yusuf et al. (1999)	<p>Enablers by decision domains:</p> <ul style="list-style-type: none"> • Integration (concurrent execution of activities, enterprise integration, information accessible to employees) • Competence (Business practice & structure are difficult to replicate; Multi-venturing capabilities) • Teambuilding (Decentralized decision-making; Empowered individuals working in teams; Cross-functional team) • Technology (Technology awareness; Leadership in the use of current technology; Skill and knowledge enhancing technologies; Flexible production technology) • Quality (Quality over product life; Products with substantial added value; First-time right design; Short development cycle times) • Change (Culture of change; Continuous improvement) • Partnership (Trust-based relationship with customers/suppliers; Rapid partnership formation; Strategic relationship with customers; Close relationship with suppliers) • Market (Response to changing market requirements; New product introduction; Customer-driven innovations; Customer satisfaction) • Education (Continuous training and development; Learning organization; Multi-skilled and flexible people; Workforce skill upgrade) • Welfare (Employee satisfaction)
Charbonnier-Voirin (2011)	<p>Agile levers:</p> <ul style="list-style-type: none"> • Structure and organization, • Processes, • Technology • People
Gunasekaran (1999)	<p>Agile manufacturing enablers:</p> <ul style="list-style-type: none"> • Virtual enterprise formation tools and metrics, • Physically distributed teams and manufacturing, • Rapid partnership formation tools and metrics, • Concurrent engineering, • Integrated product, • Production, • Business information system, • Rapid prototyping tools, • Electronic commerce
Eshlaghy et al. (2010)	<p>Enabler factors for organizational agility:</p> <ul style="list-style-type: none"> • Organisational structure (formality, complexity, centrality). • Virtual organisation (process, co-operation). • Information technology (employment, integration). • Organisational culture (participation, risk acceptance). • Leadership (transactional/transformational, future/goal centred). • Supply chain (co-operation with supplier/customer). • Progressive design technology (simulation, engineering analysis). • Progressive manufacturing technology (flexible facility, rapid prototyping). • Team working (efficiency, trust being group). • Empowerment and improvement (enrichment, accept job change). • Motivation system (job satisfaction, organisational commitment). • Planning and evaluation performance (efficiency, integration).

Source: author

Appendix C. European Community economic activity classification, NACE Rev. 2

NACE 2 Code	Description	NACE 2 Code	Description
A	Forestry and logging, fishing and aquaculture	H	Transportation and storage
B	Mining and Quarrying	I	Accommodation and food service activities
C	Manufacturing	J	Information and communication
E	Water supply; sewerage, waste management and remediation activities	K	Financial and insurance activities
F	Construction	L	Real estate activities
G	Wholesale and retail trade; repair of motor vehicles and motorcycle	M	Professional, scientific and technical activities
		N	Administrative and support service activities

Source: Eurostat (2008)

Appendix D. Agility attribute (ACn) importance weights

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
1	FH	L	H	L	L	L	FL	FL	L	FL	FH	FL	FL	M	FH	FH	FL	L	FH
2	FH	H	H	H	H	H	FH	FH	H	FH	H	FH	H	FH	H	H	FH	H	FH
3	FH	H	H	H	H	H	H	H	FH	FH	H	H	FH	H	FH	FH	FH	FH	FH
4	H	VH	H	H	FL	FH	FH	FH	FH	H	H	FH	H	FH	H	H	H	FH	FH
5	H	H	VH	H	VH	H	H	VH	VH	H	H	VH	H	VH	H	VH	H	VH	VH
6	FH	FH	VH	FH	FH	VL	M	FH	FH	M	H	FH	FH	FH	FH	H	FH	FH	FH
7	H	FH	VH	H	VH	H	H	VH	H	H	H	FH	H	H	H	H	H	H	H
8	H	FH	H	H	H	H	FH	H	H	H	FH	FL							
9	FH	H	H	FH	H	FH	M	H	H	FH									
10	FL	FH	H	H	FL	FH	FH	H	H	H	H	FH	H	H	H	H	H	H	H
11	FH	FH	FH	FH	M	FH	FL	FH	FH	FH	H	FH	H	FH	FH	FH	FH	FH	FH
12	H	L	H	FH	H	H	FL	H	H	FH	H	FH	H	H	H	H	H	H	FH
13	H	H	VH	VH	H	FH	FH	H	FH	H	FH	FH	FH	FH	M	FH	FH	FH	FH
14	FH	M	M	M	M	M	M	M	M	FH	FH	FH	M	FH	H	FH	FH	FH	H
15	FH	H	H	H	H	H	H	H	H	FL	H	M	M	M	M	H	FH	H	FH
16	VH	FH	H	VH	H	VH	VH	H	VH	FH	VH	VH	VH	FH	VH	VH	VH	VH	H
17	H	H	H	FH	FH	FH	H	H	H	FL	H	FL	FH	FH	H	H	H	FL	FL
18	H	M	VH	FH	FH	FH	M	VH	VH	FH	H	FH	FH	FH	FH	H	FH	FH	FH
19	H	FH	H	H	H	FL	FH	VH	H	FH	FH	FH	H	FH	H	FH	H	H	H
20	FH	FH	H	FH	FH	H	FH	H	FH	FH	H	FH	FH	FH	FH	H	H	FH	FH
21	H	L	FH	FL	FH														
22	FH	FH	H	FH	H	H	FH	FH	FH	FH	FH	FH	FL	FH	H	FH	FH	FH	FH
23	FH																		
24	H	FH	H	FH	H	FH	FH	H	H	FH	H	H	H	FH	H	H	H	H	H
25	FH																		
26	FH	H	H	FH	FH	FH	FH	H	FH	FH	H	H	H	FH	H	H	H	H	FH
27	FH	FH	H	FH	H	FH	FH	H	FH	FH	FL	M	FL	FH	FH	FH	FH	M	M

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
28	H	H	H	FH	FH	FH	FH	FH	FH	H	FH	FH	H	FH	FH	M	H	FH	FH
29	FL	FL	FH	FH	FH	M	FH	FH	FH	M	M	L	FL	M	FH	FH	H	M	FH
30	H	FH	VH	H	FH	VH	FH	H	FH	H	M	H	H	H	H	FH	FH	H	H
31	FH	FH	FH	FH	H	FH													
32	FH	H	H	M	H	FL	FL	H	FH	M	FL	H	H	FH	H	FH	FH	H	FL
33	FH	FH	FH	H	FH	FL	FL	H	FH	FH	FH	FH	FH	FL	FH	FH	FH	FH	FH
34	FH	FH	FH	H	FH														
35	FH	FH	H	H	H	H	H	FH	FH	H	FH	FH	H	H	H	H	H	H	H
36	H	M	H	H	H	FH	M	FH	M	FH									
37	M	M	M	M	M	M	M	M	FH	M	M	M	M	M	FH	FH	M	FH	FH
38	FH	H	FL	H	H	H	FH	H	FH	H	H	H	H	FH	FH	FH	FH	FH	FH
39	FH	M	H	H	H	H	FH	VH	FH	H	FH	H	H	H	H	H	VH	VH	H
40	FH	FL	H	FH	M	FH	M	FH	M	FH	FH	FH	M	FH	FH	FL	H	FH	FH
41	FH	FH	H	H	H	FH	H	FH	FH	H	H	H	H	H	H	H	H	H	FH
42	FH	FH	H	H	FH	H	FL	FH	H	FL	FH	FL	FL	H	FL	FL	H	H	FL
43	H	FH	H	H	FH	H	FL	H	FH	H	H	H	H	H	H	H	FH	H	H
44	H	VH	FH	FH	H	H	FH	FH	M	L	FH								
45	H	FH	H	FH	FH	VH	FH	H	H	FL	H	H	VH	H	H	H	H	FH	M
46	H	FH	H	H	FH	FH	FH	FH	FH	FH	H	VL	H	H	H	H	H	H	H
47	H	FH	H	FH	VH	FH	H	FH	H	FH	H	FH	VH	FH	FH	VH	VH	FH	H
48	FH	FH	FH	H	FH														
49	FH	FH	H	FH	FL	H	H	FH	H	FH	FH	H	FH	FH	H	FH	FH	FH	FH
50	FH	H	VH	H	H	H	FH	H	FH	FH	H	FH	H	FH	H	FH	H	FH	FH
51	FH	FH	H	FH	M	FH	FH	L	FH	FL	FL	FH	FH	FL	FL	FL	FL	FH	FL
52	H	FH	H	H	H	FH	FH	FH	FH	FH	FL	FH	FH	FH	FH	FH	FH	M	FH
53	FH	FH	H	H	H	H	H	H	FH	FH	H	H	FH	FH	H	H	H	H	FH
54	FH	FH	FH	H	H	FH	FH	FH	FH	H	FH	FH	H	FH	FH	FH	FH	FH	FH
55	FH	FH	H	H	H	FH	FH	FH	FH	H	FH	M							

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
56	VH	VH	VH	VH	VH	H	VH	H	VH	H	H	FH	M	VH	VH	VH	VH	H	H
57	H	FL	VH	H	M	H	H	VH	VH	M	FH	VL	FL	M	H	FH	H	M	VL
58	VH	FL	VH	VH	H	VH	H	H	VH	H	H								
59	VH	FH	H	H	FL	L	FH	M	FH	FL	VH	H	FL	H	FH	VH	FL	L	H
60	H	FH	VH	VH	VH	VH	H	VH	H	VH	VH	H	VH						
61	FL	M	FH	FH	H	H	FL	H	FH	H	FH	M	H	FH	M	H	H	M	H
62	H	L	VH	H	M	FH	FL	FL	FH	FL	H	M	FL	M	H	VH	FH	FL	H
63	VH	H	VH	H	H	VH	VH	VH	VH	H	VH								
64	H	M	VH	VH	VH	H	FH	FH	FH	FH	FL	M	FL	H	FH	FH	FH	M	M
65	FL	H	VH	VH	M	FH	H	VH	VH	FL	VH								
66	H	VH	VH	H	H	H	H	VH	H	FH	H	H	VH	VH	H	VH	VH	VH	H
67	FH	FH	H	FH	H	L	FH	H	H	VH	VH	FH	FH	FL	H	H	VH	VH	H
68	FL	M	M	M	FH	M	M	FH	FL	M	FH	H	FH	FH	FH	FH	FH	H	H
69	M	L	VH	H	VH	VH	H	L	H	FL	FH	H	H	VH	VH	VH	H	VH	H
70	M	L	VH	VH	VH	H	FH	FL	VH	FH	VH	VH	H	VH	FL	H	VH	H	VH
71	VH	VH	VH	VH	VH	VH	FH	H	VH	H	VH	FH	FH	H	VH	VH	VH	VH	H
72	FH	VH																	
73	H	FH	VH	H	H	M	FH	H	H	H	FH	FL	H	H	H	H	FH	H	H
74	H	H	H	VH	VH	VH	H	H	VH	H	VH	FH	VH	VH	H	VH	VH	VH	VH
75	FH	M	VH	H	H	H	FH	VH	VH	H	VH	M	VH	VH	VH	VH	VH	VH	M
76	FH	L	VH	VH	H	FH	VH	FH	H	VH	FL	H	H	FL	VH	VH	H	M	L
77	VH	VH	VH	VH	H	VH	FH	VH	VH	FH	VH	FH	H	VH	VH	VH	VH	H	H
78	FL	VL	H	H	VH	H	FL	H	H	L	FL	H	H	L	FH	H	FH	H	FH
79	L	L	VH	H	FH	VL	FH	L	H	VL	H	VL	VL	M	H	H	VH	FL	FL
80	VH	H	VH	H	VH	H	VH	FH	VH	VH	VH	VH	H						
81	H	FH	VH	VH	M	H	VH	H	H	VH	VH	VH	VH	VH	H	VH	VH	VH	FH
82	H	H	VH	FH	M	VH	H	VH	H	FH	H	FH	VH	H	VH	H	H	FH	VH
83	VH	M	L	VH	VH	VH	VL	FH	M	L	H	VH	VH	VH	L	VH	VL	VH	VH

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
84	H	L	VH	H	H	FH	H	M	H	M	VH	H	M	FH	H	H	VH	VH	FH	FH
85	H	H	VH	VH	H	H	M	VH	VH	VH	VH	VH	H	H	VH	H	H	VH	H	H
86	H	H	VH	H	VH	VH	VH	VH	VH											
87	VH	H	VH	VH	VH	VH	FH	VH	VH	L	VH	VH	H	VH	H	VH	VH	VH	H	H
88	M	VL	VH	L	L	FL	M	FL	H	L	FH	VL	L	M	VL	H	H	FH	FL	FL
89	FH	H	VH	M	VH	FH	FH	VH	FH	FH	FH	L	FH	VH	VH	VH	VH	L	FL	FL
90	M	FH	M	FH	H	VH	VH	VH	VH	FH	VH	FH	FH	H	H	H	H	H	H	H
91	FL	FH	VH	VH	FH	H	H	VH	H	FL	H	VH	VH	FH	VH	H	FH	VH	H	H
92	FH	FH	VH	VH	FL	VH	FH	H	FH	H	FH	FH	FH							
93	VH	M	VH	VH	FH	M	FH	M	VH	VH	FH	VH	M	VH	FH	VH	VH	VH	VH	M
94	FH	VH	VH	FH	FL	FL	M	M	FH	VH	VH	FH	FH							
95	FH	FL	VH	FH	VH	FH	FH	FH	VH	VH	VH	VH	FH	FH	VH	VH	FH	FH	FH	FH
96	FH	FH	FH	FH	FL	FH	FH	VH	FH											
97	FH	FL	FH	FH	FH	VH	VH	FH												
98	VH	FH	VH	FH	FH	VH	FH													
99	FH	M	VH	FH	FH	M	FH	FH	FH	VH	FH	VH	FH							
100	H	FH	FH	VH	FH	VH	FH	VH	VH	FL	H	VH	VH	VH	FH	VH	FH	VH	VH	FH
101	FH	FH	VH	VH	FH	VH	FH	VH	VH	FH	FH	VL	VL	FH						
102	VH	VL	VH	VH	VH	FL	VH	VH	VH											
103	FH	FH	FH	VH	FH	VH	FH	FL	FH	FH	FH	FH								
104	M	VH	VH	FH	VH	VH	VH	VH	VH	VH	H	FH	FH	VH	VH	VH	FH	FH	FH	FH
105	VH	VH	H	VH	VH	L	M	FH	M	M	L	FL	H	VH	L	VH	VH	VH	FH	VH
106	FH	L	VH	VH	VH	VH	H	FH	FH	L	VH	H	H	VH	VH	FH	VH	VH	FL	FH
107	FH	VH	VH	VH	FH	M	FH	M	M	FH	VH	VH	FH	VH	VH	FH	FH	M	VH	VH
108	VH	FH	VH	VH	FH	VH	VL	FH	VH	L	VH	FL	FH	VH	VH	VH	FH	FH	FH	FH
109	FH	FH	VH	VH	VH	VH	FH	VH	VH	VH	VH	VH	H	H	H	H	VH	VH	VH	VH
110	FH	H	H	L	H	VH	M	VH	FH	H	M	VH	VH	FH	H	FH	FH	FH	FH	FL
111	FH	FH	VH	VH	L	VH	FH	H	VH	L	VH	FH	VH	VH	FH	VH	VH	VH	FH	FH

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
112	VH	M	VH	VH	FH	VH	FH	VH												
113	VH	FH	FH	FH	FH	FH	M	FH	FH	VH	FH	VH	VH	FH						
114	FH	FH	FH	M	FH	VH	FH	H	H	FH										
115	VH	VL	VH	VH	L	VH	FL	M	FH	FH	M	FH	H	H	H	FH	VH	M	VH	H
116	FH	H	VH	H	VH	VH	H	H	H	FL	FH	H	FH	H	H	H	H	FH	FH	FH
117	M	FH	H	H	FH	FH	FH	H	FH	FH	FH	FH	FH	H	FH	FH	FH	FH	FH	M
118	M	L	FH	L	H	H	FL	FH	H	M	H	FL	FL	H	M	FL	FH	H	H	H
119	FH	FL	VH	VH	H	FH	M	VH	VH	FH	VH	VH	M	H	VH	VH	VH	VH	FH	H
120	FH	FL	VH	M	H	FH	FL	FH	M	L	H	H	VH	H	M	FL	H	FL	H	FL
121	FL	FH	H	VH	VH	M	FH	H	FH	M	FH	H	H	H	FH	FH	VH	H	H	H
122	VH	VH	VH	VH	H	H	H	VH	VH	H	H	VH	VH	H	H	H	H	H	VH	VH
123	FH	H	H	H	VH	FH	FH	H	FH	FH	FH	H	FL	H	FH	H	FH	H	FH	FH
124	FH	FH	VH	H	VH	FH	H	H	M	M	H	H	FH	FH	FH	FH	FH	H	FH	H
125	M	VL	VH	FH	VL	VH	VH	VH	VH	M	H	VH	M	VH	VH	M	FH	H	FH	H
126	H	FH	VH	VH	H	L	VH	VH	VH	M	M	VH	VH	VH	H	H	VH	H	H	H
127	VH	FH	VH	VH	VH	H	H	H	H	H	H	FH	FH	H	H	VH	H	H	VH	VH
128	FH	FH	H	H	M	M	FH	M	H	FH	H	H	H	H	H	H	H	H	H	H
129	H	H	VH	H	H	VH	H	VH	VH	FH	FH	H	H	H	FH	FH	H	H	VH	H
130	FH	H	H	FH	H	H	FH	M	FH	H	H	M	H	FL	L	H	H	FH	L	L
131	FH	FH	VH	VH	VH	VH	H	VH	VH	H	VH	H	H	H	H	VH	VH	VH	VH	H
132	FH	H	VH	H	VH	FH	FH	FH	FH	FH	VH	FL	FL	VH	H	L	FH	H	FH	FH
133	FH	H	H	H	H	H	FH	FH	H	M	H	H	H	H	FH	H	FH	FH	M	FH
134	M	M	FL	FH	H	H	H	FH	FH	L	H	FH	FL	M	FL	FL	FH	FH	FH	M
135	FH	H	H	H	FH	FH	H	H	H	H	H	H	FH	H	FH	H	M	H	H	FH
136	FH	M	FH	FH	H	H	M	L	FH	H	FL	FH	FL	L	L	H	M	FL	FL	FL
137	FH	FL	H	FH	FH	VH	M	VH	FH	FH	H	VH	H	H	FH	VH	VH	FH	VH	H
138	VH	VH	VH	FH	M	FL	VH	FH	H	H	FH	FL	FH	H	FH	VH	VH	FH	FH	VH
139	H	FL	VH	FL	VH	VH	L	FL	FH	H	L	L	FL	FL	H	FL	H	FL	FL	VL

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂	
140	H	FH	H	M	VH	H	FH	H	FH	M	H	H	H	FH	M	H	M	FH	H	
141	H	FH	VH	H	H	VH	M	H	VH	H	M	H	FH	FH	H	FH	VH	H	FH	
142	FH	H	FH	H	VH	H	FH	VH	FH	H	VH	L	H	H	H	H	VH	VH	H	
143	FL	FH	VH	H	H	H	H	FH	H	M	FH	M	FH	FH	H	H	H	FH	H	
144	FH	H	FH	M	L	H	H	H	FH	L	FH	L	L	FH	FH	FH	FH	FH	FH	
145	H	FH	H	H	H	H	FH	H	FH	M	H	H	H	FH	VH	H	H	H	H	
146	VH	H	VH	VH	H	VH	H	VH	H	FH	VH	VH	H	H	H	VH	VH	H	VH	
147	H	H	H	H	FH	FH	FH	H	H	FH	H	FH	FH	H	FH	FH	FH	FH	M	
148	H	H	H	VH	FH	M	M	H	FH	M	M	FH	H	H	H	H	FH	FH	FH	
149	M	FL	L	H	L	FH	L	H	FH	FH	H	FH	L	M	H	H	H	M	H	
150	VH	H	FH																	
151	VH	VH	FH	H	H	FH	H	H	H	H	FH	H	H	H	H	H	H	FH	FH	
152	VH	FH	VH	VH	VH	VH	M	VH	VH	FL	FH	H	VH	VH	H	VH	VH	VH	H	
153	FH	H	H	FH	H	FH	M	FH	FH	H	FH	H	L	L	FH	FH	M	M	L	
154	FH	H	H	H	H	H	FH	H	FH	FH	L	L	H	H	H	H	H	FH	H	
155	M	FH	H	H	FH	FH	H	VH	FH	FH	FH	H	FH	H	FH	FH	H	FH	FH	
156	FH	FL	FH	FH	H	FH	FH	H	H	FH	H	H	FH	H	FH	FH	FH	FH	FH	
157	H	H	H	H	H	H	M	H	H	L	H	FH	H	FL	H	H	H	H	M	
158	FH	FH	FH	H	H	H	H	H	H	H	FL	H	FH	H	VH	VH	H	VH	VH	
159	FH	FH	H	H	FH	H	FL	FH	FH	H	H	FL	H	H	H	H	H	H	H	
160	FH	FH	H	H	FH	H	FH	H	FH	M	FH	FH	FH	FH	H	H	FH	FH	H	
161	H	FH	H	H	FH	H	FH	H	H	H	H	H	FH	H	H	H	H	H	FH	
162	H	L	H	H	H	H	FH	H	H	L	H	L	FL	FL	H	H	VH	VH	VH	
163	FH	FH	H	FH	FH	H	FH	H	H	H										
164	M	H	FH	VH	FH	H	VH	H	H	VH	FL	H	H	H	FH	VH	H	FH	FL	
165	FH	FH	FH	H	L	H	L	FH	FL	FH	FH	FH	L	FH	FH	FH	FH	FH	FH	
166	M	M	H	FH	H	L	H	FL	H	H	FL	FL	FL	H	H	H	H	FL	FH	
167	FH	FH	H	H	M	FH	FH	H	FH	FL	FH	FH	H	FH	H	FH	H	FH	H	

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
168	H	FH	H	H	H	FH	H	H	FH	H	H	M	H	H	FL	H	H	FL	H	H
169	FH	M	H	FH	H	H	FH	H	H	FH	H	FH	FH	FH	H	H	H	H	H	FH
170	FH	H	H	H	H	FH	H	H	H	H	H	H	H	H	H	H	H	H	H	H
171	FH	FH	FH	FH	FH	FH	M	H	H	FH	FH	FL	FL	FH	H	FH	FH	FH	FH	M
172	FH	FH	H	FH	H	H	H	H	VH	H	H	FH	FH	H	FL	FH	H	VL	H	FH
173	H	H	VH	H	VH	VH	VH													
174	H	H	FH	FH	H	FH	M	H	FH	H	H	L	FH	FH	FH	FH	L	FH	FH	FH
175	H	FL	H	H	FH	FH	FH	H	FL	FH	H	FH	FH	FH	FH	FH	FH	FL	H	FL
176	M	H	H	FL	FH	FH	FL	VH	H	FH	VH	VL	H	H	H	M	FH	FH	FH	FH
177	FH	H	H	H	H	H	FH	FH	H	FH	VH	FH	H	FH	H	H	H	VH	FH	FH
178	FH	FH	H	H	H	FH	FH	FH	FH	H	H	H								
179	FH	FH	H	H	FH	H	FL	H	H	L	H	H	H	H	H	H	H	H	H	VH
180	FH	FH	H	H	FL	FL	L	H	FH	FL	FH	FL	FL	FH	FH	FL	FH	FH	FH	VL
181	H	H	VH	H	FL	H	H	FH	FH	FH	VH	FH	FH	FH	VH	FH	FH	VH	FH	VH
182	FH	H	H	H	H	FH	H	VH	VH	L	H	VH	VH	VH	H	H	FH	VH	H	VH
183	VH	H	VH	VH	VH	VH														
184	L	H	L	H	H	H	L	L	FH	H	FH	FH	H	FL	H	H	H	H	H	H
185	VH	H	H	H	FH	H	FH	VH	H	H	FH	H	H	H	H	FH	FH	VH	H	FH
186	FH	FH	FH	M	FH	FH	FH	M	M	FH										
187	H	FH	VH	FH	FH	FL	L	H	FH	FH	FH	FH	H	H	H	H	VH	VH	VH	H
188	FH	FH	FH	H	FL	H	H	FH	FH	FH	FH	FL	FL	FL	FH	M	FL	FL	M	FH
189	H	H	H	FL	H	H	FH	H	FH	FH	M	H	H	FH	FH	M	FH	H	H	H
190	FH	H	FH	FH	VH	H	FH	H	H	FH	FH	FH	H	H	FH	FH	H	FH	H	FH
191	FH	H	H	FH	H	H	FH	FH	FH	M	M	H	FH	M	M	FH	M	H	H	FH
192	VL	H	VH	VH	H	H	FH	FH	FH	FH	FH	FL	FL	L	FH	FH	FL	FH	FH	L
193	FH	H	M	M	FH	FH	FL	M	M	FL	M	FH	M	FH	FH	FL	H	H	FH	FH
194	L	FH	FH	FH	H	FH	FH	FL	FH	FH	L	L	L	FH	FH	FH	L	FH	FH	FH
195	FH	M	H	FH	H	VH	FH	H	FH	H	H	H	FH	FH	FH	H	H	H	H	FH

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
196	FH	FH	VH	VH	FH	H	M	VH	VH	M	VH	FL	FL	FL	FH	FL	FL	FL	FL
197	FH	M	M	FH	FH	FH	FL	H	FL	FL	FL	FL	M	FL	FL	FL	FL	L	FL
198	FH	H	H	H	FL	FH	FL	H	H	FL	FL	FH	H	M	FH	H	FH	FL	FH
199	FL	L	H	VH	H	L	FH	FH	FH	H	FH	L	FH	FH	H	H	H	FH	L
200	FH	H	H	FH	FH	FH	FH	VH	H	FH	H	VH	H	FH	FH	FH	FH	H	FH
201	FH	H	H	FH	M	H	FH	H	H	FH	M	FL	H	FH	M	FH	FH	FH	M
202	FH	H	H	H	FH	M	FH	M	H	FH	H	FH	M	M	H	H	H	H	M
203	H	FH	H	VH	H	VH	H	H	H	H	FH	H	FH	H	FH	FH	H	H	H
204	M	H	H	FH	FL	FH	FL	M	FH	M	VH	FL	FH	M	FH	FL	L	FH	VL
205	FH	H	H	H	H	H	L	FH	FH	H	FH	H	FH	H	FL	FH	FH	FH	FH
206	M	FH	H	FH	FH	VH	VL	H	FH	L	H	VL	H	FL	FL	H	H	H	VL
207	FH	FH	H	H	VH	VH	FH	FL	H	H	H	VH	VH	FL	M	M	VH	VH	FL
208	FH	FH	H	FH	FH	FL	FL	FL	FH	FH	L	FL	H	FL	FL	FL	FH	VH	FH
209	H	FH	VH	H	FH	H	FH	FL	H	L	FH	FL	H	L	FH	H	H	FH	L
210	FH	FH	H	H	FH	H	FL	H	FH	FH	H	FH							
211	H	FH	H	H	H	H	H	H	FH	H	FL	M	FH	H	FL	H	H	FL	FL
212	VH	VH	FH	FH	M	VH	FH	FH	M	FL	FH	H	M	FH	H	VH	FH	VH	VH
213	FH	FH	H	H	FL	H	FH	H	FH	FH	H	H	H	H	FH	FH	H	H	FH
214	FH	H	H	FH	FH	FH	FH	H	FH	FH	H	FH	FH	H	H	FH	H	FH	H
215	FH	FH	H	H	FH	H	H	H	H	FH	FL	H	FH	H	H	H	H	H	FH
216	FH	FH	VH	FH	H	FH	L	VH	VH	FH	H	FH	FH	VH	VH	FH	FH	FH	FH
217	FH	FH	H	FH	VH	VH	FH	FH	H	FH	FH	FH	FH						
218	FH	VH	L	VH	VH	VH	M	FH	VH	FH	FH	FH	FH	FH	M	FH	M	VH	FH
219	FH	FH	VH	VH	VH	VH	FH	VH	FH										
220	FH	VH	VH	VH	FH	VH	FH	FL	FH	M	VH	FH	VH	FH	FH	VH	VH	FH	FH
221	M	VH	VH	VH	VH	VH	H	VH	VH	H	VH	VH	H	H	VH	H	H	VH	FH
222	FH	FH	FH	FH	FH	VH	M	FH	VH	VH	FH	FH	FH	VH	FH	FH	VH	VH	FH
223	H	FH	VH	VH	FH	VH	FH	M	FH	FH	FH	FH	FH	VH	FH	FH	FH	VH	FH

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
224	FH	FH	FH	VH	L	FH	FL	FH	H	FL	L	FH	VH	FH	H	H	FH	H	H	FH
225	VH	FH	VH	VH	VH	H	VH	VH	VH	FH	FH	VH								
226	VH	FH	FH	VH	M	M	FH	H	H	FH	M	FH	FH	H	FH	H	M	M	VH	VH
227	H	FH	VH	FH	FH	H	FH	FH	FH	H	VH	FH	FL	FH	FH	FH	FH	VH	FH	FH
228	H	FL	FL	M	FH	VH	FL	FH	H	FL	H	FL	M	FL	VH	FL	M	M	FH	H
229	FH	FH	VH	H	H	H	FH	FH	FH	FH	VH	VH	H	FH	VH	VH	VH	VH	VH	FH
230	M	VH	H	H	FH	VH	FL	FH	FH	FH	FH	VH	M	M	FH	FH	FH	VH	VH	M
231	FH	FH	VH	H	FH	FH	FH	VH	VH	FH	H	VH	FH	FH	FH	VH	H	VH	VH	FH
232	VH	M	VH	FH	FH	FH	M	FH	FH	M	FH	M	VH	VH	VH	VH	FH	FH	VH	VH
233	FH	FH	VH	FH	FH	FH	FH	VH	FH	M	FH	FH								
234	FH	VH	VH	VH	VH	FH	FH	VH	VH	FH	VH	VH	FH	FH	FH	VH	VH	FH	FH	FH
235	FH	FH	FL	FH	L	VH	L	FH	FH	FH	FH	VH	M	FH	FH	FL	VH	FH	H	VH
236	L	VH	VH	H	FH	H	VH	VH	VH	VH	H	H	FH	VH	VH	VH	VH	VH	H	VH
237	VH	FH	VH	VH	FH	VH	VH	VH	H	H	VH	VH	FH	H	H	H	H	H	H	H
238	FL	FH	VH	VH	H	VH	FH	FH	FH	VH	VH	VH	FH	FL	FH	VH	VH	FH	L	VL
239	FH	FH	VH	VH	FH	FH	H	FH	FH	FH	H	H	VH	H	FH	FH	FH	H	FH	H

Note: very high (VH), high (H), fairly high (FH), medium (M), fairly low (FL), low (L), very low (VL)

Source: author

Appendix E. Agility attribute (ACn) performance ratings

Respondent	AC₁₁₁	AC₁₁₂	AC₁₂₁	AC₁₂₂	AC₁₃₁	AC₁₃₂	AC₁₄₁	AC₂₁₁	AC₂₁₂	AC₂₂₁	AC₂₃₁	AC₂₄₁	AC₂₅₁	AC₃₁₁	AC₃₁₂	AC₃₂₁	AC₃₂₂	AC₃₃₁	AC₃₄₁	AC₃₄₂
1	G	VP	G	G	G	P	F	P	P	P	G	G	F	G	G	G	G	P	P	G
2	G	E	G	F	E	G	G	F	G	G	F	F	G	G	F	G	G	G	G	F
3	G	G	VG	VG	VG	G	G	VG	G	G	G	VG	G	G	G	G	G	G	G	G
4	G	F	G	F	G	G	G	G	F	G	G	F	G	G	G	G	G	VG	G	G
5	E	VG	VG	G	G	VG	VG	VG	G	G	G	VG	VG	G	VG	G	VG	VG	VG	VG
6	G	G	VG	VG	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	F
7	E	G	G	G	G	G	G	G	G	F	G	G	E	G	G	VG	VG	G	G	G
8	VG	G	VG	G	F	F	G	F	G	G	G	G	G	F	G	G	G	G	G	F
9	G	G	F	G	G	G	F	G	F	G	G	G	G	G	F	G	G	G	G	G
10	G	G	G	G	F	F	G	G	G	F	F	F	F	F	G	G	G	F	G	G
11	E	G	G	G	G	G	G	E	G	G	G	G	G	G	G	G	G	G	G	G
12	G	G	G	G	VP	G	G	F	G	G	VG	G	G	G	VG	G	G	G	G	G
13	F	G	G	F	G	G	VG	G	G	G	F	F	VG	F	F	G	VG	G	G	F
14	VG	VG	E	VG	VG	VG	VG	VG	VG	G	G	G	VG	VG	G	G	G	VG	VG	VG
15	E	VG	G	F	VG	VG	VG	G	G	G	VG	F	F	F	VG	G	VG	G	VG	G
16	VG	G	E	E	E	VG	E	E	VG	G	E	VG	E	VG	VG	VG	E	VG	VG	VG
17	E	VG	E	G	G	G	E	G	G	E	E	E	P	VG	G	G	E	E	G	G
18	G	G	F	F	G	F	G	P	F	G	F	P	P	F	G	P	F	F	F	F
19	F	G	G	G	G	G	G	F	G	G	F	G	G	G	G	VG	F	G	G	G
20	F	G	G	G	G	G	G	F	F	G	G	G	G	G	G	G	G	G	G	G
21	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
22	G	P	G	F	F	F	F	G	F	F	F	P	P	F	G	G	G	G	G	F
23	VG	VG	E	E	VG	VG	E	E	E	VG	E	E	E	VG	E	E	E	E	E	E
24	G	G	E	VG	G	G	VG	VG	VG	G	G	VG	G	G	G	G	G	VG	VG	VG
25	G	E	VG	E	E	G	G	E	G	G	E	E	G	G	G	E	E	G	G	G
26	E	VG	VG	G	G	F	G	F	G	G	VG	G	G	F	G	F	G	F	G	F
27	G	F	G	F	G	G	G	F	G	F	F	F	F	F	F	F	F	F	F	F

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
28	G	G	G	G	G	G	F	G	G	G	G	G	G	G	G	G	G	G	G	G
29	G	G	E	VG	F	G	G	G	G	G	G	G	F	F	G	G	E	G	F	G
30	G	G	VG	G	G	G	G	G	F	G	G	G	G	G	G	G	F	G	G	G
31	F	F	G	G	G	F	F	F	F	F	F	F	G	G	F	G	G	G	G	F
32	G	VG	G	G	VG	G	G	VG	G	G	VG	VG	VG	VG	VG	F	F	G	VG	G
33	G	VG	G	G	G	G	F	G	G	G	G	G	G	G	G	G	G	G	G	G
34	G	G	G	G	G	G	G	F	F	G	G	F	G	G	G	F	F	G	G	F
35	E	G	VG	E	E	E	G	G	G	VG	VG	G	G	G	G	G	G	G	G	G
36	G	F	F	G	F	G	F	F	F	F	F	F	G	G	F	F	G	G	G	G
37	G	VG	G	F	P	F	G	G	P	G	G	G	F	G	G	P	VG	G	F	P
38	G	G	F	E	G	G	F	F	F	F	F	F	G	G	G	F	G	G	G	G
39	VG	G	VG	G	G	VG	G	G	G	G	F	G	VG	G	G	F	E	VG	VG	G
40	F	P	F	F	F	G	F	F	F	P	F	VP	F	F	F	F	P	F	F	P
41	F	F	F	F	F	G	G	F	F	F	F	VP	VP	F	F	F	VP	G	F	F
42	G	G	VG	VG	VG	G	VG	G	VG	G	G	G	W	P	G	G	VG	VG	G	F
43	G	F	G	G	F	F	F	G	G	G	G	G	G	G	G	F	G	F	G	F
44	VG	G	G	VG	G	G	G	G	G	G	G	G	G	VG	G	G	G	G	G	F
45	VG	G	VG	G	G	VG	G	G	G	P	G	G	G	VG	VG	G	VG	G	G	F
46	G	G	G	G	G	G	G	F	F	G	G	F	G	G	G	F	G	G	G	G
47	VG	VG	E	VG	VG	G	E	G	VG	VG	VG	G	G	VG	G	E	VG	VG	G	VG
48	G	G	G	G	G	G	G	F	G	F	G	F	G	G	G	P	G	G	G	G
49	G	VG	VG	G	P	G	G	F	G	F	G	F	G	G	G	F	F	G	G	G
50	G	G	G	VG	VG	VG	G	G	G	G	G	G	VG	G	G	G	G	G	VG	G
51	F	F	F	E	P	G	F	F	G	F	G	F	G	G	F	F	G	F	G	F
52	G	G	VG	VG	VG	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
53	VG	G	VG	VG	VG	VG	E	VG	VG	G	VG	VG	E	VG	G	VG	E	VG	VG	G
54	VG	G	G	VG	G	G	G	G	G	VG	VG	G	G	G	G	G	G	G	G	G
55	G	G	VG	G	G	G	G	G	G	G	G	G	G	G	G	VG	G	G	G	F

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
56	E	VG	VG	E	VG	G	G	VG	E	E	VG	VG	VG							
57	F	W	F	P	F	G	P	G	F	VP	F	G	W	P	F	VG	G	G	P	W
58	E	E	E	E	VG	E	E	VG	VG	E	G	E	E	E	E	VG	VG	E	VG	VG
59	G	G	G	VG	G	VP	F	G	G	G	G	G	G	F	G	G	G	G	G	G
60	VG	E	E	VG	E	VG	VG	E	VG	E	E	E	VG	VG	E	E	E	E	E	E
61	P	G	F	G	VG	VG	P	VG	G	G	G	G	G	G	G	F	VG	VG	F	VG
62	P	VG	G	P	G	G	G	G	F	G	VG	G	G	G	G	G	VG	E	VG	VG
63	E	E	E	VG	E	E	E	VG	E	G	E	VG	VG	VG	E	G	VG	VG	G	E
64	G	F	F	F	P	VG	G	G	G	G	G	G	G	P	F	F	G	G	G	G
65	E	E	VG	E	G	G	VG	VG	VG	E	VG	E	E	E	E	E	E	VG	E	VG
66	G	G	VG	G	F	G	VG	VG	G	G	VG	VG	VG	G	VG	VG	VG	VG	G	VG
67	VG	G	G	G	G	VG	VP	G	VG	G	G	VG	VG	G	P	VG	F	VG	E	VG
68	F	F	F	F	VG	P	F	F	G	P	F	G	G	G	G	G	G	G	G	G
69	VG	VG	E	G	VG	VG	VG	VP	G	P	G	VG	G	VG	E	E	VG	VG	VG	E
70	F	VP	E	E	E	VG	G	P	E	G	E	E	E	VG	E	P	VG	E	VG	E
71	G	G	G	F	F	G	G	G	VG	G	G	G	G	F	G	E	VG	VG	G	VG
72	F	E	E	G	P	VG	VG	P	P	G	F	G	G	F	W	P	F	G	P	P
73	VG	G	G	F	G	F	G	F	F	F	G	VG	VG	G	VG	G	G	G	VG	VG
74	VG	VG	E	VG	F	VG	VG	VG	P	F	P	G	VG	VG	E	F	G	G	VG	VG
75	G	F	E	VP	G	VG	F	VG	G	G	G	VG	P	F	G	F	G	F	F	F
76	VG	VP	VG	E	G	F	VG	G	VG	G	VG	VG	G	G	P	VG	VG	VG	F	VG
77	E	VG	G	VG	VG	E	G	VG	G	VG	G	VG	G	VG	G	E	VG	VG	VG	VG
78	VG	VG	F	F	F	VG	VG	G	G	VG	VG	P	VG	G	VP	G	VG	G	VG	G
79	G	G	F	VG	VG	E	G	VP	VG	G	VG	W	W	W	VG	P	E	G	F	W
80	VG	E	VG	G	E	E	E	VG	VG	G	E	G	E	VG	F	G	E	E	E	G
81	VG	E	VG	VG	VG	VG	VG	G	G	F	G	G	VG	F	G	G	VG	VG	E	E
82	G	VG	G	VG	F	E	G	VG	VG	G	VG	E	G	VG	VG	VG	G	VG	G	VG
83	G	P	VP	E	G	G	E	G	F	VG	VG	E	F	P	VP	E	E	G	P	P

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
84	VG	E	VG	G	VG	VG	E	G	VG	G	VG	VG	VG	G						
85	E	VG	G	E	VG	VG	G	E	E	VG	E	VG	VG	F	G	G	VG	VG	G	G
86	G	G	VG	G	F	G	G	VG	G	G	VG	E	G	F	F	E	G	F	VG	G
87	VG	F	VG	F	G	VG	F	G	G	VG	G	VG	VG	G	VG	VG	VG	E	VG	VG
88	P	F	VP	F	P	P	F	F	E	VP	VG	VP	P	P	W	VG	VG	VG	P	P
89	G	G	G	F	VP	F	F	G	F	G	G	G	G	G	G	F	G	G	G	G
90	G	G	G	G	E	E	G	VG	G	G	G	G	VG	E	E	E	E	E	E	G
91	F	F	E	E	G	F	G	G	F	E	G	G	G	G	G	VG	VG	VG	G	G
92	VG	G	VG	VG	G	G	G	G	G	G	G	G	E	G	VG	G	E	G	G	G
93	VG	G	G	F	VG	G	VG	G	G	F	G	VG	F	G	F	G	G	G	G	G
94	G	G	F	G	G	G	P	G	G	G	F	G	G	G	G	G	F	G	G	G
95	E	G	VG	G	VG	G	G	G	G	VG	G	G	G	G	G	G	G	G	G	G
96	G	P	F	G	G	P	G	F	F	G	G	G	G	F	F	G	G	F	G	F
97	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
98	G	G	E	G	G	G	G	G	F	F	F	F	F	F	F	G	G	G	G	F
99	G	F	G	F	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
100	G	G	F	F	G	G	G	G	F	G	G	F	F	G	G	F	F	G	G	G
101	G	G	G	G	G	G	G	F	F	G	G	G	W	G	G	G	G	G	G	G
102	G	G	G	G	G	E	E	E	E	E	E	E	W	E	E	E	E	E	E	E
103	G	G	G	G	G	G	G	G	F	G	G	G	G	G	G	G	G	G	G	G
104	F	F	F	F	G	G	G	F	F	F	F	F	VP	VP	VP	VP	F	F	G	F
105	G	VG	G	F	E	VG	G	VG	G	VG	G	G	VG	G	G	E	VG	E	G	VG
106	G	G	G	F	F	G	G	F	G	VG	G	E	VG	G	F	G	G	VG	G	F
107	G	G	VG	F	G	G	G	G	G	G	G	F	F	F	VG	G	G	F	G	G
108	E	E	G	E	G	G	G	G	VG	G	G	F	G	G	E	G	G	G	G	G
109	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
110	G	G	G	G	VP	G	G	F	F	F	G	G	G	VP	F	F	G	G	G	VP
111	G	VG	G	VG	F	G	G	G	G	G	G	G	G	E	G	F	G	E	G	G

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
112	G	F	G	G	G	G	G	G	G	F	G	G	G	G	G	G	G	G	G	G
113	G	G	VG	G	G	VG	VG	G	G	G	G	G	G	G	G	G	G	G	G	G
114	G	G	G	G	P	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
115	F	F	VG	G	G	E	P	F	G	G	W	F	F	VP	P	F	G	G	G	G
116	G	VG	VG	G	VG	G	G	VG	G	F	G	G	G	F	F	G	G	F	G	G
117	F	G	VG	F	G	G	G	G	G	VG	F	F	G	G	VG	G	F	G	G	F
118	F	E	F	F	G	G	P	G	G	F	F	F	F	F	F	F	G	F	G	F
119	VG	G	E	VG	VG	VG	G	E	VG	VG	E	VG	G	VG	E	VG	E	E	G	E
120	VG	P	E	G	VG	VG	P	VG	G	VP	VG	G	E	E	G	VG	VG	VG	E	F
121	G	F	F	G	G	F	F	G	F	P	F	F	G	VG	G	F	G	VG	G	F
122	G	VG	E	G	F	VG	VG	E	E	VG	VG	E	VG	VG	VG	VG	VG	E	E	E
123	G	F	F	F	G	G	G	F	F	F	F	F	F	F	G	F	G	F	F	F
124	G	G	G	G	G	VG	G	G	F	F	F	G	F	G	G	F	G	G	G	F
125	F	G	VG	P	G	F	W	VG	VP	W	G	VG	VP	VG	G	F	G	VG	P	G
126	VG	F	E	VG	VG	F	VG	E	E	F	F	E	VG	E	VG	E	E	VG	E	VG
127	VG	VG	VG	VG	VG	VG	G	VG	VG	VG	VG	VG	G	VG	VG	VG	VG	VG	G	VG
128	G	G	G	G	G	VG	VG	G	VG	G	VG	VG	G	G	G	G	VG	VG	VG	VG
129	VG	G	VG	G	F	E	F	G	VG	G	VG	VG	VG	G	G	F	F	VG	VG	VG
130	VG	G	E	VG	VG	G	G	G	G	VG	VG	F	VG	F	F	E	VG	G	F	G
131	G	G	G	VG	E	E	VG	VG	VG	VG	E	VG	VG	VG	VG	E	E	E	E	VG
132	G	F	G	G	W	G	F	F	G	F	F	F	F	F	F	F	G	F	F	F
133	G	F	VG	VG	G	G	G	G	G	F	VG	VG	G	G	G	VG	G	F	G	G
134	VG	F	G	G	G	F	F	G	F	G	G	F	F	F	P	F	G	G	G	VG
135	VG	G	G	VG	VG	G	VG	VG	G	VG	F	G	G	G	VG	G	F	G	G	VG
136	G	G	G	G	G	G	F	G	G	G	P	G	W	G	G	F	F	P	F	F
137	G	F	VG	VG	G	E	VG	G	G	G	VG	G	VG	VG	G	VG	E	VG	VG	VG
138	G	G	VG	G	VG	F	VG	VG	VG	VG	G	F	G	VG	VG	E	VG	VG	G	E
139	VG	G	G	F	G	G	F	F	G	G	F	F	F	F	G	F	G	G	G	G

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
140	G	G	VG	G	G	G	VG	G	VG	G	G	VG	VG	VG	VG	G	G	G	VG	VG
141	G	G	E	E	G	G	G	VG	E	G	G	E	G	G	VG	G	E	E	E	G
142	G	G	G	F	P	G	P	G	F	P	P	P	F	G	G	G	G	G	G	G
143	G	G	E	VG	VG	G	G	G	G	G	F	G	F	VG	F	VG	G	VG	F	G
144	VG	G	G	G	VG	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
145	W	F	F	F	F	G	G	F	G	G	P	G	F	F	F	P	F	G	F	F
146	G	VG	G	G	G	VG	VG	G	G	G	G	G	G	G	G	G	VG	G	VG	VG
147	VG	VG	G	F	G	G	G	VG	G	G	G	G	G	VG	G	F	G	G	F	G
148	G	VG	E	VG	G	G	VG	VG	G	F	G	G	F	G	G	G	G	VG	G	G
149	E	G	G	E	G	G	F	VG	G	G	G	VG	G	G	E	G	VG	E	F	VG
150	G	G	G	G	F	G	F	VG	G	G	F	G	G	F	G	G	G	G	G	G
151	E	VG	VG	G	G	G	E	VG	VG	VG	VG	VG	VG	G	VG	VG	G	G	G	G
152	VG	P	VG	VG	VG	G	G	VG	VG	F	E	G	F	VG	VG	VG	G	G	G	F
153	F	VG	G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	G	G	F
154	VG	VG	G	G	F	F	F	G	P	F	P	P	G	F	F	F	F	F	F	G
155	G	G	G	G	G	G	G	G	G	E	G	G	G	G	G	G	G	G	G	G
156	G	F	G	G	F	G	G	G	F	G	F	F	G	F	G	F	G	G	G	G
157	G	F	VG	VG	F	F	F	VG	F	F	VG	F	F	VG	F	VG	VG	VG	VG	F
158	G	G	G	VG	G	G	G	G	VG	G	VG	F	F	F	G	G	VG	G	VG	VG
159	G	G	E	E	G	G	F	G	G	G	VG	G	G	G	VG	F	VG	F	VG	G
160	G	G	VG	G	G	G	G	G	G	G	G	F	G	G	G	G	VG	G	G	G
161	VG	G	VG	G	VG	G	G	G	F	F	G	VG	G	G	G	G	G	G	G	F
162	E	G	E	E	E	E	G	VG	VG	VG	VG	VG	W	G	VG	VG	VG	E	E	E
163	G	G	G	G	G	G	G	G	G	G	G	G	G	G	VG	VG	G	G	G	VG
164	G	VG	G	VG	F	G	VG	G	G	F	VG	F	VG	G	G	F	VG	G	G	G
165	G	F	F	G	G	G	G	G	G	G	G	G	G	G	G	G	G	VG	G	VG
166	F	F	F	F	G	G	G	G	F	F	G	G	G	G	F	F	G	G	G	G
167	F	F	F	F	F	G	F	G	F	F	F	G	F	G	F	G	G	G	G	F

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
168	G	G	G	G	G	VG	F	F	G	F	G	G	F	G	G	VG	VG	G	VG	G
169	G	G	E	G	G	G	G	G	E	F	G	G	G	E	G	G	G	G	G	G
170	G	G	G	G	G	G	VG	F	F	F	G	G	G	G	VG	F	G	F	G	G
171	G	G	G	F	G	VG	G	G	G	F	G	G	G	G	G	F	G	G	G	G
172	E	E	G	G	G	F	G	VG	G	G	F	E	F	G	VG	G	E	E	G	G
173	E	E	E	G	VG	E	E	E	E	E	VG	VG	E	E	E	VG	VG	E	E	VG
174	F	G	F	F	F	F	F	F	F	F	F	G	G	F	F	F	F	G	G	G
175	VG	G	E	VG	G	G	G	VG	G	G	G	G	G	G	G	G	G	F	VG	G
176	F	F	G	G	G	G	P	F	P	G	G	G	F	F	F	F	G	F	G	G
177	E	E	E	E	G	G	G	G	G	G	VG	G	VG	G	E	E	E	VG	E	G
178	G	G	G	G	F	G	F	VG	F	F	G	G	VG	G	G	G	G	G	G	VG
179	G	G	E	F	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
180	G	G	G	VG	G	VG	G	G	G	G	VG	F	G	F	E	G	E	G	G	F
181	G	G	G	F	G	G	E	G	F	F	G	G	G	G	VG	G	G	G	G	VG
182	G	G	F	G	F	G	G	VG	G	F	VG	G	VG	F	F	G	G	VG	G	VG
183	E	E	E	E	E	E	E	VG	E	E	VG	E	E	E	G	VG	E	VG	G	E
184	VP	P	G	P	G	VG	E	VG	VG	W	P	G	F	G	VG	G	VG	G	G	F
185	G	VG	G	VG	G	G	F	G	G	F	G	G	G	VG	G	F	G	G	G	G
186	F	G	VG	VG	G	VG	VG	VG	VG	G	G	G	G	G	G	G	G	G	VG	G
187	G	P	F	G	P	VG	VP	F	G	P	VG	P	P	F	F	G	E	VG	F	F
188	G	G	VG	F	VP	G	P	F	G	F	F	G	G	F	F	G	G	G	G	G
189	G	G	G	F	P	G	G	G	G	F	G	VG	G	G	G	F	G	G	VG	VG
190	G	G	G	G	F	G	G	G	F	F	G	G	F	F	G	G	VG	G	G	F
191	G	G	F	G	G	F	F	F	G	F	F	G	G	G	F	G	G	G	G	F
192	W	VP	VP	VP	P	G	G	F	VP	VP	F	F	G	F	F	P	F	F	G	F
193	G	F	G	F	G	G	G	F	F	G	G	F	G	F	G	G	G	G	G	G
194	F	F	G	F	F	G	G	G	G	F	F	G	G	G	G	F	G	VG	G	G
195	G	G	VG	G	F	G	G	G	G	F	F	G	G	G	F	VG	G	G	F	F

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
196	F	G	E	E	F	F	VG	VG	VG	G	VG	G	G	G	G	G	G	G	G	G
197	G	G	G	VG	VG	VG	G	VG	G	G	G	G	G	VG	G	G	G	G	G	G
198	VG	VG	G	G	VG	G	F	G	F	F	F	G	G	F	G	F	G	G	G	F
199	G	G	G	G	G	G	G	G	G	G	G	G	P	G	F	G	G	G	G	G
200	VG	E	G	VG	G	G	G	VG	G	G	G	VG	G	G	G	G	G	VG	VG	G
201	G	F	VG	F	F	VG	F	F	VG	G	F	P	G	G	F	F	F	G	F	F
202	G	G	F	F	F	G	G	G	G	G	G	VG	G	F	G	F	G	G	G	F
203	G	G	F	G	G	G	G	G	G	G	G	G	G	F	G	F	G	G	G	G
204	G	G	P	F	G	G	G	G	G	G	F	G	F	F	G	F	G	G	G	G
205	F	G	F	G	F	F	F	F	F	G	G	G	G	G	G	P	G	G	G	G
206	G	G	VG	G	G	G	G	VG	VG	VG	VG	G	W	G	G	VG	G	G	F	G
207	E	G	F	G	F	G	G	G	G	G	VG	G	VG	F	G	G	G	G	G	G
208	VG	VG	VG	VG	G	VG	VG	G	G	G	G	G	G	G	G	VG	VG	G	VG	G
209	F	G	G	F	G	G	G	G	G	G	F	G	G	E	G	E	G	E	G	G
210	G	G	G	F	G	G	F	F	F	G	G	G	F	F	F	F	G	G	G	F
211	G	F	F	G	VG	G	W	G	G	G	G	G	F	F	G	G	G	VG	G	G
212	VG	G	G	F	G	VG	G	G	G	G	G	G	VG	G	G	F	G	G	G	G
213	G	G	VG	G	G	G	G	G	G	G	G	G	G	G	G	G	G	VG	G	G
214	VG	G	G	G	G	G	G	G	G	G	G	VG	G	G	G	G	G	G	G	G
215	G	VG	VG	G	G	VG	VG	G	VG	G	G	VG	VG	VG	G	VG	VG	G	G	VG
216	G	G	VG	G	G	G	F	G	VG	G	VG	G	G	G	G	E	G	G	G	G
217	G	VG	G	F	G	G	G	G	G	G	VG	G	G	G	G	G	G	VG	G	G
218	G	E	G	G	E	E	G	G	E	G	E	E	E	G	E	E	E	E	E	E
219	F	G	VG	VG	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
220	F	F	F	G	G	G	F	F	F	F	F	F	F	P	F	F	F	G	F	G
221	G	F	G	G	F	G	F	G	G	F	G	G	G	G	P	VG	G	VG	VG	G
222	G	G	G	F	F	G	G	F	G	G	G	G	G	F	F	G	G	G	G	G
223	G	E	E	G	G	E	G	G	G	G	G	E	G	G	G	G	G	G	G	G

Respondent	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
224	P	P	F	VG	P	P	P	P	P	W	G	G	G	P	F	G	G	F	G	G
225	VG	E	G	G	F	F	F	G	G	G	G	G	G	G	G	G	G	G	G	G
226	G	F	F	G	F	F	F	F	F	F	G	G	G	F	G	G	F	G	F	G
227	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
228	G	G	G	G	G	G	G	G	F	F	G	G	G	G	G	G	G	G	G	G
229	VG	G	G	E	E	VG	G	G	F	G	G	G	VG	G	G	F	VG	G	VG	G
230	P	F	VG	F	E	G	E	E	G	E	VG	P	G	F	F	G	F	F	F	G
231	VG	G	VG	G	F	G	G	G	G	G	G	G	F	G	G	VG	VG	VG	G	G
232	F	F	G	G	E	G	F	G	G	F	G	F	G	G	F	G	G	E	F	F
233	G	G	F	F	F	G	G	F	G	G	G	G	G	G	G	G	G	G	G	G
234	E	VG	G	VG	VG	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
235	G	G	G	VG	G	G	G	G	G	G	G	G	G	G	G	G	VG	G	G	G
236	E	G	E	VG	G	G	E	VG	VG	G	VG	G	G	G	G	VG	G	G	G	VG
237	VG	G	G	G	VG	G	G	G	G	G	G	G	G	G	G	G	VG	VG	G	P
238	G	G	G	VG	G	VG	VG	G	F	G	G	G	G	G	F	VG	G	G	G	G
239	G	G	VG	G	VG	G	G	G	G	G	VG	E	G	G	G	G	G	G	G	G

Note: excellent (E), very good (VG), good (G), fair (F), poor (P), very poor (VP), worst (W)
Source: author

Appendix F: Agility attribute (ACn) importance weights in fuzzy numbers

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
1	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.2, 0.35, 0.5)	(0.1, 0.2, 0.3)	(0.1, 0.2, 0.3)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.1, 0.2, 0.3)
2	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
3	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
4	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)
5	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)
6	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
7	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
8	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
9	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
10	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)

N	AC ₋₁₁₁	AC ₋₁₁₂	AC ₋₁₂₁	AC ₋₁₂₂	AC ₋₁₃₁	AC ₋₁₃₂	AC ₋₁₄₁	AC ₋₂₁₁	AC ₋₂₁₂	AC ₋₂₂₁	AC ₋₂₃₁	AC ₋₂₄₁	AC ₋₂₅₁	AC ₋₃₁₁	AC ₋₃₁₂	AC ₋₃₂₁	AC ₋₃₂₂	AC ₋₃₃₁	AC ₋₃₄₁	AC ₋₃₄₂
51	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)
52	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.4, 0.5)
53	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
54	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
55	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
56	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
57	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0, 0.15, 0.3)	(0.2, 0.3, 0.4)	(0.3, 0.4, 0.5)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.3, 0.4, 0.5)	(0, 0.05, 0.15)
58	(0.85, 0.95, 1)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
59	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.3, 0.4, 0.5)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.2, 0.3, 0.4)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.2, 0.3, 0.4)	(0.1, 0.2, 0.3)	(0.7, 0.8, 0.9)
60	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)

N	AC ₋₁₁₁	AC ₋₁₁₂	AC ₋₁₂₁	AC ₋₁₂₂	AC ₋₁₃₁	AC ₋₁₃₂	AC ₋₁₄₁	AC ₋₂₁₁	AC ₋₂₁₂	AC ₋₂₂₁	AC ₋₂₃₁	AC ₋₂₄₁	AC ₋₂₅₁	AC ₋₃₁₁	AC ₋₃₁₂	AC ₋₃₂₁	AC ₋₃₂₂	AC ₋₃₃₁	AC ₋₃₄₁	AC ₋₃₄₂	
71	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	
72	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	
73	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.65)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
74	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)
75	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)
76	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.1, 0.2, 0.3)
77	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
78	(0.2, 0.35, 0.5)	(0, 0.05, 0.15)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
79	(0.1, 0.2, 0.3)	(0.1, 0.2, 0.3)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0, 0.05, 0.15)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0, 0.05, 0.15)	(0.7, 0.8, 0.9)	(0, 0.05, 0.15)	(0, 0.05, 0.15)	(0, 0.05, 0.15)	(0.3, 0.4, 0.5)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)
80	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂	
81	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,3, 0,5, 0,7)	(0,7, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)
82	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)
83	(0,85, 0,95, 1)	(0,3, 0,5, 0,7)	(0,1, 0,2, 0,3)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,1, 0,2, 0,3)	(0,7, 0,8, 0,9)	(0,1, 0,2, 0,3)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,1, 0,2, 0,3)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)
84	(0,7, 0,8, 0,9)	(0,1, 0,2, 0,3)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)	(0,3, 0,5, 0,7)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)
85	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,3, 0,5, 0,7)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)
86	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)
87	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,1, 0,2, 0,3)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)
88	(0,3, 0,5, 0,7)	(0,85, 0,95, 1)	(0,1, 0,2, 0,3)	(0,85, 0,95, 1)	(0,1, 0,2, 0,3)	(0,2, 0,35, 0,5)	(0,3, 0,5, 0,7)	(0,2, 0,35, 0,5)	(0,7, 0,8, 0,9)	(0,1, 0,2, 0,3)	(0,1, 0,2, 0,3)	(0,5, 0,65, 0,8)	(0,1, 0,2, 0,3)	(0,3, 0,5, 0,7)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,2, 0,35, 0,5)	(0,2, 0,35, 0,5)
89	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,3, 0,5, 0,7)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,1, 0,2, 0,3)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,1, 0,2, 0,3)	(0,2, 0,35, 0,5)	(0,2, 0,35, 0,5)
90	(0,3, 0,5, 0,7)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)

N	AC ₋₁₁₁	AC ₋₁₁₂	AC ₋₁₂₁	AC ₋₁₂₂	AC ₋₁₃₁	AC ₋₁₃₂	AC ₋₁₄₁	AC ₋₂₁₁	AC ₋₂₁₂	AC ₋₂₂₁	AC ₋₂₃₁	AC ₋₂₄₁	AC ₋₂₅₁	AC ₋₃₁₁	AC ₋₃₁₂	AC ₋₃₂₂	AC ₋₃₃₁	AC ₋₃₄₁	AC ₋₃₄₂
111	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.1, 0.2, 0.3)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.1, 0.2, 0.3)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
112	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)
113	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)
114	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
115	(0.85, 0.95, 1)	(0, 0.05, 0.15)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.1, 0.2, 0.3)	(0.85, 0.95, 1)	(0.2, 0.35, 0.5)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
116	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
117	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
118	(0.3, 0.5, 0.7)	(0.1, 0.2, 0.3)	(0.65, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.8, 0.9, 1)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
119	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
120	(0.65, 0.8)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.8, 0.9, 1)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
121	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
122	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)
123	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
124	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
125	(0.3, 0.5, 0.7)	(0, 0.05, 0.15)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0, 0.05, 0.15)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
126	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
127	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)
128	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
129	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)
130	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.1, 0.2, 0.3)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)

N	AC ₋₁₁₁	AC ₋₁₁₂	AC ₋₁₂₁	AC ₋₁₂₂	AC ₋₁₃₁	AC ₋₁₃₂	AC ₋₁₄₁	AC ₋₂₁₁	AC ₋₂₁₂	AC ₋₂₂₁	AC ₋₂₃₁	AC ₋₂₄₁	AC ₋₂₅₁	AC ₋₃₁₁	AC ₋₃₁₂	AC ₋₃₂₁	AC ₋₃₂₂	AC ₋₃₃₁	AC ₋₃₄₁	AC ₋₃₄₂
131	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)
132	(0.5, 0.65, 0.8)	(0.7, 0.85, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.7, 0.85, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
133	(0.5, 0.65, 0.8)	(0.7, 0.85, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.85, 0.9)	(0.2, 0.35, 0.5)	(0.3, 0.5, 0.8)
134	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.3, 0.5, 0.7)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
135	(0.5, 0.65, 0.8)	(0.7, 0.85, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.7, 0.85, 0.9)	(0.8, 0.9, 1)	(0.5, 0.65, 0.8)
136	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.1, 0.2, 0.3)	(0.1, 0.2, 0.3)	(0.7, 0.85, 0.9)	(0.3, 0.5, 0.7)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)
137	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.7, 0.85, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
138	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
139	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.2, 0.35, 0.5)	(0.1, 0.2, 0.3)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.1, 0.2, 0.3)	(0.1, 0.2, 0.3)	(0.2, 0.35, 0.5)	(0.7, 0.85, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.85, 0.9)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0, 0.05, 0.15)
140	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.85, 0.9)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
141	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)
142	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 0,2)	(0,1, 0,2, 0,3)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)
143	(0,2, 0,35, 0,5)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,3, 0,5, 0,7)	(0,3, 0,5, 0,7)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)
144	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,1, 0,2, 0,3)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,1, 0,2, 0,3)	(0,5, 0,65, 0,8)	(0,2, 0,35, 0,5)	(0,1, 0,2, 0,3)	(0,1, 0,2, 0,3)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)
145	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)
146	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)
147	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)
148	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)	(0,3, 0,5, 0,7)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)
149	(0,3, 0,5, 0,7)	(0,2, 0,35, 0,5)	(0,1, 0,2, 0,3)	(0,7, 0,8, 0,9)	(0,1, 0,2, 0,3)	(0,5, 0,65, 0,8)	(0,1, 0,2, 0,3)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,1, 0,2, 0,3)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,3, 0,5, 0,7)	(0,7, 0,8, 0,9)
150	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)

N	AC ₋₁₁₁	AC ₋₁₁₂	AC ₋₁₂₁	AC ₋₁₂₂	AC ₋₁₃₁	AC ₋₁₃₂	AC ₋₁₄₁	AC ₋₂₁₁	AC ₋₂₁₂	AC ₋₂₂₁	AC ₋₂₃₁	AC ₋₂₄₁	AC ₋₂₅₁	AC ₋₃₁₁	AC ₋₃₁₂	AC ₋₃₂₁	AC ₋₃₂₂	AC ₋₃₃₁	AC ₋₃₄₁	AC ₋₃₄₂
191	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)
192	(0, 0.05, 0.15)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.35, 0.5, 0.8)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)
193	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.2, 0.35, 0.5)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
194	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.1, 0.2, 0.3)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
195	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
196	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)
197	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.35, 0.5, 0.8)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.1, 0.2, 0.3)	(0.2, 0.35, 0.5)
198	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)
199	(0.2, 0.35, 0.5)	(0.1, 0.2, 0.3)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)
200	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂	
201	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.8)	(0.7, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)
202	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)
203	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
204	(0.3, 0.5, 0.7)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0, 0.05, 0.15)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0, 0.05, 0.15)
205	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
206	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0, 0.05, 0.15)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.7, 0.8, 0.9)	(0, 0.05, 0.15)	(0, 0.05, 0.15)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0, 0.05, 0.15)
207	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.2, 0.35, 0.5)
208	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.35, 0.5, 0.7)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.1, 0.2, 0.3)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
209	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0, 0.05, 0.15)	(0.7, 0.8, 0.9)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)
210	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)

N	AC ₋₁₁₁	AC ₋₁₁₂	AC ₋₁₂₁	AC ₋₁₂₂	AC ₋₁₃₁	AC ₋₁₃₂	AC ₋₁₄₁	AC ₋₂₁₁	AC ₋₂₁₂	AC ₋₂₂₁	AC ₋₂₃₁	AC ₋₂₄₁	AC ₋₂₅₁	AC ₋₃₁₁	AC ₋₃₁₂	AC ₋₃₂₁	AC ₋₃₂₂	AC ₋₃₃₁	AC ₋₃₄₁	AC ₋₃₄₂
211	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.8)	(0.7, 0.8, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.8)	(0.2, 0.35, 0.5)
212	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.95)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)
213	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.8)	(0.5, 0.65, 0.8)
214	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.8)	(0.5, 0.65, 0.8)
215	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.8)	(0.5, 0.65, 0.8)
216	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
217	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
218	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.1, 0.2, 0.3)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)
219	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
220	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂	
221	(0,3, 0,5, 0,7)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	
222	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	
223	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	
224	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,1, 0,2, 0,3)	(0,5, 0,65, 0,8)	(0,2, 0,35, 0,5)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,2, 0,35, 0,5)	(0,1, 0,2, 0,3)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)
225	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	
226	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,3, 0,5, 0,7)	(0,3, 0,5, 0,7)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,3, 0,5, 0,7)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,3, 0,5, 0,7)	(0,3, 0,5, 0,7)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	
227	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,2, 0,3, 0,5)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	
228	(0,7, 0,8, 0,9)	(0,2, 0,35, 0,5)	(0,2, 0,35, 0,5)	(0,3, 0,5, 0,7)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,2, 0,35, 0,5)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,2, 0,35, 0,5)	(0,7, 0,8, 0,9)	(0,2, 0,35, 0,5)	(0,3, 0,5, 0,7)	(0,2, 0,35, 0,5)	(0,85, 0,95, 1)	(0,2, 0,35, 0,5)	(0,3, 0,5, 0,7)	(0,3, 0,5, 0,7)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	
229	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,5, 0,65, 0,8)	
230	(0,3, 0,5, 0,7)	(0,85, 0,95, 1)	(0,7, 0,8, 0,9)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,2, 0,35, 0,5)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,3, 0,5, 0,7)	(0,3, 0,5, 0,7)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,5, 0,65, 0,8)	(0,85, 0,95, 1)	(0,85, 0,95, 1)	(0,3, 0,5, 0,7)	

N	AC ₋₁₁₁	AC ₋₁₁₂	AC ₋₁₂₁	AC ₋₁₂₂	AC ₋₁₃₁	AC ₋₁₃₂	AC ₋₁₄₁	AC ₋₂₁₁	AC ₋₂₁₂	AC ₋₂₂₁	AC ₋₂₃₁	AC ₋₂₄₁	AC ₋₂₅₁	AC ₋₃₁₁	AC ₋₃₁₂	AC ₋₃₂₁	AC ₋₃₂₂	AC ₋₃₃₁	AC ₋₃₄₁	AC ₋₃₄₂
231	(0.5, 0.65, 0.85)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)
232	(0.85, 0.95, 1)	(0.3, 0.5, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)
233	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.3, 0.5, 0.7)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)
234	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)
235	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0.85, 0.95, 1)	(0.1, 0.2, 0.3)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.3, 0.5, 0.7)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.2, 0.35, 0.5)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.85, 0.95)
236	(0.1, 0.2, 0.3)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)
237	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)
238	(0.2, 0.35, 0.5)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.1, 0.2, 0.3)	(0, 0.05, 0.15)
239	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.85, 0.95, 1)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.7, 0.8, 0.9)	(0.85, 0.95, 1)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)	(0.5, 0.65, 0.8)	(0.7, 0.8, 0.9)

Note: N - Respondent
Source: author

Appendix G. Agility attribute (ACn) performance ratings in fuzzy numbers

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
1	(5, 6.5, 8)	(1, 2, 3)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(3, 5, 7)	(2, 3.5, 5)	(2, 3.5, 5)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(2, 3.5, 5)	(5, 6.5, 8)
2	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(3, 5, 7)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)
3	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
4	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)
5	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)
6	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)
7	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
8	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)
9	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
10	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂	
11	(8,5, 9,5, 10)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(8,5, 9,5, 10)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	
12	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(1,2, 3)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)
13	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(3,5, 7)	(7,8, 9)	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(3,5, 7)
14	(7,8, 9)	(7,8, 9)	(8,5, 9,5, 10)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(7,8, 9)
15	(8,5, 9,5, 10)	(7,8, 9)	(5, 6,5, 8)	(3,5, 7)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(7,8, 9)	(5, 6,5, 8)	(7,8, 9)	(5, 6,5, 8)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)
16	(7,8, 9)	(5, 6,5, 8)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(7,8, 9)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(7,8, 9)	(5, 6,5, 8)	(8,5, 9,5, 10)	(7,8, 9)	(8,5, 9,5, 10)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(8,5, 9,5, 10)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(7,8, 9)
17	(8,5, 9,5, 10)	(7,8, 9)	(8,5, 9,5, 10)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(2, 3,5, 5)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)
18	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(2, 3,5, 5)	(3,5, 7)	(5, 6,5, 8)	(3,5, 7)	(2, 3,5, 5)	(2, 3,5, 5)	(3,5, 7)	(5, 6,5, 8)	(2, 3,5, 5)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)
19	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 7)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)
20	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂	
21	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	
22	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(2, 3.5, 5)	(2, 3.5, 5)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3.5, 7)
23	(7.8, 9)	(7.8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)	(7.8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)
24	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(7.8, 9)
25	(5, 6.5, 8)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
26	(8.5, 9.5, 10)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)
27	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)
28	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
29	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7.8, 9)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)
30	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂	
31	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(5, 6.5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3, 5, 7)
32	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)
33	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
34	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)
35	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
36	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
37	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(2, 3.5, 5)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(2, 3.5, 5)
38	(5, 6.5, 8)	(8.5, 9.5, 10)	(3, 5, 7)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
39	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)
40	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(2, 3.5, 5)	(3, 5, 7)	(1, 2, 3)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(2, 3.5, 5)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(2, 3.5, 5)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
41	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 9)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(1, 2, 3)	(1, 2, 3)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(1, 2, 3)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)
42	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(0, 0.5, 1.5)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)
43	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)
44	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)
45	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)
46	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
47	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)
48	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
49	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
50	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
51	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 8)	(2, 3, 5, 9)	(5, 6, 5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(3, 5, 7)
52	(5, 6, 5, 8)	(5, 6, 5, 8)	(7, 8, 9)	(5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)
53	(7, 8, 9)	(5, 6, 5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)
54	(7, 8, 9)	(5, 6, 5, 8)	(5, 6, 5, 8)	(7, 8, 9)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)
55	(5, 6, 5, 8)	(5, 6, 5, 8)	(7, 8, 9)	(5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)
56	(8, 5, 9, 10)	(7, 8, 9)	(7, 8, 9)	(8, 5, 9, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)
57	(3, 5, 7)	(0, 0, 5, 1, 5)	(3, 5, 7)	(2, 3, 5, 5)	(3, 5, 7)	(5, 6, 5, 8)	(2, 3, 5, 5)	(5, 6, 5, 8)	(3, 5, 7)	(1, 2, 3)	(3, 5, 7)	(5, 6, 5, 8)	(0, 0, 5, 1, 5)	(2, 3, 5, 5)	(3, 5, 7)	(7, 8, 9)	(5, 6, 5, 8)	(5, 6, 5, 8)	(2, 3, 5, 5)	(0, 0, 5, 1, 5)
58	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(7, 8, 9)	(8, 5, 9, 10)	(8, 5, 9, 10)	(7, 8, 9)	(7, 8, 9)	(8, 5, 9, 10)	(5, 6, 5, 8)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(7, 8, 9)	(7, 8, 9)	(8, 5, 9, 10)	(7, 8, 9)	(7, 8, 9)
59	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(1, 2, 3)	(5, 6, 5, 8)	(1, 2, 3)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)
60	(7, 8, 9)	(8, 5, 9, 10)	(8, 5, 9, 10)	(7, 8, 9)	(8, 5, 9, 10)	(7, 8, 9)	(7, 8, 9)	(8, 5, 9, 10)	(7, 8, 9)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(7, 8, 9)	(7, 8, 9)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
61	(2, 3.5, 5)	(5, 7.8, 8)	(3.5, 7)	(5, 6.5, 8)	(7.8, 9)	(2, 3.5, 5)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(7.8, 9)	(7.8, 9)	(3.5, 7)	(7.8, 9)
62	(3.5, 5)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(7.8, 9)
63	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)
64	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(2, 3.5, 5)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
65	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(7.8, 9)
66	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)
67	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(1, 2, 3)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(2, 3.5, 5)	(7.8, 9)	(3.5, 7)	(7.8, 9)	(8.5, 9.5, 10)	(7.8, 9)
68	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(7.8, 9)	(2, 3.5, 5)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(2, 3.5, 5)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
69	(7.8, 9)	(7.8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(1, 2, 3)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(8.5, 9.5, 10)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(8.5, 9.5, 10)
70	(3.5, 7)	(1, 2, 3)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(2, 3.5, 5)	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(2, 3.5, 5)	(7.8, 9)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
71	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)
72	(3, 5, 7)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(2, 3.5, 5)	(7, 8, 9)	(7, 8, 9)	(2, 3.5, 5)	(2, 3.5, 5)	(2, 3.5, 5)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(0, 0.5, 1.5)	(2, 3.5, 5)	(3, 5, 7)	(5, 6.5, 8)	(2, 3.5, 5)	(2, 3.5, 5)
73	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)
74	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(3, 5, 7)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(2, 3.5, 5)	(3, 5, 7)	(2, 3.5, 5)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)
75	(5, 6.5, 8)	(3, 5, 7)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(2, 3.5, 5)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)
76	(7, 8, 9)	(1, 2, 3)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(3, 5, 7)	(7, 8, 9)
77	(8.5, 9.5, 10)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)
78	(7, 8, 9)	(7, 8, 9)	(3, 5, 7)	(3, 5, 7)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(2, 3.5, 5)	(7, 8, 9)	(5, 6.5, 8)	(1, 2, 3)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)
79	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(1, 2, 3)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(0, 0.5, 1.5)	(0, 0.5, 1.5)	(0, 0.5, 1.5)	(7, 8, 9)	(2, 3.5, 5)	(8.5, 9.5, 10)	(5, 6.5, 8)	(3, 5, 7)	(0, 0.5, 1.5)
80	(7, 8, 9)	(8.5, 9.5, 10)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
81	(7, 8, 9)	(8,5, 9,5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(7, 8, 9)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(7, 8, 9)	(7, 8, 9)	(8,5, 9,5, 10)	(8,5, 9,5, 10)
82	(5, 6,5, 8)	(7, 8, 9)	(5, 6,5, 8)	(7, 8, 9)	(3,5, 7)	(8,5, 9,5, 10)	(5, 6,5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6,5, 8)	(7, 8, 9)	(8,5, 9,5, 10)	(5, 6,5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6,5, 8)	(7, 8, 9)	(5, 6,5, 8)	(7, 8, 9)
83	(5, 6,5, 8)	(2, 3,5, 5)	(1,2, 3)	(8,5, 9,5, 10)	(5, 6,5, 8)	(5, 6,5, 8)	(8,5, 9,5, 10)	(5, 6,5, 8)	(3,5, 7)	(7, 8, 9)	(7, 8, 9)	(8,5, 9,5, 10)	(3,5, 7)	(2, 3,5, 5)	(1,2, 3)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(5, 6,5, 8)	(2, 3,5, 5)	(2, 3,5, 5)
84	(7, 8, 9)	(8,5, 9,5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6,5, 8)	(7, 8, 9)	(7, 8, 9)	(8,5, 9,5, 10)	(5, 6,5, 8)	(7, 8, 9)	(5, 6,5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6,5, 8)
85	(8,5, 9,5, 10)	(7, 8, 9)	(5, 6,5, 8)	(8,5, 9,5, 10)	(7, 8, 9)	(7, 8, 9)	(5, 6,5, 8)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(7, 8, 9)	(8,5, 9,5, 10)	(7, 8, 9)	(8,5, 9,5, 10)	(5, 6,5, 8)	(7, 8, 9)	(5, 6,5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6,5, 8)	(5, 6,5, 8)
86	(5, 6,5, 8)	(5, 6,5, 8)	(7, 8, 9)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(7, 8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(7, 8, 9)	(8,5, 9,5, 10)	(5, 6,5, 8)	(3,5, 7)	(3,5, 7)	(8,5, 9,5, 10)	(5, 6,5, 8)	(3,5, 7)	(7, 8, 9)	(5, 6,5, 8)
87	(7, 8, 9)	(3,5, 7)	(7, 8, 9)	(3,5, 7)	(5, 6,5, 8)	(7, 8, 9)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(7, 8, 9)	(5, 6,5, 8)	(7, 8, 9)	(8,5, 9,5, 10)	(3,5, 7)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(8,5, 9,5, 10)	(7, 8, 9)	(7, 8, 9)
88	(2, 3,5, 5)	(3,5, 7)	(1,2, 3)	(3,5, 7)	(2, 3,5, 5)	(2, 3,5, 7)	(3,5, 7)	(3,5, 7)	(8,5, 9,5, 10)	(1,2, 3)	(7, 8, 9)	(1,2, 3)	(2, 3,5, 5)	(2, 3,5, 5)	(0, 0,5, 1,5)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(2, 3,5, 5)	(2, 3,5, 5)
89	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(1,2, 3)	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 7)	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)
90	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(5, 6,5, 8)	(7, 8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(7, 8, 9)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(8,5, 9,5, 10)

N	AC ₋₁₁₁	AC ₋₁₁₂	AC ₋₁₂₁	AC ₋₁₂₂	AC ₋₁₃₁	AC ₋₁₃₂	AC ₋₁₄₁	AC ₋₂₁₁	AC ₋₂₁₂	AC ₋₂₂₁	AC ₋₂₃₁	AC ₋₂₄₁	AC ₋₂₅₁	AC ₋₃₁₁	AC ₋₃₁₂	AC ₋₃₂₁	AC ₋₃₂₂	AC ₋₃₃₁	AC ₋₃₄₁	AC ₋₃₄₂
91	(3, 5, 7)	(3, 5, 7)	(8, 5, 9, 10)	(8, 5, 9, 10)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 7)	(3, 5, 7)	(8, 5, 9, 10)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6, 5, 8)	(5, 6, 5, 8)
92	(7, 8, 9)	(5, 6, 5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(8, 5, 9, 10)	(5, 6, 5, 8)	(7, 8, 9)	(5, 6, 5, 8)	(8, 5, 9, 10)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)
93	(7, 8, 9)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(7, 8, 9)	(5, 6, 5, 8)	(7, 8, 9)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(7, 8, 9)	(3, 5, 7)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)
94	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(2, 3, 5)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)
95	(8, 5, 9, 10)	(5, 6, 5, 8)	(7, 8, 9)	(5, 6, 5, 8)	(7, 8, 9)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(7, 8, 9)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)
96	(5, 6, 5, 8)	(2, 3, 5)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(2, 3, 5)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(3, 5, 7)
97	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)
98	(5, 6, 5, 8)	(5, 6, 5, 8)	(8, 5, 9, 10)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 7)	(3, 5, 7)
99	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)
100	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6, 5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6, 5, 8)	(5, 6, 5, 8)	(5, 6, 5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
101	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(0, 0.5, 1.5)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
102	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(0, 0.5, 1.5)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)
103	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
104	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)
105	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(3.5, 7)	(8.5, 9.5, 10)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)
106	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 7)	(3.5, 7)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7.8, 9)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(3.5, 7)
107	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)
108	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
109	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
110	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(1, 2, 3)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(1, 2, 3)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
111	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)
112	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
113	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
114	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
115	(3, 5, 7)	(3, 5, 7)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(2, 3.5, 5)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(0, 0.5, 1.5)	(3, 5, 7)	(3, 5, 7)	(1, 2, 3)	(2, 3.5, 5)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
116	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)
117	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 7)	(3, 5, 7)
118	(3, 5, 7)	(8.5, 9.5, 10)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)
119	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(8.5, 9.5, 10)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)
120	(7, 8, 9)	(2, 3.5, 5)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(2, 3.5, 5)	(7, 8, 9)	(5, 6.5, 8)	(1, 2, 3)	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(3, 5, 7)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
121	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(2, 3.5, 5)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)
122	(5, 6.5, 8)	(7, 8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)
123	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)
124	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)
125	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(2, 3.5, 5)	(5, 6.5, 8)	(3, 5, 7)	(0, 0.5, 1.5)	(7, 8, 9)	(1, 2, 3)	(0, 0.5, 1.5)	(5, 6.5, 8)	(7, 8, 9)	(1, 2, 3)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(2, 3.5, 5)	(5, 6.5, 8)
126	(7, 8, 9)	(3, 5, 7)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(3, 5, 7)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(3, 5, 7)	(3, 5, 7)	(8.5, 9.5, 10)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)	(8.5, 9.5, 10)	(7, 8, 9)
127	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)
128	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)
129	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(8.5, 9.5, 10)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)
130	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(3, 5, 7)	(7, 8, 9)	(3, 5, 7)	(8.5, 9.5, 10)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
131	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)
132	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 0, 1.5)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)
133	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3, 5, 7)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)
134	(7, 8, 9)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(2, 3.5, 5)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)
135	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)
136	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 7)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(0, 0.5, 1.5)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(2, 3.5, 5)	(3, 5, 7)	(3, 5, 7)
137	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 9)	(7, 8, 9)	(5, 6.5, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)
138	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)
139	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
140	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 9)	(7, 8, 9)	(5, 6.5, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
141	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)
142	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(2, 3.5, 5)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(3.5, 7)	(2, 3.5, 5)	(2, 3.5, 5)	(2, 3.5, 5)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
143	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(7.8, 9)	(3.5, 7)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(3.5, 7)	(5, 6.5, 8)
144	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
145	(0, 0.5, 1.5)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(3.5, 7)	(2, 3.5, 5)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)
146	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 9)	(5, 6.5, 9)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)
147	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)
148	(5, 6.5, 8)	(7.8, 9)	(8.5, 9.5, 10)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)
149	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7.8, 9)	(8.5, 9.5, 10)	(3.5, 7)	(7.8, 9)
150	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(3.5, 7)	(5, 6.5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
151	(8,5, 9,5, 10)	(7,8, 9)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(8,5, 9,5, 10)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(5, 6,5, 8)	(7,8, 9)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)
152	(7,8, 9)	(2, 3,5, 5)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(7,8, 9)	(3,5, 7)	(8,5, 9,5, 10)	(5, 6,5, 8)	(3,5, 7)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)
153	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)
154	(7,8, 9)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(2, 3,5, 5)	(3,5, 7)	(2, 3,5, 5)	(2, 3,5, 5)	(5, 6,5, 8)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)
155	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(8,5, 9,5, 10)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)
156	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)
157	(5, 6,5, 8)	(3,5, 7)	(7,8, 9)	(7,8, 9)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(7,8, 9)	(3,5, 7)	(3,5, 7)	(7,8, 9)	(3,5, 7)	(3,5, 7)	(7,8, 9)	(3,5, 7)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(7,8, 9)	(3,5, 7)
158	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 9)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 9)	(7,8, 9)	(5, 6,5, 8)	(7,8, 9)	(3,5, 7)	(3,5, 7)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(5, 6,5, 8)	(7,8, 9)	(7,8, 9)
159	(5, 6,5, 8)	(5, 6,5, 8)	(8,5, 9,5, 10)	(8,5, 9,5, 10)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 7)	(5, 6,5, 8)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(3,5, 7)	(7,8, 9)	(3,5, 7)	(7,8, 9)	(5, 6,5, 8)
160	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(3,5, 7)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)	(7,8, 9)	(5, 6,5, 8)	(5, 6,5, 8)	(5, 6,5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
161	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)
162	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(0, 1.5)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)
163	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
164	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(3, 5, 7)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
165	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
166	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
167	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)
168	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)
169	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
170	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂	
171	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 7)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	
172	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(8.5, 9.5, 10)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	
173	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)
174	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
175	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)
176	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(3, 5, 7)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
177	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)
178	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)
179	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
180	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
181	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)
182	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 9)	(7.8, 9)	(5, 6.5, 8)	(3.5, 7)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(7, 8, 9)
183	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7.8, 9)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(7.8, 9)	(8.5, 9.5, 10)	(7.8, 9)	(5, 6.5, 8)	(8.5, 9.5, 10)
184	(1, 2, 3)	(2, 3, 5)	(5, 6.5, 8)	(2, 3, 5)	(5, 6.5, 8)	(7.8, 9)	(8.5, 9)	(7.8, 9)	(7.8, 9)	(0, 0.5, 1.5)	(2, 3, 5)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)
185	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
186	(3.5, 7)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)
187	(5, 6.5, 8)	(2, 3, 5)	(3.5, 7)	(5, 6.5, 8)	(2, 3, 5)	(7.8, 9)	(1, 2, 3)	(3.5, 7)	(5, 6.5, 8)	(2, 3, 5)	(7.8, 9)	(2, 3, 5)	(2, 3, 5)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7.8, 9)	(3.5, 7)	(3.5, 7)
188	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(3.5, 7)	(1, 2, 3)	(5, 6.5, 8)	(2, 3, 5)	(3.5, 7)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
189	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(2, 3, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(7, 8, 9)
190	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)	(3.5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(7.8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3.5, 7)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
191	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)
192	(0, 0.5, 1.5)	(1, 2, 3)	(1, 2, 3)	(1, 2, 3)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(1, 2, 3)	(1, 2, 3)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(2, 3.5, 5)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)
193	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
194	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)
195	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)
196	(3, 5, 7)	(5, 6.5, 8)	(8, 5, 9.5, 10)	(8, 5, 9.5, 10)	(3, 5, 7)	(3, 5, 7)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
197	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
198	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)
199	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
200	(7, 8, 9)	(8, 5, 9.5, 10)	(5, 6.5, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
201	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(3, 5, 7)	(3, 5, 7)	(7, 8, 9)	(3, 5, 7)	(3, 5, 7)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)
202	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)
203	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
204	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
205	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
206	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(0, 0.5, 1.5)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)
207	(8.5, 9.5, 10)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
208	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)
209	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(8, 5, 9, 5, 10)	(5, 6.5, 8)	(8, 5, 9, 5, 10)	(5, 6.5, 8)	(5, 6.5, 8)
210	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂
211	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(0, 0.5, 1.5)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)
212	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
213	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)
214	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
215	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 9)
216	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(8, 5, 9, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
217	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)
218	(5, 6.5, 8)	(8, 5, 9, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(8, 5, 9, 10)	(8, 5, 9, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(8, 5, 9, 10)	(5, 6.5, 8)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(5, 6.5, 8)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)	(8, 5, 9, 10)
219	(3, 5, 7)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
220	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)

N	AC ₁₁₁	AC ₁₁₂	AC ₁₂₁	AC ₁₂₂	AC ₁₃₁	AC ₁₃₂	AC ₁₄₁	AC ₂₁₁	AC ₂₁₂	AC ₂₂₁	AC ₂₃₁	AC ₂₄₁	AC ₂₅₁	AC ₃₁₁	AC ₃₁₂	AC ₃₂₁	AC ₃₂₂	AC ₃₃₁	AC ₃₄₁	AC ₃₄₂	
221	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 7)	(5, 6.5, 8)	(5, 6.5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	
222	(5, 6.5, 8)	(5, 6.5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	
223	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	
224	(2, 3.5, 5)	(2, 3.5, 5)	(3, 5, 7)	(7, 8, 9)	(2, 3.5, 5)	(2, 3.5, 5)	(2, 3.5, 5)	(2, 3.5, 5)	(2, 3.5, 5)	(0, 0.5, 1.5)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(2, 3.5, 5)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	
225	(7, 8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	
226	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	
227	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	
228	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	
229	(7, 8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	
230	(2, 3.5, 5)	(3, 5, 7)	(7, 8, 9)	(3, 5, 7)	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(2, 3.5, 5)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)

N	AC ₋₁₁₁	AC ₋₁₁₂	AC ₋₁₂₁	AC ₋₁₂₂	AC ₋₁₃₁	AC ₋₁₃₂	AC ₋₁₄₁	AC ₋₂₁₁	AC ₋₂₁₂	AC ₋₂₃₁	AC ₋₂₄₁	AC ₋₂₅₁	AC ₋₃₁₁	AC ₋₃₁₂	AC ₋₃₂₁	AC ₋₃₂₂	AC ₋₃₃₁	AC ₋₃₄₁	AC ₋₃₄₂
231	(5, 7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)
232	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(3, 5, 7)	(3, 5, 7)
233	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(3, 5, 7)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
234	(8.5, 9.5, 10)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
235	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
236	(8.5, 9.5, 10)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(8.5, 9.5, 10)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)
237	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(2, 3.5, 5)
238	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(7, 8, 9)	(5, 6.5, 8)	(3, 5, 7)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(3, 5, 7)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)
239	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(7, 8, 9)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(7, 8, 9)	(8.5, 9.5, 10)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)	(5, 6.5, 8)

Notes: N - Respondent
Source: author

$$FAI_{Company 1} =$$

$$\begin{aligned} & (0.5,0.65,0.8) \times (5.0,6.5,8.0) + (0.1,0.2,0.3) \times (1.0,2.0,3.0) + (0.7,0.8,0.9) \times (5.0,6.5,8.0) + (0.1,0.2,0.3) \times (5.0,6.5,8.0) + \\ & (0.7,0.8,0.9) \times (5.0,6.5,8.0) + (0.1,0.2,0.3) \times (2.0,3.5,5.0) + (0.2,0.35,0.5) \times (3.0,5.0,7.0) + (0.2,0.35,0.5) \times (2.0,3.5,5.0) + \\ & (0.1,0.2,0.3) \times (2.0,3.5,5.0) + (0.2,0.35,0.5) \times (2.0,3.5,5.0) + (0.5,0.65,0.8) \times (5.0,6.5,8.0) + (0.2,0.35,0.5) \times (5.0,6.5,8.0) + \\ & (0.2,0.35,0.5) \times (3.0,5.0,7.0) + (0.2,0.35,0.5) \times (5.0,6.5,8.0) + (0.3,0.5,0.7) \times (5.0,6.5,8.0) + (0.5,0.65,0.8) \times (5.0,6.5,8.0) + \\ & (0.5,0.65,0.8) \times (5.0,6.5,8.0) + (0.2,0.35,0.5) \times (2.0,3.5,5.0) + (0.1,0.2,0.3) \times (2.0,3.5,5.0) + (0.5,0.65,0.8) \times (5.0,6.5,8.0) \\ & \underline{\underline{(0.5,0.65,0.8) + (0.1,0.2,0.3) + (0.7,0.8,0.9) + (0.1,0.2,0.3) + (0.2,0.35,0.5) + (0.2,0.35,0.5) +}} \\ & \underline{\underline{(0.1,0.2,0.3) + (0.2,0.35,0.5) + (0.5,0.65,0.8) + (0.2,0.35,0.5) + (0.2,0.35,0.5) + (0.3,0.5,0.7) + (0.5,0.65,0.8) +}} \\ & \underline{\underline{(0.5,0.65,0.8) + (0.2,0.35,0.5) + (0.1,0.2,0.3) + (0.5,0.65,0.8)}} \end{aligned}$$

$$\begin{aligned} & (2.5,4.23,6.4) + (0.1,0.4,0.9) + (3.5,5.2,7.2) + (0.5,1.3,2.4) + (3.5,5.2,7.2) + (0.2,0.7,1.5) + (0.6,1.75,3.5) + (0.4,1.225,2.5) + \\ & \underline{\underline{(0.2,0.7,1.5) + (0.4,1.225,2.5) + (2.5,4.225,6.4) + (1.0,2.275,4.0) + (0.6,1.75,3.5) + (1.0,2.275,4.0) + (1.5,3.25,5.6) +}} \\ & \underline{\underline{(2.5,4.225,6.4) + (0.4,1.225,2.5) + (0.2,0.7,1.5) + (2.5,4.225,6.4)}} \\ & \underline{\underline{(6.10,8.1,1.50)}} \end{aligned}$$

$$= (4.36, 5.72, 7.16)$$

Appendix I. Fuzzy Agility Index (FAI) of surveyed companies

N	FAI
1	(4.36, 5.72, 7.16)
2	(4.84, 6.4, 7.92)
3	(5.56, 6.9, 8.26)
4	(4.65, 6.25, 7.84)
5	(6.3, 7.49, 8.66)
6	(5.17, 6.61, 8.06)
7	(5.43, 6.86, 8.24)
8	(4.76, 6.31, 7.87)
9	(4.59, 6.2, 7.8)
10	(4.23, 5.92, 7.61)
11	(5.35, 6.8, 8.2)
12	(4.87, 6.32, 7.78)
13	(4.52, 6.16, 7.79)
14	(6.32, 7.56, 8.73)
15	(5.86, 7.08, 8.35)
16	(7.5, 8.51, 9.32)
17	(6.79, 7.91, 8.87)
18	(3.27, 5.07, 6.86)
19	(4.69, 6.27, 7.85)
20	(4.82, 6.36, 7.9)
21	(5.6, 5.8)
22	(3.7, 5.4, 7.11)
23	(8.05, 9.05, 9.7)
24	(6.7, 7.26, 8.51)
25	(6.5, 7.78, 8.85)
26	(4.9, 6.43, 7.95)
27	(3.83, 5.59, 7.38)

N	FAI
61	(5.48, 6.7, 8.01)
62	(5.18, 6.57, 7.93)
63	(7.52, 8.58, 9.37)
64	(4.2, 5.86, 7.5)
65	(7.71, 8.71, 9.46)
66	(6.04, 7.28, 8.51)
67	(6.05, 7.22, 8.37)
68	(4.48, 5.94, 7.5)
69	(6.75, 7.78, 8.74)
70	(7.53, 8.42, 9.07)
71	(5.34, 6.76, 8.16)
72	(4.02, 5.46, 6.87)
73	(5.06, 6.55, 8.04)
74	(5.71, 7, 8.24)
75	(4.65, 6.11, 7.57)
76	(6.13, 7.25, 8.37)
77	(6.68, 7.81, 8.86)
78	(5.25, 6.63, 8.01)
79	(5.37, 6.46, 7.51)
80	(7.12, 8.24, 9.14)
81	(6.11, 7.41, 8.62)
82	(6.42, 7.57, 8.69)
83	(4.4, 5.81, 7.14)
84	(6.72, 7.8, 8.87)
85	(6.68, 7.84, 8.88)
86	(5.38, 6.82, 8.21)
87	(5.98, 7.25, 8.49)

N	FAI
121	(4.34, 5.93, 7.54)
122	(7.17, 8.27, 9.17)
123	(3.7, 5.53, 7.35)
124	(4.74, 6.27, 7.83)
125	(4.11, 5.27, 6.56)
126	(7.36, 8.34, 9.16)
127	(6.72, 7.78, 8.85)
128	(5.95, 7.2, 8.46)
129	(5.78, 7.09, 8.38)
130	(6.26, 7.38, 8.53)
131	(7.34, 8.38, 9.23)
132	(3.41, 5.16, 6.98)
133	(5.4, 6.75, 8.14)
134	(4.26, 5.93, 7.59)
135	(5.61, 6.96, 8.3)
136	(4.25, 5.73, 7.27)
137	(6.47, 7.61, 8.71)
138	(6.47, 7.59, 8.69)
139	(4.78, 6.23, 7.78)
140	(5.95, 7.2, 8.46)
141	(6.49, 7.74, 8.82)
142	(4.03, 5.56, 7.11)
143	(5.69, 6.96, 8.26)
144	(5.14, 6.61, 8.08)
145	(3.22, 4.99, 6.78)
146	(5.6, 6.95, 8.3)
147	(5.16, 6.6, 8.06)

N	FAI
181	(5.2, 6.64, 8.08)
182	(5.15, 6.6, 8.05)
183	(7.86, 8.91, 9.6)
184	(4.37, 5.76, 7.16)
185	(5.06, 6.53, 8.01)
186	(5.51, 6.91, 8.29)
187	(4.06, 5.61, 7.1)
188	(4.08, 5.74, 7.37)
189	(5.01, 6.43, 7.88)
190	(4.46, 6.1, 7.74)
191	(4.27, 5.93, 7.61)
192	(2.54, 4.04, 5.6)
193	(4.39, 6.04, 7.69)
194	(4.39, 6.05, 7.71)
195	(4.63, 6.22, 7.81)
196	(5.87, 7.12, 8.35)
197	(5.87, 7.05, 8.33)
198	(4.67, 6.24, 7.82)
199	(4.87, 6.37, 7.88)
200	(5.84, 7.13, 8.41)
201	(4.35, 5.91, 7.53)
202	(4.55, 6.15, 7.76)
203	(4.75, 6.3, 7.86)
204	(4.04, 5.79, 7.5)
205	(4.27, 5.91, 7.57)
206	(5.54, 6.87, 8.19)
207	(5, 6.54, 8.04)

N	FAI
28	(4.91, 6.43, 7.95)
29	(5.3, 6.71, 8.12)
30	(4.98, 6.47, 7.97)
31	(3.92, 5.68, 7.45)
32	(6.14, 7.29, 8.5)
33	(5.06, 6.54, 8.02)
34	(4.41, 6.06, 7.7)
35	(5.91, 7.26, 8.5)
36	(3.96, 5.7, 7.46)
37	(4.05, 5.68, 7.27)
38	(4.59, 6.19, 7.78)
39	(5.67, 7, 8.32)
40	(2.86, 4.69, 6.51)
41	(2.97, 4.75, 6.53)
42	(5.6, 6.77, 8.01)
43	(4.4, 6.03, 7.67)
44	(5.23, 6.67, 8.11)
45	(5.63, 6.9, 8.2)
46	(4.59, 6.19, 7.79)
47	(6.72, 7.82, 8.87)
48	(4.56, 6.13, 7.7)
49	(4.67, 6.21, 7.76)
50	(5.51, 6.88, 8.25)
51	(4.21, 5.84, 7.48)
52	(5.41, 6.77, 8.17)
53	(6.93, 7.98, 8.97)
54	(5.47, 6.83, 8.21)
55	(5.17, 6.61, 8.06)

N	FAI
88	(4.68, 5.56, 6.63)
89	(4.21, 5.81, 7.42)
90	(6.76, 7.93, 8.93)
91	(5.49, 6.91, 8.26)
92	(5.9, 7.17, 8.43)
93	(5.03, 6.51, 8.01)
94	(4.47, 6.09, 7.69)
95	(5.56, 6.92, 8.27)
96	(3.9, 5.63, 7.33)
97	(5, 6.5, 8)
98	(4.64, 6.21, 7.78)
99	(4.85, 6.37, 7.91)
100	(4.23, 5.93, 7.63)
101	(4.68, 6.26, 7.81)
102	(7.4, 8.46, 9.2)
103	(4.9, 6.43, 7.95)
104	(3, 4.68, 6.37)
105	(6.36, 7.55, 8.67)
106	(4.89, 6.44, 7.96)
107	(4.73, 6.29, 7.86)
108	(5.88, 7.22, 8.45)
109	(5, 6.5, 8)
110	(3.93, 5.5, 7.06)
111	(5.44, 6.87, 8.24)
112	(4.85, 6.38, 7.91)
113	(5.26, 6.68, 8.11)
114	(4.86, 6.36, 7.85)
115	(4.28, 5.68, 7.08)

N	FAI
148	(5.61, 6.94, 8.28)
149	(6.41, 7.55, 8.65)
150	(4.69, 6.27, 7.85)
151	(6.44, 7.61, 8.72)
152	(5.91, 7.13, 8.34)
153	(3.5, 5.39, 7.27)
154	(3.91, 5.59, 7.27)
155	(5.15, 6.64, 8.1)
156	(4.3, 5.98, 7.66)
157	(5.33, 6.66, 8.06)
158	(5.49, 6.83, 8.2)
159	(5.62, 6.97, 8.3)
160	(5.16, 6.6, 8.06)
161	(5.14, 6.59, 8.06)
162	(7.58, 8.5, 9.23)
163	(5.31, 6.73, 8.15)
164	(5.47, 6.8, 8.16)
165	(5, 6.5, 8)
166	(4.05, 5.81, 7.55)
167	(4.05, 5.74, 7.48)
168	(4.97, 6.48, 7.99)
169	(5.48, 6.9, 8.26)
170	(4.69, 6.27, 7.85)
171	(4.79, 6.34, 7.9)
172	(5.49, 6.99, 8.35)
173	(7.87, 8.9, 9.6)
174	(3.56, 5.43, 7.29)
175	(5.77, 7.03, 8.32)

N	FAI
208	(5.93, 7.19, 8.46)
209	(5.29, 6.78, 8.18)
210	(4.14, 5.85, 7.56)
211	(4.57, 6.03, 7.54)
212	(5.21, 6.63, 8.07)
213	(5.24, 6.67, 8.11)
214	(5.21, 6.65, 8.1)
215	(6.09, 7.32, 8.54)
216	(5.63, 6.95, 8.27)
217	(5.24, 6.67, 8.11)
218	(7.48, 8.58, 9.37)
219	(5.2, 6.63, 8.07)
220	(3.65, 5.42, 7.21)
221	(4.79, 6.3, 7.81)
222	(4.52, 6.14, 7.75)
223	(5.8, 7.16, 8.42)
224	(3.68, 5.11, 6.57)
225	(4.91, 6.46, 7.98)
226	(3.96, 5.7, 7.46)
227	(5, 6.5, 8)
228	(4.79, 6.35, 7.9)
229	(5.69, 7.04, 8.36)
230	(4.62, 6.25, 7.77)
231	(5.42, 6.79, 8.18)
232	(4.54, 6.18, 7.79)
233	(4.49, 6.14, 7.78)
234	(5.51, 6.89, 8.26)
235	(5.27, 6.69, 8.12)

N	FAI
56	(7.23, 8.23, 9.13)
57	(3.63, 5.08, 6.53)
58	(7.84, 8.86, 9.56)
59	(4.96, 6.4, 7.87)
60	(8, 9, 9.66)

N	FAI
116	(5.16, 6.59, 8.04)
117	(4.79, 6.31, 7.86)
118	(3.88, 5.61, 7.36)
119	(7.46, 8.43, 9.24)
120	(6.79, 7.7, 8.59)

N	FAI
176	(3.83, 5.57, 7.29)
177	(6.81, 7.98, 8.97)
178	(5.22, 6.63, 8.07)
179	(5.08, 6.58, 8.05)
180	(5.62, 6.97, 8.3)

N	FAI
236	(6.07, 7.35, 8.57)
237	(5.23, 6.64, 8.05)
238	(5.36, 6.74, 8.14)
239	(5.53, 6.91, 8.26)

Note: N-Respondent

Source: author

Appendix J. Agility Level estimation using Euclidean Distance

Respondent	d(EA S)	d(EA F)	d(EA A)	d(EA VA)	d(EA EA)	Agility Level
1	7.35	4.76	1.30	2.18	4.78	A
2	8.46	5.87	2.40	1.06	3.66	VA
3	9.37	6.77	3.31	0.27	2.77	VA
4	8.22	5.63	2.16	1.31	3.90	VA
5	10.37	7.78	4.32	0.95	1.82	VA
6	8.86	6.26	2.80	0.67	3.26	VA
7	9.26	6.66	3.20	0.30	2.87	VA
8	8.33	5.73	2.27	1.20	3.79	VA
9	8.14	5.54	2.08	1.40	3.99	VA
10	7.66	5.06	1.61	1.89	4.48	A
11	9.16	6.56	3.10	0.39	2.97	VA
12	8.36	5.76	2.30	1.17	3.77	VA
13	8.07	5.47	2.01	1.47	4.06	VA
14	10.46	7.87	4.41	1.02	1.72	VA
15	9.70	7.11	3.65	0.40	2.45	VA
16	12.05	9.46	6.02	2.63	0.84	EA
17	11.03	8.43	4.99	1.62	1.29	EA
18	6.19	3.61	0.44	3.37	5.96	A
19	8.26	5.66	2.20	1.27	3.87	VA
20	8.42	5.83	2.36	1.10	3.70	VA
21	8.66	6.06	2.60	0.87	3.46	VA
22	6.77	4.17	0.76	2.78	5.37	A
23	12.91	10.32	6.88	3.48	1.22	EA
24	9.98	7.38	3.93	0.57	2.18	VA
25	10.76	8.17	4.71	1.31	1.45	VA
26	8.54	5.94	2.47	0.99	3.59	VA

Respondent	d(EA S)	d(EA F)	d(EA A)	d(EA VA)	d(EA EA)	Agility Level
120	10.76	8.18	4.75	1.47	1.63	VA
121	7.69	5.09	1.63	1.85	4.44	A
122	11.63	9.04	5.59	2.20	0.88	EA
123	6.99	4.40	1.02	2.60	5.17	A
124	8.28	5.68	2.22	1.25	3.85	VA
125	6.62	4.02	0.67	2.95	5.53	A
126	11.78	9.19	5.75	2.38	0.93	EA
127	10.90	8.31	4.86	1.49	1.38	EA
128	9.88	7.29	3.83	0.49	2.27	VA
129	9.67	7.08	3.62	0.32	2.47	VA
130	10.21	7.62	4.17	0.85	1.99	VA
131	11.84	9.25	5.80	2.42	0.85	EA
132	6.39	3.80	0.51	3.18	5.76	A
133	9.12	6.52	3.06	0.45	3.01	VA
134	7.67	5.07	1.62	1.87	4.46	A
135	9.45	6.86	3.40	0.23	2.68	VA
136	7.36	4.76	1.30	2.16	4.76	A
137	10.57	7.98	4.53	1.17	1.65	VA
138	10.56	7.96	4.52	1.16	1.67	VA
139	8.25	5.65	2.19	1.28	3.87	VA
140	9.88	7.29	3.83	0.50	2.27	VA
141	10.72	8.12	4.67	1.28	1.49	VA
142	7.04	4.44	0.98	2.49	5.08	A
143	9.48	6.88	3.43	0.31	2.67	VA
144	8.85	6.25	2.79	0.68	3.27	VA
145	6.07	3.48	0.40	3.50	6.08	A

Respondent	d(FAI,S)	d(FAI,F)	d(FAI,A)	d(FAI,VA)	d(FAI,EA)	Agility Level
27	7.11	4.52	1.11	2.46	5.04	A
28	8.54	5.94	2.48	0.99	3.59	VA
29	9.03	6.43	2.97	0.52	3.10	VA
30	8.61	6.01	2.54	0.92	3.52	VA
31	7.26	4.67	1.25	2.31	4.89	A
32	10.07	7.47	4.02	0.70	2.11	VA
33	8.73	6.13	2.67	0.80	3.40	VA
34	7.89	5.30	1.84	1.65	4.24	VA
35	9.92	7.32	3.86	0.49	2.23	VA
36	7.30	4.70	1.27	2.27	4.85	A
37	7.22	4.62	1.16	2.32	4.91	A
38	8.11	5.51	2.05	1.42	4.02	VA
39	9.52	6.93	3.47	0.25	2.62	VA
40	5.54	2.96	0.71	4.03	6.62	A
41	5.64	3.05	0.59	3.92	6.51	A
42	9.18	6.58	3.13	0.55	2.98	VA
43	7.86	5.26	1.80	1.68	4.27	VA
44	8.95	6.35	2.89	0.58	3.17	VA
45	9.37	6.78	3.32	0.34	2.77	VA
46	8.13	5.53	2.07	1.41	4.00	VA
47	10.93	8.34	4.89	1.51	1.35	EA
48	8.02	5.42	1.96	1.51	4.11	VA
49	8.16	5.56	2.10	1.37	3.96	VA
50	9.32	6.72	3.26	0.28	2.81	VA
51	7.53	4.93	1.47	2.01	4.61	A
52	9.15	6.56	3.09	0.41	2.98	VA
53	11.21	8.62	5.17	1.80	1.15	EA

Respondent	d(FAI,S)	d(FAI,F)	d(FAI,A)	d(FAI,VA)	d(FAI,EA)	Agility Level
146	9.44	6.85	3.39	0.23	2.69	VA
147	8.84	6.25	2.78	0.69	3.28	VA
148	9.43	6.83	3.37	0.26	2.71	VA
149	10.47	7.88	4.43	1.07	1.75	VA
150	8.26	5.66	2.20	1.27	3.87	VA
151	10.56	7.97	4.52	1.14	1.66	VA
152	9.75	7.15	3.70	0.46	2.42	VA
153	6.75	4.17	0.86	2.85	5.42	A
154	7.08	4.49	1.05	2.46	5.05	A
155	8.88	6.29	2.82	0.64	3.24	VA
156	7.76	5.17	1.72	1.78	4.37	A
157	8.98	6.38	2.92	0.58	3.15	VA
158	9.25	6.65	3.19	0.34	2.88	VA
159	9.46	6.86	3.40	0.24	2.67	VA
160	8.85	6.25	2.79	0.68	3.28	VA
161	8.83	6.23	2.77	0.70	3.30	VA
162	12.05	9.46	6.03	2.66	0.96	EA
163	9.06	6.46	3.00	0.48	3.07	VA
164	9.20	6.60	3.14	0.39	2.93	VA
165	8.66	6.06	2.60	0.87	3.46	VA
166	7.46	4.87	1.43	2.10	4.69	A
167	7.38	4.78	1.35	2.18	4.76	A
168	8.63	6.03	2.57	0.90	3.50	VA
169	9.32	6.72	3.26	0.26	2.81	VA
170	8.26	5.67	2.20	1.27	3.86	VA
171	8.39	5.79	2.33	1.14	3.73	VA
172	9.43	6.83	3.37	0.15	2.70	VA

Respondent	d(FAI,S)	d(FAI,F)	d(FAI,A)	d(FAI,VA)	d(FAI,EA)	Agility Level
54	9.25	6.65	3.19	0.33	2.88	VA
55	8.86	6.26	2.79	0.68	3.27	VA
56	11.63	9.04	5.60	2.22	0.94	EA
57	6.20	3.60	0.15	3.33	5.93	A
58	12.59	10.00	6.56	3.17	1.01	EA
59	8.51	5.91	2.45	1.02	3.62	VA
60	12.83	10.24	6.80	3.40	1.17	EA
61	9.07	6.47	3.02	0.57	3.08	VA
62	8.77	6.17	2.71	0.78	3.36	VA
63	12.14	9.55	6.10	2.71	0.82	EA
64	7.54	4.94	1.49	2.00	4.59	A
65	12.37	9.78	6.34	2.95	0.92	EA
66	10.01	7.42	3.96	0.61	2.15	VA
67	9.91	7.31	3.86	0.61	2.28	VA
68	7.75	5.15	1.68	1.78	4.38	A
69	10.86	8.27	4.83	1.49	1.47	EA
70	11.89	9.31	5.88	2.54	1.07	EA
71	9.10	6.50	3.04	0.44	3.03	VA
72	6.84	4.25	0.79	2.69	5.28	A
73	8.75	6.15	2.68	0.78	3.38	VA
74	9.50	6.91	3.45	0.33	2.65	VA
75	7.99	5.39	1.92	1.54	4.14	VA
76	9.97	7.38	3.93	0.69	2.23	VA
77	10.90	8.30	4.85	1.47	1.37	EA
78	8.89	6.29	2.83	0.66	3.24	VA
79	8.59	6.00	2.58	1.13	3.61	VA
80	11.57	8.98	5.53	2.14	0.91	EA

Respondent	d(FAI,S)	d(FAI,F)	d(FAI,A)	d(FAI,VA)	d(FAI,EA)	Agility Level
173	12.66	10.07	6.63	3.23	1.04	EA
174	6.82	4.23	0.90	2.78	5.35	A
175	9.59	7.00	3.54	0.32	2.55	VA
176	7.04	4.45	1.03	2.51	5.10	A
177	11.14	8.54	5.09	1.70	1.17	EA
178	8.91	6.31	2.85	0.63	3.22	VA
179	8.79	6.19	2.73	0.74	3.34	VA
180	9.47	6.87	3.41	0.24	2.67	VA
181	8.90	6.30	2.84	0.63	3.23	VA
182	8.83	6.24	2.77	0.70	3.29	VA
183	12.66	10.07	6.62	3.23	1.03	EA
184	7.38	4.79	1.33	2.15	4.74	A
185	8.72	6.12	2.66	0.81	3.41	VA
186	9.36	6.76	3.30	0.23	2.77	VA
187	7.08	4.48	1.01	2.45	5.05	A
188	7.33	4.74	1.28	2.21	4.80	A
189	8.55	5.96	2.49	0.98	3.57	VA
190	7.97	5.37	1.92	1.57	4.16	VA
191	7.69	5.09	1.64	1.86	4.45	A
192	4.43	1.84	1.63	5.09	7.69	A
193	7.86	5.27	1.81	1.68	4.27	VA
194	7.89	5.29	1.83	1.66	4.25	VA
195	8.17	5.57	2.11	1.36	3.95	VA
196	9.73	7.14	3.68	0.42	2.43	VA
197	9.68	7.09	3.63	0.41	2.48	VA
198	8.22	5.62	2.16	1.31	3.91	VA
199	8.44	5.84	2.38	1.08	3.68	VA

Respondent	d(FAI,S)	d(FAI,F)	d(FAI,A)	d(FAI,VA)	d(FAI,EA)	Agility Level
81	10.19	7.59	4.14	0.74	1.97	VA
82	10.51	7.92	4.46	1.10	1.71	VA
83	7.42	4.82	1.37	2.12	4.71	A
84	10.92	8.33	4.88	1.50	1.36	EA
85	10.92	8.33	4.88	1.49	1.34	EA
86	9.18	6.59	3.12	0.36	2.94	VA
87	9.95	7.36	3.90	0.54	2.21	VA
88	7.18	4.60	1.31	2.50	5.04	A
89	7.48	4.88	1.42	2.06	4.65	A
90	11.06	8.47	5.02	1.63	1.23	EA
91	9.34	6.74	3.28	0.25	2.79	VA
92	9.82	7.23	3.77	0.44	2.33	VA
93	8.69	6.09	2.63	0.84	3.43	VA
94	7.94	5.34	1.88	1.59	4.19	VA
95	9.39	6.79	3.33	0.25	2.75	VA
96	7.14	4.55	1.11	2.41	5.00	A
97	8.66	6.06	2.60	0.87	3.46	VA
98	8.16	5.56	2.10	1.37	3.97	VA
99	8.45	5.85	2.39	1.08	3.68	VA
100	7.68	5.08	1.64	1.87	4.46	A
101	8.23	5.63	2.17	1.30	3.89	VA
102	11.90	9.31	5.87	2.50	0.90	EA
103	8.53	5.94	2.47	0.99	3.59	VA
104	5.52	2.93	0.61	4.02	6.62	A
105	10.45	7.86	4.40	1.03	1.75	VA
106	8.54	5.95	2.48	0.98	3.58	VA
107	8.30	5.71	2.24	1.23	3.82	VA

Respondent	d(FAI,S)	d(FAI,F)	d(FAI,A)	d(FAI,VA)	d(FAI,EA)	Agility Level
200	9.75	7.16	3.70	0.37	2.40	VA
201	7.67	5.07	1.61	1.86	4.46	A
202	8.05	5.46	2.00	1.48	4.07	VA
203	8.32	5.72	2.26	1.21	3.81	VA
204	7.41	4.82	1.38	2.14	4.73	A
205	7.65	5.06	1.60	1.89	4.48	A
206	9.30	6.70	3.24	0.34	2.84	VA
207	8.70	6.11	2.64	0.82	3.42	VA
208	9.87	7.27	3.82	0.48	2.29	VA
209	9.09	6.50	3.03	0.44	3.03	VA
210	7.54	4.95	1.50	2.01	4.60	A
211	7.88	5.28	1.82	1.65	4.24	VA
212	8.90	6.30	2.84	0.64	3.23	VA
213	8.96	6.36	2.90	0.58	3.17	VA
214	8.93	6.33	2.87	0.60	3.20	VA
215	10.08	7.49	4.03	0.67	2.08	VA
216	9.44	6.85	3.39	0.27	2.70	VA
217	8.96	6.36	2.90	0.58	3.17	VA
218	12.11	9.52	6.07	2.68	0.80	EA
219	8.89	6.30	2.83	0.64	3.23	VA
220	6.81	4.22	0.84	2.76	5.34	A
221	8.32	5.72	2.26	1.21	3.81	VA
222	8.03	5.44	1.98	1.50	4.10	VA
223	9.76	7.16	3.70	0.35	2.39	VA
224	6.27	3.67	0.22	3.26	5.86	A
225	8.58	5.98	2.52	0.95	3.54	VA
226	7.30	4.70	1.28	2.27	4.85	A

Respondent	d(FAI,S)	d(FAI,F)	d(FAI,A)	d(FAI,VA)	d(FAI,EA)	Agility Level
108	9.85	7.25	3.79	0.44	2.30	VA
109	8.66	6.06	2.60	0.87	3.46	VA
110	6.92	4.32	0.86	2.61	5.20	A
111	9.27	6.67	3.21	0.30	2.86	VA
112	8.46	5.86	2.39	1.07	3.67	VA
113	8.98	6.39	2.92	0.55	3.14	VA
114	8.41	5.81	2.35	1.12	3.71	VA
115	7.24	4.64	1.18	2.29	4.89	A
116	8.83	6.23	2.76	0.71	3.30	VA
117	8.35	5.75	2.29	1.18	3.77	VA
118	7.14	4.55	1.12	2.42	5.00	A
119	11.93	9.35	5.90	2.53	0.89	EA

Respondent	d(FAI,S)	d(FAI,F)	d(FAI,A)	d(FAI,VA)	d(FAI,EA)	Agility Level
227	8.66	6.06	2.60	0.87	3.46	VA
228	8.40	5.80	2.34	1.13	3.73	VA
229	9.58	6.98	3.52	0.24	2.56	VA
230	8.17	5.57	2.11	1.37	3.96	VA
231	9.17	6.58	3.11	0.40	2.96	VA
232	8.09	5.50	2.04	1.45	4.04	VA
233	8.03	5.44	1.98	1.51	4.10	VA
234	9.33	6.73	3.27	0.27	2.80	VA
235	8.99	6.40	2.93	0.54	3.13	VA
236	10.11	7.51	4.05	0.68	2.06	VA
237	8.91	6.31	2.85	0.63	3.22	VA
238	9.08	6.49	3.02	0.47	3.05	VA
239	9.36	6.76	3.30	0.26	2.78	VA

Note: *d* – Euclidean distance; S – slow; F – Fair; A – Agile; VA – Very Agile; EA – Extremely Agile.

Source: author

Appendix K. Descriptive statistics: internal factors

		N	Mean	Std. Deviation	Std. Error
Factor_1 - Networking and product development	Agile	64	3,1063	0,87430	0,10929
	Very agile	134	2,7328	0,87503	0,07559
	Extremely agile	41	2,1171	0,79997	0,12493
	Total	239	2,7272	0,91682	0,05930
Factor_2 - Human resources	Agile	64	2,6719	0,69863	0,08733
	Very agile	134	2,2597	0,66898	0,05779
	Extremely agile	41	1,7756	0,73102	0,11417
	Total	239	2,2870	0,74459	0,04816
Factor_3 - Organizational Awareness and competence	Agile	64	2,9297	0,67033	0,08379
	Very agile	134	2,4981	0,59168	0,05111
	Extremely agile	41	2,0122	0,74152	0,11581
	Total	239	2,5303	0,70478	0,04559
Factor_4 - Flexibility of resources and processes	Agile	64	3,1367	0,84624	0,10578
	Very agile	134	2,9925	0,78457	0,06778
	Extremely agile	41	2,5183	0,92431	0,14435
	Total	239	2,9498	0,84831	0,05487
Factor_5 - Organizational structure	Agile	64	3,0391	0,97307	0,12163
	Very agile	134	2,6455	0,84476	0,07298
	Extremely agile	41	2,1951	0,87947	0,13735
	Total	239	2,6736	0,92478	0,05982

Source: author

Appendix L. Descriptive statistics: Agility Attributes

		N	Mean	Std. Deviation	Std. Error
Simple organizational structure and decision making - Importance	Agile	64	3,13	1,106	0,138
	Very agile	134	2,70	1,019	0,088
	Extremely agile	41	2,22	1,084	0,169
	Total	239	2,73	1,090	0,071
Easily changeable business processes - Importance	Agile	64	3,11	1,393	0,174
	Very agile	134	2,93	1,180	0,102
	Extremely agile	41	2,85	1,621	0,253
	Total	239	2,96	1,320	0,085
Qualified and competent personnel - Importance	Agile	64	2,22	1,147	0,143
	Very agile	134	1,82	0,839	0,073
	Extremely agile	41	1,76	1,280	0,200
	Total	239	1,92	1,026	0,066
Flexible and open to change employees - Importance	Agile	64	2,63	1,254	0,157
	Very agile	134	2,16	0,903	0,078
	Extremely agile	41	1,80	0,954	0,149
	Total	239	2,23	1,049	0,068
Easily accessible needed resources (finances, specialists, technologies, etc.) - Importance	Agile	64	2,78	1,442	0,180
	Very agile	134	2,66	1,164	0,101
	Extremely agile	41	2,05	1,139	0,178
	Total	239	2,59	1,260	0,082
Effective supplier, distributor and business partner network - Importance	Agile	64	2,67	1,155	0,144
	Very agile	134	2,36	1,277	0,110
	Extremely agile	41	2,17	1,321	0,206
	Total	239	2,41	1,260	0,081
Easily changeable technology and information systems - Importance	Agile	64	3,47	1,208	0,151
	Very agile	134	3,14	1,227	0,106
	Extremely agile	41	2,39	1,282	0,200
	Total	239	3,10	1,276	0,083
Ability to sense changes and identify new business opportunities - Importance	Agile	64	2,75	1,380	0,173
	Very agile	134	2,33	1,024	0,088
	Extremely agile	41	2,10	1,241	0,194
	Total	239	2,40	1,184	0,077
Ability to implement important changes in the organization - Importance	Agile	64	2,67	0,874	0,109
	Very agile	134	2,42	0,895	0,077
	Extremely agile	41	1,78	0,909	0,142
	Total	239	2,38	0,935	0,060
Ability to change organizational resources (employees, equipment, assets, etc.) - Importance	Agile	64	3,19	1,207	0,151
	Very agile	134	3,25	1,362	0,118
	Extremely agile	41	2,78	1,314	0,205
	Total	239	3,15	1,320	0,085

		N	Mean	Std. Deviation	Std. Error
Ability to share knowledge and empower employees - Importance	Agile	64	2,80	1,011	0,126
	Very agile	134	2,34	0,951	0,082
	Extremely agile	41	1,93	1,058	0,165
	Total	239	2,39	1,023	0,066
Ability to quickly develop and introduce new products/services to the market - Importance	Agile	64	3,42	1,602	0,200
	Very agile	134	2,73	1,426	0,123
	Extremely agile	41	2,10	1,114	0,174
	Total	239	2,81	1,488	0,096
Ability to outsource, expand and change business partner network - Importance	Agile	64	3,31	1,413	0,177
	Very agile	134	2,94	1,375	0,119
	Extremely agile	41	2,44	1,379	0,215
	Total	239	2,95	1,409	0,091
Constant search for new business and development opportunities - Importance	Agile	64	2,95	1,362	0,170
	Very agile	134	2,59	1,098	0,095
	Extremely agile	41	2,17	1,116	0,174
	Total	239	2,62	1,200	0,078
Constant analysis and adaptation to internal and external changes - Importance	Agile	64	2,78	1,133	0,142
	Very agile	134	2,67	1,109	0,096
	Extremely agile	41	2,20	1,249	0,195
	Total	239	2,62	1,153	0,075
Continuously increasing employee competence and qualifications - Importance	Agile	64	2,91	1,178	0,147
	Very agile	134	2,50	1,002	0,087
	Extremely agile	41	1,85	1,014	0,158
	Total	239	2,50	1,103	0,071
Constant sharing of knowledge and information within organization - Importance	Agile	64	2,80	1,171	0,146
	Very agile	134	2,40	0,926	0,080
	Extremely agile	41	1,73	0,867	0,135
	Total	239	2,39	1,043	0,067
Constant improvement of products/services based on customer needs - Importance	Agile	64	2,81	1,246	0,156
	Very agile	134	2,42	1,085	0,094
	Extremely agile	41	1,73	1,001	0,156
	Total	239	2,41	1,166	0,075
Constant improvement of business network and its support - Importance	Agile	64	2,84	1,101	0,138
	Very agile	134	2,56	1,127	0,097
	Extremely agile	41	2,10	1,179	0,184
	Total	239	2,56	1,150	0,074
Constant monitoring of business partner quality and effectiveness - Importance	Agile	64	3,20	1,275	0,159
	Very agile	134	2,90	1,309	0,113
	Extremely agile	41	2,12	1,187	0,185
	Total	239	2,85	1,323	0,086

Source: author

Appendix M. Multiple Comparisons: Attributes

Tukey HSD					
Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.
Simple organizational structure and decision making - Importance	Agile	Very agile	,424 [*]	0,160	0,024
		Extremely agile	,905 [*]	0,211	0,000
	Very agile	Agile	-,424 [*]	0,160	0,024
		Extremely agile	,482 [*]	0,188	0,030
	Extremely agile	Agile	-,905 [*]	0,211	0,000
		Very agile	-,482 [*]	0,188	0,030
Easily changeable business processes - Importance	Agile	Very agile	0,184	0,201	0,631
		Extremely agile	0,256	0,265	0,599
	Very agile	Agile	-0,184	0,201	0,631
		Extremely agile	0,072	0,236	0,950
	Extremely agile	Agile	-0,256	0,265	0,599
		Very agile	-0,072	0,236	0,950
Qualified and competent personnel - Importance	Agile	Very agile	,398 [*]	0,154	0,028
		Extremely agile	0,463	0,203	0,060
	Very agile	Agile	-,398 [*]	0,154	0,028
		Extremely agile	0,065	0,181	0,932
	Extremely agile	Agile	-0,463	0,203	0,060
		Very agile	-0,065	0,181	0,932
Flexible and open to change employees - Importance	Agile	Very agile	,461 [*]	0,154	0,009
		Extremely agile	,820 [*]	0,203	0,000
	Very agile	Agile	-,461 [*]	0,154	0,009
		Extremely agile	0,359	0,181	0,119
	Extremely agile	Agile	-,820 [*]	0,203	0,000
		Very agile	-0,359	0,181	0,119
Easily accessible needed resources (finances, specialists, technologies, etc.) - Importance	Agile	Very agile	0,125	0,188	0,786
		Extremely agile	,732 [*]	0,248	0,010
	Very agile	Agile	-0,125	0,188	0,786
		Extremely agile	,608 [*]	0,221	0,018
	Extremely agile	Agile	-,732 [*]	0,248	0,010
		Very agile	-,608 [*]	0,221	0,018
Effective supplier, distributor and business partner network - Importance	Agile	Very agile	0,314	0,190	0,228
		Extremely agile	0,501	0,251	0,115
	Very agile	Agile	-0,314	0,190	0,228
		Extremely agile	0,187	0,224	0,680
	Extremely agile	Agile	-0,501	0,251	0,115
		Very agile	-0,187	0,224	0,680
Easily changeable technology and information systems - Importance	Agile	Very agile	0,327	0,187	0,190
		Extremely agile	1,079 [*]	0,246	0,000
	Very agile	Agile	-0,327	0,187	0,190
		Extremely agile	,752 [*]	0,220	0,002
	Extremely agile	Agile	-1,079 [*]	0,246	0,000
		Very agile	-,752 [*]	0,220	0,002

Tukey HSD					
Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.
Ability to sense changes and identify new business opportunities - Importance	Agile	Very agile	,422 [*]	0,177	0,048
		Extremely agile	,652 [*]	0,233	0,015
	Very agile	Agile	-,422 [*]	0,177	0,048
		Extremely agile	0,231	0,208	0,510
	Extremely agile	Agile	-,652 [*]	0,233	0,015
		Very agile	-0,231	0,208	0,510
Ability to implement important changes in the organization - Importance	Agile	Very agile	0,254	0,136	0,149
		Extremely agile	,891 [*]	0,178	0,000
	Very agile	Agile	-0,254	0,136	0,149
		Extremely agile	,637 [*]	0,159	0,000
	Extremely agile	Agile	-,891 [*]	0,178	0,000
		Very agile	-,637 [*]	0,159	0,000
Ability to change organizational resources (employees, equipment, assets, etc.) - Importance	Agile	Very agile	-0,059	0,200	0,953
		Extremely agile	0,407	0,263	0,270
	Very agile	Agile	0,059	0,200	0,953
		Extremely agile	0,466	0,235	0,118
	Extremely agile	Agile	-0,407	0,263	0,270
		Very agile	-0,466	0,235	0,118
Ability to share knowledge and empower employees - Importance	Agile	Very agile	,454 [*]	0,150	0,008
		Extremely agile	,870 [*]	0,197	0,000
	Very agile	Agile	-,454 [*]	0,150	0,008
		Extremely agile	,416 [*]	0,176	0,049
	Extremely agile	Agile	-,870 [*]	0,197	0,000
		Very agile	-,416 [*]	0,176	0,049
Ability to quickly develop and introduce new products/services to the market - Importance	Agile	Very agile	,691 [*]	0,217	0,005
		Extremely agile	1,324 [*]	0,286	0,000
	Very agile	Agile	-,691 [*]	0,217	0,005
		Extremely agile	,634 [*]	0,255	0,036
	Extremely agile	Agile	-1,324 [*]	0,286	0,000
		Very agile	-,634 [*]	0,255	0,036
Ability to outsource, expand and change business partner network - Importance	Agile	Very agile	0,372	0,211	0,183
		Extremely agile	,873 [*]	0,277	0,005
	Very agile	Agile	-0,372	0,211	0,183
		Extremely agile	0,501	0,247	0,108
	Extremely agile	Agile	-,873 [*]	0,277	0,005
		Very agile	-0,501	0,247	0,108
Constant search for new business and development opportunities - Importance	Agile	Very agile	0,364	0,179	0,107
		Extremely agile	,782 [*]	0,235	0,003
	Very agile	Agile	-0,364	0,179	0,107
		Extremely agile	0,419	0,210	0,116
	Extremely agile	Agile	-,782 [*]	0,235	0,003
		Very agile	-0,419	0,210	0,116

Tukey HSD					
Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.
Constant analysis and adaptation to internal and external changes - Importance	Agile	Very agile	0,110	0,173	0,802
		Extremely agile	,586*	0,228	0,029
	Very agile	Agile	-0,110	0,173	0,802
		Extremely agile	0,477	0,204	0,052
	Extremely agile	Agile	-,586*	0,228	0,029
		Very agile	-0,477	0,204	0,052
Continuously increasing employee competence and qualifications - Importance	Agile	Very agile	,406*	0,160	0,032
		Extremely agile	1,053*	0,211	0,000
	Very agile	Agile	-,406*	0,160	0,032
		Extremely agile	,646*	0,188	0,002
	Extremely agile	Agile	-1,053*	0,211	0,000
		Very agile	-,646*	0,188	0,002
Constant sharing of knowledge and information within organization - Importance	Agile	Very agile	,401*	0,150	0,022
		Extremely agile	1,065*	0,198	0,000
	Very agile	Agile	-,401*	0,150	0,022
		Extremely agile	,664*	0,176	0,001
	Extremely agile	Agile	-1,065*	0,198	0,000
		Very agile	-,664*	0,176	0,001
Constant improvement of products/services based on customer needs - Importance	Agile	Very agile	0,395	0,170	0,054
		Extremely agile	1,081*	0,223	0,000
	Very agile	Agile	-0,395	0,170	0,054
		Extremely agile	,686*	0,199	0,002
	Extremely agile	Agile	-1,081*	0,223	0,000
		Very agile	-,686*	0,199	0,002
Constant improvement of business network and its support - Importance	Agile	Very agile	0,284	0,172	0,225
		Extremely agile	,746*	0,226	0,003
	Very agile	Agile	-0,284	0,172	0,225
		Extremely agile	0,462	0,202	0,059
	Extremely agile	Agile	-,746*	0,226	0,003
		Very agile	-0,462	0,202	0,059
Constant monitoring of business partner quality and effectiveness - Importance	Agile	Very agile	0,300	0,194	0,273
		Extremely agile	1,081*	0,256	0,000
	Very agile	Agile	-0,300	0,194	0,273
		Extremely agile	,781*	0,228	0,002
	Extremely agile	Agile	-1,081*	0,256	0,000
		Very agile	-,781*	0,228	0,002

*. The mean difference is significant at the 0.05 level.

Source: author

Appendix N. Empirical survey questionnaire

Šiuo metu vykdomė įmonių vadovų apklausa, kurios tikslas išsiaiškinti kokie veiksniai nulemia sparčiai augančių įmonių judrumą.

Prašome pateiktus teiginius įvertinti pagal svarbą:

Nesudėtinga struktūra ir sprendimų priėmimo procesas.										
Q1. Kiek tai svarbu Jūsų įmonės judrumui?										
Statement 1	Kritiška	Itin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau		
	Q2. Kaip tai vertinate savo įmonėje?									
	Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės		
Lengvai* keičiami verslo procesai.										
Q1. Kiek tai svarbu Jūsų įmonės judrumui?										
Statement 2	Kritiška	Itin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau		
	Q2. Kaip tai vertinate savo įmonėje?									
	Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės		
Kvalifikuoti ir kompetetingi darbuotojai.										
Q1. Kiek tai svarbu Jūsų įmonės judrumui?										
Statement 3	Kritiška	Itin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau		
	Q2. Kaip tai vertinate savo įmonėje?									
	Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės		
Lankstūs ir atviri pokyčiams darbuotojai.										
Q1. Kiek tai svarbu Jūsų įmonės judrumui?										
Statement 4	Kritiška	Itin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau		
	Q2. Kaip tai vertinate savo įmonėje?									
	Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės		

Šiuo metu vykdome įmonių vadovų apklausą, kurios tikslas išsiaiškinti kokie veiksniai nulemia sparčiai augančių įmonių judrumą.

Prašome pateiktus teiginius įvertinti pagal svarbą:

Nesudėtingai gaunami reikalingi ištekliai (finansavimas, specialistai, technologijos ir pan.).						
Statement 5	Q1. Kiek tai svarbu Jūsų įmonės judrumui?		Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu
	Kritiška	Įtin svarbu	Svarbu			Nežinau
	Q2. Kaip tai vertinate savo įmonėje?		Patenkinamai	Nepatenkinamai	Pakankamai blogai	Neturiu nuomonės
	Puikiai	Labai gerai	Gerai			
Efektvyvus tiekėjų, platintojų ir kitų verslo partnerių tinklas.						
Statement 6	Q1. Kiek tai svarbu Jūsų įmonės judrumui?		Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu
	Kritiška	Įtin svarbu	Svarbu			Nežinau
	Q2. Kaip tai vertinate savo įmonėje?		Patenkinamai	Nepatenkinamai	Pakankamai blogai	Neturiu nuomonės
	Puikiai	Labai gerai	Gerai			
Lengvai keičiamos naudojamos technologijos ir informacinės sistemos.						
Statement 7	Q1. Kiek tai svarbu Jūsų įmonės judrumui?		Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu
	Kritiška	Įtin svarbu	Svarbu			Nežinau
	Q2. Kaip tai vertinate savo įmonėje?		Patenkinamai	Nepatenkinamai	Pakankamai blogai	Neturiu nuomonės
	Puikiai	Labai gerai	Gerai			
Gebėjimas pastebėti pokyčius ir naujas verslo galimybes rinkoje.						
Statement 8	Q1. Kiek tai svarbu Jūsų įmonės judrumui?		Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu
	Kritiška	Įtin svarbu	Svarbu			Nežinau
	Q2. Kaip tai vertinate savo įmonėje?		Patenkinamai	Nepatenkinamai	Pakankamai blogai	Neturiu nuomonės
	Puikiai	Labai gerai	Gerai			

Šiuo metu vykdome įmonių vadovų apklausą, kurios tikslas išsiaiškinti kokie veiksniai nulemia sparčiai augančių įmonių judrumą.

Prašome pateiktus teiginius įvertinti pagal svarbą:

Gebėjimas įgyvendinti svarbius pokyčius įmonėje.

Q1. Kiek tai svarbu Jūsų įmonės judrumui?

Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau
Q2. Kaip tai vertinate savo įmonėje?							
Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės

Gebėjimas lengvai keisti įmonės resursus (personala, įrangą, turta, ir pan.).

Q1. Kiek tai svarbu Jūsų įmonės judrumui?

Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau
Q2. Kaip tai vertinate savo įmonėje?							
Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės

Gebėjimas dalintis patirtimi ir ugdyti darbuotojus sprendimų priėmimui.

Q1. Kiek tai svarbu Jūsų įmonės judrumui?

Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau
Q2. Kaip tai vertinate savo įmonėje?							
Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės

Gebėjimas greitai kurti ir pristatyti naujus produktus ar paslaugas rinkai.

Q1. Kiek tai svarbu Jūsų įmonės judrumui?

Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau
Q2. Kaip tai vertinate savo įmonėje?							
Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės

Šiuo metu vykdome įmonių vadovų apklausą, kurios tikslas išsiaiškinti kokie veiksniai nulemia sparčiai augančių įmonių judrumą.

Prašome pateiktus teiginius įvertinti pagal svarbą:

Gebėjimas lengvai tobulinti, plėsti ir keisti verslo partnerių tinklą.									
Statement 13	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 14	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 15	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 16	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Nuolatinė naujų verslo ir plėtos galimybių paieška.									
Statement 13	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 14	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 15	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 16	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Nuolatinė naujų verslo ir plėtos galimybių paieška.									
Statement 13	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 14	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 15	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 16	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Nuolatinė naujų verslo ir plėtos galimybių paieška.									
Statement 13	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 14	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 15	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	
Statement 16	Q1. Kiek tai svarbu Jūsų įmonės judrumui?			Q2. Kaip tai vertinate savo įmonėje?					
	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau	

Šiuo metu vykdomė įmonių vadovų apklausa, kurios tikslas išsiaiškinti kokie veiksniai nulemia sparčiai augančių įmonių judrumą.

Prašome pateiktus teiginius įvertinti pagal svarbą:

Nuolatinis dalinimasis žiniomis ir informacija įmonės viduje.

Q1. Kiek tai svarbu Jūsų įmonės judrumui?

Statement 17	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau
	Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės

Nuolatinis produktų bei paslaugų tobulinimas, atsižvelgiant į klientų poreikius.

Q1. Kiek tai svarbu Jūsų įmonės judrumui?

Statement 18	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau
	Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės

Nuolatinis verslo partnerių tinklo tobulinimas bei jų palaikymas.

Q1. Kiek tai svarbu Jūsų įmonės judrumui?

Statement 19	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau
	Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės

Nuolatinis verslo partnerių kokybės ir efektyvumo stebėjimas.

Q1. Kiek tai svarbu Jūsų įmonės judrumui?

Statement 20	Kritiška	Įtin svarbu	Svarbu	Labiau svarbu	Labiau nesvarbu	Nesvarbu	Visiškai nesvarbu	Nežinau
	Puikiai	Labai gerai	Gerai	Patenkinamai	Nepatenkinamai	Pakankamai blogai	Labai blogai	Neturiu nuomonės

Šiuo metu vykdomė įmonių vadovų apklausa, kurios tikslas išsiaiškinti kokie veiksniai nulemia sparčiai augančių įmonių judrumą.				
Prašome pateiktus teiginius įvertinti pagal svarbą:				
Kuris veiksnys labiausiai vertia Jūsų organizaciją prisitaikyti. (Prašome įvertinti svarbą penkių balų skalėje, kai 1 – visai nesvarbu, o 5 – labai svarbu).				
Q1. Pokyčiai konkurencinėje aplinkoje.				
1 - visai nesvarbu	2	3	4	5 - labai svarbu
Q2. Pokyčiai susiję su klientais				
1 - visai nesvarbu	2	3	4	5 - labai svarbu
Q3. Technologiniai pokyčiai				
1 - visai nesvarbu	2	3	4	5 - labai svarbu
Q4. Socialiniai bei ekonominiai pokyčiai				
1 - visai nesvarbu	2	3	4	5 - labai svarbu
Statement 21				

*Lengvai – be papildomų įmonės resursų ar pastangų (Eng. translation 'Easy' - without additional company resources or effort)

Source: author

MYKOLAS ROMERIS UNIVERSITY

Mindaugas Deksnys

ORGANIZATIONAL AGILITY IN HIGH
GROWTH COMPANIES

Summary of Doctoral Dissertation
Social Sciences, Management (03 S)

Vilnius, 2018

This doctoral dissertation was prepared at Mykolas Romeris University during 2013-2018 under the right to organize doctoral studies granted to Vytautas Magnus University together with Klaipėda University, Aleksandras Stulginskis University, Mykolas Romeris University and Šiauliai University by the order of the Minister of Education and Science of the Republic of Lithuania No. V-1019 dated on June 8, 2011.

Scientific supervisor:

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The doctoral dissertation will be defended at the Scientific Council of Vytautas Magnus University, Klaipėda University, Aleksandras Stulginskis University, Mykolas Romeris University and Šiauliai University in the field of Management:

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The doctoral dissertation will be defended at the open meeting of the Scientific Council in the field of Management on November 9th, 2018 at 11:00 at Mykolas Romeris University, I-414 Room.

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The summary of the doctoral dissertation was sent on October 9th, 2018.

The Doctoral Dissertation is available at Martynas Mažvydas National Library of Lithuania (Gedimino st. 51, Vilnius), Aleksandras Stulginskis University library (Studentų st. 11, Akademija, Kauno raj.), Klaipėda University library (K.Donelaičio a. 3, Klaipėda), Mykolas Romeris University library (Ateities st. 20, Vilnius), Šiauliai University library (Vytauto st. 84, Šiauliai), Vytautas Magnus University library (K.Donelaičio st. 52, Kaunas).

INTRODUCTION

The relevance of the topic. Organizations are constantly facing change. Globalization, fast technological advances, competition, disruptive business models, emerging new markets, constantly evolving consumer preferences – are daily challenges for most big and small organizations. Combined with more traditional risks of business and economy lifecycles, these ever-changing challenges force organizations to become more efficient and agile in order to survive. Organizational agility is increasingly growing in significance as one of the main tools for gaining and maintaining a competitive advantage in the fast-changing market environment. Agility is becoming one of the key organizational characteristics that business practitioners seek in order to stay adaptive and competitive in turbulent environments.

Due to the increasing popularity of e-commerce, even small-size businesses are able to compete on a global scale. These developments further increase the need for organizational agility in order to adapt and compete outside home markets. To take advantage of emerged global opportunities, companies have to have efficient and agile business processes, flexible organizational structure, open-to-change workforce, agile networks and partners, and easily adaptable technology.

Consumer habits and needs constantly change as well. The current age of information abundance and speed provides new levels of choice for the customers. Customers are becoming more knowledgeable. Product and service reviews, user ratings are available instantly for the judgment and choice by consumers. Ability to select the best service provider or business partner at moment's notice gives new meaning for a competitive marketplace. In order to stay competitive companies should not only provide great product or service but also be ready to change and customize them to accommodate the ever-changing customer tastes and expectations. Agility allows organizations to adapt to the changing market situation, customer expectations and plays a major role in organizational survival in the consumer-driven environment.

In order to effectively compete in a 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 the agility level and identify which internal organizational factors affect it. These are the areas this dissertation aims to research.

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 compa-

nies 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.

Measurement, identification, and evaluation of factors affecting organizational agility level in a highly volatile environment remain important questions for researchers and practitioners. This dissertation is dedicated to answering some of them.

The scientific problem and the level of the topic's examination. The thesis seeks to solve the problem – what factors influence organizational agility and how to measure the level of agility of fast-growing companies. In order to answer the question (problem) raised in the dissertation, scientific literature has been analysed, helping to determine the level of topic's examination.

Many scientists claim, that organizational agility is a multidimensional and complex topic and is approached by many researchers from different perspectives. One camp of the researchers study agility from the perspective of enablers and capabilities which help organizations to achieve agility (Alberts & Hayes, 2003; Baškarada & Koronios, 2018; Botani, 2010; Cai, 2013; Charbonnier-Voirin, 2011; Dyer & Shafer, 1998; Eshlaghy, Mashayekhi, Rajabzadeh, & Razavian, 2010; Felipe & Rold, 2017; Giachetti, Martinez, Sáenz, & Chen, 2003; Jackson & Johansson, 2003; C. T. Lin, Chiu, & Chu, 2006; Ren, Yusuf, & Burns, 2009; Sharifi & Zhang, 2001; Yusuf, Sarhadi, & Gunasekaran, 1999). The second group of researchers identify main practices that agile organizations use in their daily operations (Aburub, 2015; Carvalho, Sampaio, Rebentisch, & Saraiva, 2017; Charbonnier-Voirin, 2011; Gehani, 2010; Goldman, Nagel, & Preiss, 1995; Sherehiy, Karwowski, & Layer, 2007; Vázquez-Bustelo, Avella, & Fernández, 2007). Third group of researchers approaches agility from the perspective of how organizations interact with the changing environment through sense-response dimension (Dove, 2005; Dyer & Shafer, 2003; Holsapple & Li, 2008; Lu & Ramamurthy, 2011a; Marhraoui & Manouar, 2017; Nijssen & Pauwe, 2012; Popovič, Hackney, Tassabehji, & Castelli, 2018; Sambamurthy, Bharadwaj, & Grover, 2003; J. Singh & Sharma, 2013; Wright & Snell, 1998).

Most of the earlier research is concentrated only on specific industry of organizations, in particular – manufacturing sector, where researchers analyse what manufacturing organization can do to enhance their agility (Ganguly, Nilchiani, & Farr, 2009; Jackson & Johansson, 2003; Yang & Li, 2002; Yauch, 2011; Yusuf et al., 1999). Others evaluate agility in a narrow context of business process or area – e.g. supply chain agility (Ren et al., 2009; Sharifi & Zhang, 2001; Van Hoek, 2001), human resource agility (Breu, Hemingway, Strathern, & Bridger, 2002; Shafer, 1997), knowledge management and IT capabilities (Kassim and Zain, 2004; Sarker and Sarker, 2009; Lu and Ramamurthy, 2011b; Cai, 2013; Singh, Oberoi and Ahuja, 2013), business processes (Arteta & Giachetti, 2004), strategic alignment (Tallon & Pinsonneault, 2011), market orientation (Grewal & Tansuhaj, 2001). Lin et al., (2010) focuses on agility properties in organization networks.

Recently, researchers have increased focus on IT, learning and innovations effect on agility level in an organization and its performance (Cegarra-Navarro, Soto-Acosta, & Wensley, 2016; Khoshlahn & Ardebili, 2016; Panda & Rath, 2018; Ravichandran, 2017,

2018). Few of the researchers analyse how organizational agility influences competitive advantage (Côrte-Real, Oliveira, & Ruivo, 2017; Mikalef & Pateli, 2017). Other analyses focus on individual factors and their influence on organizational agility. For example, Panda and Rath (2017), Mikalef and Pateli (2017), Felipe et al. (2016), Yeganegi and Azar (2012) study how information technology capabilities affect agility level in the organization. Their empirical research shows the direct positive correlation between IT capabilities and agility level in the organization, i.e. the better IT capabilities organization has, the agiler it is.

Another factor that is gaining researchers' attention is the knowledge and human resource management and their effect on organizational agility. Scientists claim that there is a positive relationship between the effectiveness of human resource management actions and organizational agility level (Teimouri, Jenab, Moazeni, & Bakhtiari, 2017). Learning and knowledge sharing also has a positive effect on organizational agility level (Bahrami, Kiani, Montazeralfaraj, Zadeh, & Zadeh, 2016). In fact, in a modern fast-changing environment, constant learning and innovation are one of the most important factors in ensuring successful organizational performance. Researchers also agree that innovative organizations are agiler compared to less innovative counterparts (Ravichandran, 2017). Without innovations organizations' growth opportunities are limited.

Organizational agility concept is also discussed in doctoral dissertations. For example, Kharabe (2013) in his dissertation analyses the effects of enterprise systems on organizational agility level. The author argues that innovations are necessary for achieving a high level of organizational agility. Kharabe (2013) shows, that enterprise system agility has a positive influence on overall organizational agility level. In Smithwick (2016) doctoral dissertation factors influencing construction contractor' organizational agility are analysed. Allwein (2017) dissertation presents agility theory, which is a result of the organization's digital infrastructure. Organizational agility or fast-growing companies context is not widely researched in Lithuanian author dissertations, however, important agility element of capabilities is analysed by several authors in their dissertations. Mickevičienė (2010) in her dissertation presents a methodology to evaluate the organization's capability to compete using internal and external organizational factors. Organizational dynamic capabilities influence on supply chain was researched by Masteika (2015) in his dissertation, where the author presents a model to identify dynamic capabilities and their influence on particular stages of the supply chain. Paliokaitė (2013) in her dissertation analyses organizational ambidexterity as organizational capability and its effect on innovation. While dynamic capabilities and organizational inertia in changing environment are studied by Nedzinskas (2013) in his dissertation.

In summary, it can be stated that organizational agility topic receives plenty of attention from researchers. The scientific literature pays much attention to the effect of agility on the organization's performance and its competitive edge. Researchers also analyse individual factors that increase organizations' agility level. However, it has been noted that there is a lack of a systematic approach towards the agility of organization and lack of holistic models that could be applied to assess the organization's agility in different markets, industries and countries. Thus, the topic of organizational is relevant both in a theoretical and practical sense and requires further research.

The aim, the tasks, and the object. The aim of the thesis – after identifying the main factors affecting organizational agility level, to propose theoretical organizational agility model and measure agility level in high-growth companies using presented methodology. In order to achieve the aim of the thesis, the following tasks are set:

1. To systemize organizational agility theoretical concepts based on scientific literature analysis.
2. Identify organizational agility drivers, enablers, capabilities and practices.
3. To develop a theoretical evaluation model of the agility level of fast-growing organizations/companies.
4. To analyse organizational agility level evaluation methods and propose a methodology for its measurement.
5. Using proposed methodology, empirically verify the application of the model and evaluate agility level and affecting factors in Lithuanian high-growth companies.

The object of the research is organizational agility.

The scientific research methods. Scientific literature analysis and synthesis, comparison, generalization, as well as inductive top-down theorizing methods, is used to analyse theoretical aspects of organizational agility, forming a theoretical model of agility of organizations, and identifying the factors determining the organization agility level. For the formation of the organization agility evaluation model, graphic modelling, questionnaire survey methods, and expert evaluation methods are used. Analysis of the empirical research results are based on descriptive statistics, fuzzy number logic, factor analysis and analysis of variance methods.

The scientific novelty of the study.

1. After analysing and evaluating the concepts of agility offered by the researchers, the definition of organizational agility is presented. The proposed definition makes the concept of agility more holistic and applicable to a wide range of organizations, regardless of the industry they operate in. Universal organizational agility definition allows researchers to approach organizational agility concept from a unified direction and apply it to a wide range of organizations.
2. Organizational agility theoretical model based on the sense-response framework is presented. Author of the dissertation proposes a holistic approach towards studying organizational agility and combines different elements of organizational agility (capabilities, enablers and practices), which previously have been studied separately, into the more cohesive theoretical model. Organizational agility theoretical model opens a possibility to study, evaluate and compare organizational agility between organizations in different industries and countries.
3. The factors that determine an organization's agility are identified and systematized in the dissertation. Both individual and factor groups are considered and presented. Organizational agility attributes, capabilities, enablers and practices are unified to be applicable to a variety of organizations. This allows applying the same methodology and criteria when studying organizational agility and comparing results in different organizations.

4. The fuzzy logic methodology is applied in evaluating agility level in the company. This provides a more accurate tool for researchers to measure agility level in the wide range of organizations and compare data using a unified approach.
5. The unified questionnaire is proposed to evaluate organizational agility in high-growth companies. It can be applied and benefit future studies of agility in organizations in other countries or different context.
6. The organizational agility level evaluation model is proposed and empirically tested in the context of high-growth companies. Fuzzy agility Index is calculated and three hypotheses tested and confirmed. This helps to identify key factors that drive and influence an organization to be agile.

The applied significance of the work.

1. In order to improve agility in the organization, practitioners (business owners, managers, leaders, etc.) need to be able to measure it. Agility measurement model presented in this dissertation, based on fuzzy logic, can be applied to evaluate agility in practitioner's organization.
2. The questionnaire presented and used in the empirical assessment of organizational agility can be used for practical purposes when evaluating agility level in the company.
3. This dissertation identifies key internal factors, which help to improve organizational agility level. This, in turn, will help practitioners to efficiently focus agility level improvement efforts in their organizations.
4. Agility attribute analysis of high-growth companies performed in this dissertation will provide insights into practices, capabilities, and attributes that successful and agile organizations have.

Research limitations.

1. The organizational agility research in this dissertation was limited to the context of high-growth companies in Lithuania. The differences between countries can arise from differences in the legislature, statistical representation of company results, classification under industries, availability of reliable data, or other country-specific differences. To test the model applicability in other countries, the researcher needs to conduct a survey in the country under investigation.
2. Some organizations in specific industries may have unique attributes that are key to the organizational agility in their particular company. The model presented in this dissertation attempts to unify the agility level evaluation and uses generalized attributes that could fit the majority of the organization. However, for these niche sectors of the economy, not all attributes can be considered. Therefore, researchers or should identify the factors and attributes that may be unique in their organization and apply them when evaluating organizational agility level.
3. An ability of the organization is a complex concept, and therefore factors driving agility can change, due to changes in the economic and political situation in the country. For this reason, the model for agility level measurement proposed in the dissertation should be periodically reviewed and verified.

Structure of the dissertation. The current dissertation consists of an introduction, three chapters (theory, methodology and empirical findings), conclusions, references and appendixes. The first part of the dissertation deals with the concept of agility and systematizes the attitudes of scientists towards this phenomenon. The second part of the dissertation presents the research methodology. The research methodology was developed on the basis of scientific literature for the study of the agility of organizations. The empirical (third) part of the dissertation presents a research carried out, presented for processing and interpreted its (research's) results.

1. THEORETICAL ASPECTS OF ORGANIZATIONAL AGILITY

The first part of the dissertation conducts a thorough analysis of scientific literature and reveals that the discussion on the subject of organizational agility is highly fragmented. The scientific literature reveals that even 'agility' term is used interchangeably with term 'flexibility', which only complicates focused study into organizational agility concept. The author of this dissertation discusses the differences between these two terms and proposes distinction based on criteria of scope, situation characteristics, response rate, outcome and type of change.

Disagreements in the scientific literature continue when defining organizational agility. Many authors approach agility concept from different directions, frameworks and contexts. Narrow definitions are used, that apply to specific industry context (e.g. manufacturing), functional area (e.g. supply chain) or take into consideration only limited internal or external factors (e.g. employee skills). The literature analysis establishes the need for a unified organizational agility definition that can be applied to the wide context of organizations, regardless of the industry or business profile. The author of this dissertation proposes to unify definition of organizational agility as an organizational ability to recognize unexpected changes in the environment and appropriately respond in a swift and efficient manner, by utilizing and reconfiguring internal resources, thus gaining competitive advantage in the process.

Further analysis of organizational agility research literature reveals the main directions and approaches to organizational agility concept by the scientific community. The author of this dissertation systemizes these directions into three frameworks: capabilities-enablers framework, sense-response framework and practices framework. Most of the researches on organizational agility are based on one or another framework. The author of this dissertation proposes to combine some of the concepts and study organizational agility within sense-response framework, by utilizing organizational capabilities, enablers and practices as framework elements.

The author of the dissertation completes the literature review part, presenting the theoretical model of organizational agility, based on the structure of sense-respond (see Fig. 1).

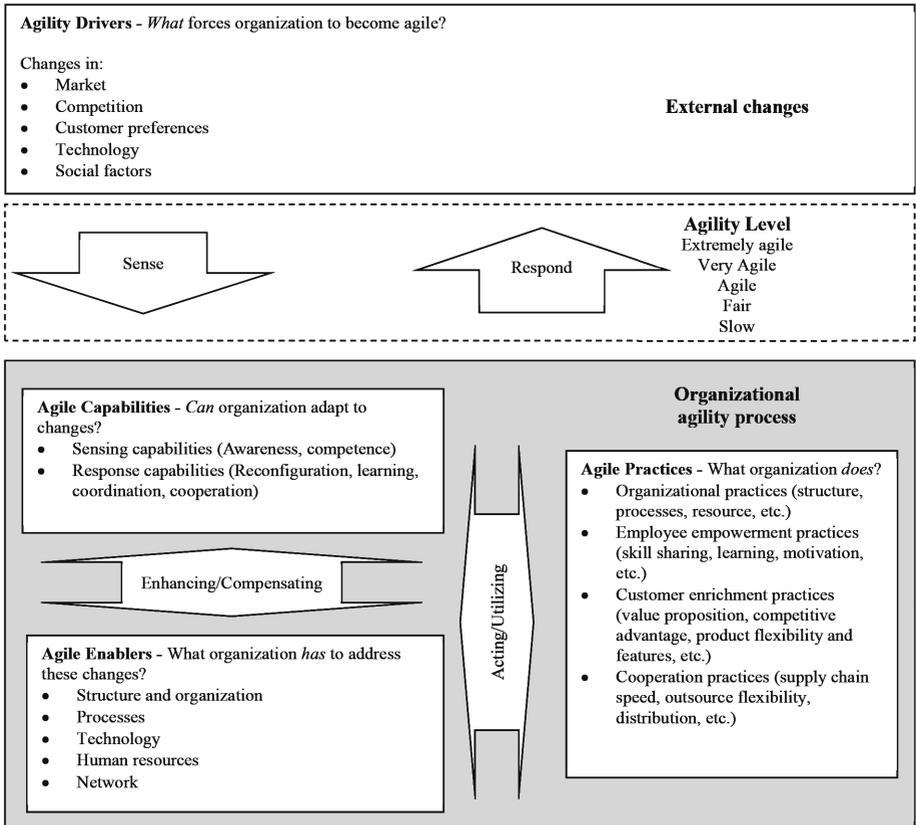


Figure 1. Theoretical model of organizational agility evaluation model
Source: author

Theoretical organizational agility model could be applied as a process roadmap or a flow for decision making. Organizational adaptation starts as with the change in the environment through agility drivers. Once the change is sensed and recognized, decision-makers should take inventory of current situation in the organization by answering the questions ‘what resources we have to address the changes in the environment’ and ‘do we have necessary abilities to utilize those resources and adapt to the changes?’ Once the inventory is established, organization decision makers should respond to the environment drivers by utilizing these of enablers and capabilities. The response is represented by action or practice, which leads to an outcome, such as the development of a new product, or a change in procedures. This process of adaptation to the environmental changes increases organizational agility level further through experience sharing. As the business environment is constantly changing, the agile organization is also constantly applying its enablers, capabilities, and practices to adapt to these changes. Agility level determines how efficiently and quickly

organization responds to the external changes, threats and opportunities. Organizations that are agile will adapt and take advantage of market changes better, compared to slower counterparts which can fail to adapt.

2. ORGANIZATIONAL AGILITY MEASUREMENT METHODOLOGY

The second part of the dissertation offers organizational agility evaluation methodology. The methodological part of the paper analyses the methods meant for determining the level of an organization's agility formulates the methodology of evaluating an organization's agility, based on the completed analysis. Firstly, agility drivers are distinguished; they are as follows: agility capabilities, agility practices. Secondly, the need for agility attributes is identified, and terms of assessment are determined. Thirdly, the agility level using fuzzy numbers for factors weighing procedure is measured.

The following hypotheses were raised for evaluation of an organization's agility:

H₁: Majority of high-growth companies' agility level is 'very agile'.

In order to test the first hypothesis (H₁), 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 thesis 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;
- K-means method;
- Two-step method.

H₂: Companies in 'wholesale, retail trade and repair of motor vehicles' industry are more agile than in construction, manufacturing and transportation industries.

The clusters formed for the testing of the first hypothesis (H₁) are used in testing the second hypothesis (H₂). For hypothesis H₂ testing SPSS comparing column proportion method is used.

H₃: Organizational agility level is influenced by following enabler, capability and practice factors: networking and product development, human resources, organizational awareness and competence, the flexibility of resources and processes, organizational structure.

In order to verify the third hypothesis (H₃) factor analysis is applied. Factor analysis is broadly used in the social sciences. Factor analysis can be defined as the sum of statistical methods, the purpose of which is to replace the population of attributes describing the observed phenomenon with a set of several factors (Šimanskienė & Paužuolienė, 2012). In other words, factor analysis helps to simplify sets of complex data. For study data processing, researchers studying the agility of organizations, apply exploratory factor analysis (EFA) (Panda & Rath, 2016; Wendler, 2014, 2016).

The data was obtained by surveying the heads of fast-growing companies in Lithuania via a questionnaire.

3. EMPIRICAL ASSESSMENT OF ORGANIZATIONAL AGILITY

The third part of the dissertation carries out a research on organizations' agility, and its aim is to test the hypotheses raised in the second part of the paper.

An empirical study into organizational agility was conducted during September 2016. The list of high-growth Lithuanian companies was obtained from "Gazele" project implemented by the business daily newspaper "Verslo Žinios" analytics department (Verslo Žinios, 2016).

3576 companies were selected from "Gazele" 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 a 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 name of the director.

In order to confirm the hypotheses, all the companies under consideration were grouped by industries.:

- agriculture, forestry, and fishing;
- construction;
- financial and insurance activities;
- human health and social work activities;
- manufacturing;
- professional, scientific and technical activities;
- real estate activities;
- transportation and storage;
- wholesale and retail trade; repair of motor vehicles and motorcycles.

However, there are sectors with a small number of companies, therefore, it is not expedient to analyse these sectors as the results obtained will not represent the entire population. Therefore, four industries are analysed below, namely

- construction;
- manufacturing;
- transportation and storage;
- wholesale and retail trade; repair of motor vehicles and motorcycles.

An analysis of the data shows that in each industry under consideration, the majority of companies are very agile (fall within the second cluster). This can be explained by the fact that high-growth companies during growth period have seen major changes in the external environment. What is more, 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. The analysis of the results allows for the conclusion that the first hypothesis is true. Ergo, it is reasonable to claim that the majority of fast-growing organizations are agile or very agile.

What is more, the results revealed that out of four examined spheres (wholesale, retail trade and repair of motor vehicles' industry, construction, manufacturing and transportation industries) the extremely agile are the organizations operating in wholesale, retail trade and repair of motor vehicles' industry. Actually, comparing all four analysed industries, from the business perspective, 'wholesale and retail trade; repair of motor vehicles and motorcycles' industry has the highest seasonality effect. Customer preferences are most dynamic and dependent on many external factors. Construction, manufacturing, transportation, and storage – all the remaining sectors are slower to adapt to the changing environment due to their business nature. In other words, the obtained results verified the second hypothesis.

Further on, it was studied which factors affect the level of an organization's agility. Upon carrying out the research it became apparent that networking and product development, human resources, organization's awareness and competence, the flexibility of resources and processes as well as organizational structure have an impact on the level of organization's agility. Organizational structure is a very important and encompassing factor for organizational agility. Without a flexible and adaptable organizational structure, companies will not be able to effectively coordinate the change. The flexibility of resources and processes factor is mutually dependent on the organizational structure and both influence organizational agility level. Organizational structure influence on agility level of the company will not be effective without flexible and agile resources and processes. Organizational awareness and competence is also an important factor for organizational agility level and refers to the ability of the company to notice the changes in the market, competition, consumer preferences. Human resources is a very important factor in the agility of the company. Organizational awareness, competence, ability to coordinate, control and direct change – all rely on human resources and their experience and qualifications. Networking and product development is important to an organization's agility level due to its external dimension. Many organizations depend on their environment, network, partners, suppliers, distributors. Therefore, it can be stated that the third hypothesis is verified.

CONCLUSIONS

The analysis of the scientific literature made in the dissertation has shown that the evaluation of organizations' agility and the determination of the level is a topical issue that is being addressed by different scholars. Organizational agility is a hard-to-measure variable and no unified methodology has been proposed for solving this task. The dissertation analyses the level of agility of fast-growing Lithuanian organizations and makes the following conclusions:

1. Different definitions of organizational agility are found in the scientific literature. Researchers agree that organizational agility is a multi-dimensional concept that requires concentration on the country, market, and the industry in which the organization operates. However, after analysing the scientific literature and summarizing the views of different scientists on the agility of the organization, this dissertation proposes a general definition of the agility of organizations applicable to organizations operating in different countries, markets and industries. In this dissertation, organizational agility is defined as the organization's ability to recognize unexpected changes in the environment and respond to them quickly and efficiently, using and configuring internal resources, thereby gaining a competitive advantage. The proposed definition helped to reduce the problem of uncertainty of the concept of agility of the organization. In addition, this definition contributes to the theory of organizations' agility, which will help to make progress in scientific agility of organizations in various countries around the world.
2. In order to examine what affects the level of an organization's agility, it is crucial to identify the factors that promote it (agility) and the reasons for the organization's intention to change. Factors promoting agility were distinguished based on the analysis of the scientific literature. In addition, the factors were congregated into four main groups:
 - a) Agility drives are the factors forcing an organization to stay agile. These factors are market developments; changes in a competitive environment; changes in customer preferences; technological changes; socio-economic changes.
 - b) Agility realization factors are the resources available to the organization to help it (the organization) adapt to change and to be agile. These factors are as follows: organizational structure, processes in the organization, technologies, human resources, networking
 - c) Agility capabilities are the organization's ability to identify external changes and execute/change its activities accordingly. The following agility options are distinguished: sensing capabilities and response capabilities.
 - d) Agility practices are actions performed by an agile organization before and during the change period. The following agility practices are distinguished: organizational practices, employee motivation practices, the practice of customer enrichment and practices of collaboration with business partners.
3. The dissertation developed a model for assessing the agility of organizations. The model combines the four agility groups mentioned above. Summarizing the scientific literature, the model outlined the external factors that make the organization change. What is more, the model thoroughly introduces internal organizational factors that encourage it (organization) to become agile. In other words, the model presents the processes that an organization can complete in order to achieve a certain level of agility. In addition, the analysis of the theoretical model highlighted the areas of production on which the theoretical model proposed in the dissertation is tested. As already mentioned, the dissertation is focused on internal factors' analysis, therefore, these factors are presented in the model more widely. The cur-

rent module focuses on enablers, capabilities, and practices of agile high-growth organizations. External factors and pressures are difficult to influence, but internal factors can be improved and adjusted. Therefore, it is important for practical and academic reasons to study what internal factors affect the agile organization's ability to adapt faster and more effectively to external changes. The model of organizational agility evaluation is beneficial for practitioners while analysing their organizational agility level within the internal factors.

4. Three hypotheses have been raised to test the theoretical model:

H₁: Majority of high-growth companies' agility is "very agile".

H₂: Companies in the "wholesale, retail trade and repair of motor vehicle industries" are more agile than construction, manufacturing and transportation industries.

H₃: Organizational agility level is influenced by the following enablers, capability and practice factors: networking and product development, human resources, organizational awareness and competence, resource and process flexibility, organizational structure.

Hypothesis testing is based on a survey where respondents are heads of high-growth Lithuanian organizations. During the survey respondents were asked to evaluate the factors of the organization's agility, which were distinguished during the analysis of the scientific literature. Respondents had to evaluate twenty statements and answer two questions assigned to each statement. The first question was "How much the given statement is important to the agility of the organization?" the second is "How would you assess the level of agility of the organization you are working in." The following methods were used to evaluate respondents' answers:

- a) The triangular fuzzy numbers method was selected in order to reduce the inaccuracy and uncertainty of responses.
 - b) The Fuzzy Agility Index was used to measure the agility level for each surveyed company.
 - c) Cluster analysis was applied in order to group the companies under consideration into clusters and continue the analysis for each cluster individually.
 - d) Factor analysis was used in order to assign a specific attribute to each agility factor identified.
5. The results of the empirical study showed that all fast-growing organizations that participated in the survey considered themselves to be agile, very agile or extremely agile. This may be explained by the fact that the organizations surveyed were taken from the *Gazelle* list of the most successful companies in Lithuania in terms of revenue growth.

An organization cluster analysis was carried out for testing the first hypothesis of the "Majority of high-growth companies" agility is "very agile." Three methods were used for cluster analysis: Euclidean distance method, K-means method, the two-step method. The results of the research showed that the analysed organizations can be grouped into three clusters, namely "agile organizations", "very agile organizations", "fully agile organizations". In addition, most organizations fall into the second cluster - very agile organizations. Ergo,

it can be stated that most high-growth organizations are very agile and the first hypothesis (H_1) has proved to be true.

The clusters created during the cluster analysis were used to test the second hypothesis, “Companies in the wholesale, retail trade and repair of motor vehicles’ industries are more agile than in construction, manufacturing and transport industries.” Hypothesis testing was performed using the method of column proportion comparison. An analysis of companies operating in different industries has shown that most agile companies are in the “wholesale and retail trade sector and motor vehicle and motorcycles repair” sector. Thus, it can be stated that the second hypothesis (H_2) proved to be true.

A factor analysis was used to test the third hypothesis. According to the results of factor analysis, the more agile the organization is, the more relevant the following factors are: networking and product development, human resources, organizational awareness and competence, the flexibility of resources and processes, organizational structure. Therefore, it can be stated that the third hypothesis (H_3) proved to be true.

Summarizing the results of the empirical study, it can be claimed that the proposed model for assessing the agility of high-growth organizations has made it possible to identify not only the key factors that encourage organizations to change and become more agile but also the sector in which organizations are most agile and able to adapt to a rapidly changing environment. Despite the fact that model testing was performed based on high-growth Lithuanian organizations, it (model) is universal and can be used in different countries and markets.

Further research directions

In the next studies, it would be worth analysing the external factors determining the level of agility of organizations and suggesting a model that combines internal and external agility factors. In addition, it would be advisable to develop a methodology that would assess the influence of external factors on the level of organizations’ agility and offer an algorithm that would allow organizations to move to a higher level of agility, allowing them to adapt more quickly to socio-economic changes taking place in the market.

Dissemination of dissertation results:

Publications published in the reviewed scientific publications on the topic of the dissertation:

1. Deksnys, M. (2013). Lithuanian high-growth companies: Characteristics and dynamics. *XI International Scientific Conference "Management and Engineering '13": Conference Proceedings*. Volume II: June 23-26, 2013 Sozopol, Bulgaria, 2, 648-656.
2. Žitkienė R., Kazlauskienė E., Deksnys M., (2015). Dynamic capabilities for service innovation. *Managing sustainable growth MIC 2015: Conference Proceedings*. Portorož, Slovenia, November 2015
3. Deksnys, Mindaugas, & Žitkienė, Rima. (2016). Dynamic capabilities for strategic flexibility in retail firms. *Whither Our Economies - 2016: 5th International Scientific Conference*, October 20-21, 2016: Conference Proceedings, 5, 76-83.
4. Žitkienė R., Deksnys, M. (2018). Organizational Agility Conceptual Model. *Montenegrin Journal of Economics*. Vol. 14, No. 2 (2018), 115-129.
5. Žitkienė R., Deksnys, M. (2018). Organizational Agility Level Evaluation Model and Empirical Assessment in High-Growth Companies. *NORDSCI Conference on Social Sciences 2018*. Volume 1, Issue 2, 199 – 213.

The results of the dissertation research were also presented at scientific conferences:

1. Deksnys, M. (2013). Lithuanian high-growth companies: Characteristics and dynamics. *XI International Scientific Conference "Management and Engineering '13": Conference Proceedings*. Volume II: June 23-26, 2013 Sozopol, Bulgaria, 2, 648-656.
2. Žitkienė R., Kazlauskienė E., Deksnys M., (2015). Dynamic capabilities for service innovation. *Managing sustainable growth MIC 2015: Conference Proceedings*. Portorož, Slovenia, November 2015
3. Deksnys, Mindaugas, & Žitkienė, Rima. (2016). Dynamic capabilities for strategic flexibility in retail firms. *Whither Our Economies - 2016: 5th International Scientific Conference*, October 20-21, 2016: Conference Proceedings, 5, 76-83.
4. Žitkienė R., Deksnys, M. (2018). Organizational Agility Level Evaluation Model and Empirical Assessment in High-Growth Companies. *NORDSCI Conference on Social Sciences 2018*. Volume 1, Issue 2, 199 – 213.

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AUGANČIOSE ĮMONĖSE

Daktaro disertacijos santrauka
Socialiniai mokslai, vadyba (03 S)

Vilnius, 2018

Mokslo daktaro disertacija rengta 2013–2018 metais Mykolo Romerio universitete pagal Vytauto Didžiojo universitetui su Klaipėdos universitetu, Aleksandro Stulginskio universitetu, Mykolo Romerio universitetu ir Šiaulių universitetu Lietuvos Respublikos švietimo ir mokslo ministro 2011 m. birželio 8 d. įsakymu Nr. V-1019 suteiktą doktorantūros teisę.

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Daktaro disertacijos santrauka išsiųsta 2018 m. spalio 9 d.

Daktaro disertaciją galima peržiūrėti Lietuvos nacionalinėje Martyno Mažvydo bibliotekoje (Gedimino pr. 51, Vilnius) ir Aleksandro Stulginskio universiteto (Studentų g. 11, Akademija, Kauno raj.), Klaipėdos universiteto (K. Donelaičio a. 3, Klaipėda), Mykolo Romerio universiteto (Ateities g. 20, Vilnius), Šiaulių universiteto (Vytauto g. 84, Šiauliai), Vytauto Didžiojo universiteto (K. Donelaičio g. 52, Kaunas) bibliotekose.

IVADAS

Temos aktualumas. Organizacijos nuolat susiduria su pokyčiais. Globalizacija, sparti technologijų plėtra, konkurencija, neveiksmingi verslo modeliai, besiformuojančios naujos rinkos, nuolat besikeičiančios vartotojų preferencijos – tai kasdieniai iššūkiai daugeliui didelių ir mažų organizacijų. Kartu su labiau tradicine verslo ir ekonomikos gyvavimo ciklo rizika, šie, nuolat kintantys iššūkiai, įpareigoja organizacijas tapti judrias ir lankstesnes tam, kad išliktų rinkoje. Organizacinis judrumas tampa vis labiau svarbus, nes tai yra vienas pagrindinių įrankių konkurenciniam pranašumui įgyti ir išlaikyti sparčiai besikeičiančiose rinkose. Judrumas tampa viena pagrindinių organizacinių charakteristikų, kurios siekia verslo praktikai, norėdami išlaikyti prisitaikymo prie pokyčių gebėjimą ir konkurencingumą nestabilioje aplinkoje.

Dėl didėjančio e. verslo populiarumo net mažos įmonės geba konkuruoti globalioje rinkoje. Tai didina organizacijos judrumo poreikį tam, kad įmonė galėtų prisitaikyti ir konkuruoti ne tik vietinėje rinkoje. Norėdamos pasinaudoti globalizacijos suteikiamomis galimybėmis, įmonės verslo procesai turi būti veiksnūs ir judrūs. Taip pat įmonė turi turėti lanksčią organizacinę struktūrą, būti atvira darbuotojų kaitai, turėti judrius bendradarbiavimo tinklus bei partnerius ir lengvai pritaikyti savo veiklą prie naujų technologijų.

Prekių ir paslaugų pirkimo būdai taip pat keičiasi. Dabartinis informacijos gausos ir greičio amžius klientams suteikia naujas pasirinkimo galimybes, klientai tampa vis labiau informuoti. Prekių ir paslaugų apžvalgos, vartotojų įvertinimai yra lengvai prieinami. Gebėjimas greitai pasirinkti tinkamiausią tiekėją ir / ar partnerius suteikia naują prasmę rinkos konkurencingumui. Įmonėms, norinčioms išlikti konkurencingoms, reikia ne tik suteikti geriausią turimą prekę ar paslaugą, bet ir, dar svarbiau, galėti prisitaikyti prie besikeičiančių klientų poreikių. Dėl šios priežasties judrumas leidžia organizacijoms prisitaikyti prie besikeičiančios rinkos ir klientų lūkesčių ir yra svarbus organizacijai norinčiai išlikti rinkoje.

Siekdamos veiksmingai konkuruoti kintančioje rinkoje, organizacijos privalo aktyviai vykdyti savo veiklą ir numatyti pokyčius. Norėdamos to pasiekti, organizacinės struktūros turėtų įgyti didesnį judrumą per lankstumą ir atsaką. Praktikams reikia naujų organizacinių sprendimų, formų ir priemonių, kurie apimtų besikeičiančią aplinką ir užtikrintų naujas verslo plėtros galimybes. Sėkmingas prisitaikymas prie išorinių veiksnių reikalauja judrių organizacinių priemonių, gebėjimų ir veiklų. Siekiant kontroliuoti ir tobulinti judrumo lygį, organizacijoms reikia sugebėti jį išmatuoti ir nustatyti, kokie vidiniai organizaciniai veiksniai jam (judrumui) daro įtaką. Ši disertacija yra orientuota į šių veiksnių ištyrimą.

Organizacinis judrumas yra ypač svarbus greitai augančioms organizacijoms. Normalaus augimo organizacijos prisitaiko prie aplinkos pokyčių; prisitaikymas yra reakcija į aplinkos veiksnius (konkurenciją, technologinius pokyčius ir / ar vartotojų lūkesčius ir pan.). Jei aplinka yra statiška, organizacijai reikia mažiau judrumo. Tačiau greitai augančiose organizacijose pokyčiai ir greitas prisitaikymas yra būtini, o judrumas tampa dinamiška dimensija. Dažnai vedamos sėkmės, pardavimų kiekio padidėjimo, pelno ir joms tenkančios rinkos dalies tendencijomis, greitai augančios organizacijos patiria reikšmingus vidinius pokyčius. Todėl spartaus augimo metu organizacinis judrumas yra svarbus norint prisitaikyti prie vidaus ir išorės pokyčių. Taigi, greitai augančios organizacijos yra ypač tinkamas kontekstas siekiant iširti organizacinį judrumą.

Mokslininkai ir specialistai vis dar matuoja, identifikuoja ir vertina veiksnius, turinčius įtakos organizacijos judrumo lygiui nepastovioje aplinkoje. Ši disertacija skirta atsakyti į kai kuriuos iš šių klausimų.

Mokslinė problema ir temos ištyrimo lygis. Disertacija siekia išspręsti problemą – kokie veiksniai turi įtakos organizaciniam judrumui ir kaip išmatuoti greitai augančių organizacijų judrumo lygį. Tam, kad galima būtų atsakyti į disertacijoje iškeltą klausimą (problema), buvo analizuojama mokslinė literatūra problemos ištyrimo lygio nustatymui.

Daugelis mokslininkų tvirtina, kad organizacinis judrumas yra daugialypis ir sudėtingas veiksnys, visapusiškai analizuojamas tyrėjų. Viena mokslininkų grupių tiria judrumą iš priemonių ir galimybių, padedančių organizacijoms pasiekti judrumo, perspektyvos (Alberts & Hayes, 2003; Baškarada & Koronios, 2018; Bottani, 2010; Cai, 2013; Charbonnier-Voirin, 2011; Dyer & Shafer, 1998; Eshlaghy, Mashayekhi, Rajabzadeh, & Razavian, 2010; Felipe & Rold, 2017; Giachetti, Martinez, Sáenz, & Chen, 2003; Jackson & Johansson, 2003; C. T. Lin, Chiu, & Chu, 2006; Ren, Yusuf, & Burns, 2009; Sharifi & Zhang, 2001; Yusuf, Sarhadi, & Gunasekaran, 1999). Kita tyrėjų grupė nustato pagrindines veiklas, judrių organizacijų naudojamas savo kasdiniame darbe (Aburub, 2015; Carvalho, Sampaio, Reben-tisch, & Saraiva, 2017; Charbonnier-Voirin, 2011; Gehani, 2010; Goldman, Nagel, & Preiss, 1995; Sherehiy, Karwowski, & Layer, 2007; Vázquez-Bustelo, Avella, & Fernández, 2007). Trečiasis tyrėjų segmentas studijuoja judrumą per organizacijos sąveiką su besikeičiančia aplinka per pojūčio-reagavimo dimensijos prizmę (Dove, 2005; Dyer & Shafer, 2003; Holsapple & Li, 2008; Lu & Ramamurthy, 2011a; Marhraoui & Manouar, 2017; Nijssen & Pauwe, 2012; Popovič, Hackney, Tassabehji, & Castelli, 2018; Sambamurthy, Bharadwaj, & Grover, 2003; J. Singh & Sharma, 2013; Wright & Snell, 1998).

Dauguma ankstesnių tyrimų yra sutelkta tik į konkrečios pramonės organizacijas, ypač vykdančias veiklą gamybos sektoriuje. Mokslininkai, atliekantys šiuos tyrimus, analizuoja gamybos organizacijos veiksmus, orientuotus į judrumo lygio pakėlimą (Ganguly, Nilchiani, & Farr, 2009; Jackson & Johansson, 2003; Yang & Li, 2002; Yauch, 2011; Yusuf et al., 1999). Kiti vertina judrumą siaurame verslo proceso/ srities kontekste, pvz., tiekimo grandinės judrumas (Ren et al., 2009; Sharifi & Zhang, 2001; Van Hoek, 2001), žmogiškųjų išteklių judrumas (Breu, Hemingway, Strathern, & Bridger, 2002; Shafer, 1997), žinių valdymas ir IT pajėgumai (Kassim and Zain, 2004; Sarker and Sarker, 2009; Lu and Ramamurthy, 2011b; Cai, 2013; Singh, Oberoi and Ahuja, 2013), verslo procesai (Arteta & Giachetti, 2004), strateginis derinimas (Tallon & Pinsonneault, 2011), orientacija į rinką (Grewal & Tansuhaj, 2001). Lin et al., (2010) daugiausia dėmesio skiria judrumo savybėms organizacijų tinkluose.

Neseniai mokslininkai sutelkė dėmesį į IT, mokymosi ir inovacijų įtaką organizacijos judrumo lygiui ir jos veiklos rezultatams (Cegarra-Navarro, Soto-Acosta, & Wensley, 2016; Khoshlahn & Ardabili, 2016; Panda & Rath, 2018; Ravichandran, 2017, 2018). Nedaugelis tyrėjų analizuoja, kaip organizacinis judrumas veikia konkurencinį pranašumą (Côrte-Real, Oliveira, & Ruivo, 2017; Mikalef & Pateli, 2017). Taip pat yra tyrimų, kuriuose daugiausiai dėmesio skiriama atskiriems veiksniams ir jų įtakai organizaciniam judrumui. Pavyzdžiui, Panda ir Rath (2017), Mikalef ir Pateli (2017), Felipe ir kt. (2016 m.), Yeganegi ir Azar (2012 m.) tyrė kokią įtaką informacinių technologijų pajėgumai daro organizacijos judrumo lygiui. Jų empiriniai tyrimai rodo stiprią teigiamą koreliaciją tarp IT pajėgumų ir

judrumo lygio organizacijoje, t.y. kuo didesni IT pajėgumai organizacijoje, tuo ji (organizacija) yra judresnė.

Kitas mokslininkų dėmesio sulaukęs veiksnys yra žinių ir žmogiškųjų išteklių valdymas bei jo įtaka organizaciniam judrumui. Mokslininkai tvirtina, kad tarp žmogiškųjų išteklių valdymo veiksmų efektyvumo ir organizacinio judrumo lygis egzistuoja teigiamas ryšys (Teimouri, Jenab, Moazeni, & Bakhtiari, 2017). Mokymasis ir dalijimasis žiniomis taip pat teigiamai veikia organizacinio judrumo lygį (Bahrami, Kiani, Montazeralfaraj, Zadeh, & Zadeh, 2016). Iš tiesų, šiuolaikinėje greitai besikeičiančioje aplinkoje nuolatinis mokymasis ir inovacijos yra vieni svarbiausių veiksnių, užtikrinančių sėkmingą organizacijos veiklą. Tyrėjai taip pat sutinka, kad inovatyvios organizacijos yra judresnės lyginant su mažiau novatoriškais konkurentais (Ravichandran, 2017). Iš tikrųjų, be inovacijų, organizacijų augimo galimybės yra ribotos.

Organizacinio judrumo koncepcija taip pat yra aptariama daktaro disertacijose. Pavyzdžiui, Kharabe (2013) savo disertacijoje analizuoja įmonių sistemų poveikį organizaciniam judrumui. Autorius teigia, kad norint pasiekti aukštą organizacinio judrumo lygį naujovės yra būtinos. Kharabe (2013) įrodo, kad įmonių sistemų judrumas daro teigiamą įtaką bendram organizacinio judrumo lygiui. Smithwick (2016) savo daktaro disertacijoje analizuoja veiksnius, darančius įtaką statybos rangovo organizaciniam judrumui. Allwein (2017) disertacijoje pateikia judrumo teoriją, kuri yra organizacijos skaitmeninės infrastruktūros rezultatas. Organizacinis sparčiai augančių įmonių judrumo kontekstas Lietuvos autorių disertacijose nėra išsamiai išnagrinėtas, tačiau kelių autorių disertacijose analizuojamas svarbus judrumo galimybių elementas. Mickevičienė (2010) savo disertacijoje pateikia metodologiją, įvertinančią organizacijos gebėjimą konkuruoti naudojant vidinius ir išorinius organizacinius veiksnius. Masteik (2015) ištyrė organizacinių dinaminių gebėjimų įtaką tiekimo grandinei ir pateikė modelį, skirtą nustatyti dinaminius sugebėjimus ir jų įtaką tam tikroms tiekimo grandinės etapams. Paliokaitė (2013) analizuoja organizacinę ambidekstriją kaip organizacinį gebėjimą ir jo įtaką inovacijoms. Nedzinskas (2013) studijavo dinaminius gebėjimus ir organizacinę inerciją kintančioje aplinkoje.

Apibendrinant galima teigti, kad mokslinėje literatūroje organizacijos judrumas sulaukia didelio dėmesio. Taip pat nemažai dėmesio skiriama judrumo įtakai organizacijų veiklai apskritai ir judrumo įtakai organizacijos konkurenciniam pranašumui. Taip pat mokslininkai analizuoja pavienius veiksnius, skatinančius organizacijos judrumo lygio augimą. Tačiau pastebėta, kad trūksta sisteminio požiūrio į organizacijos judrumą ir nėra sukurtas bendras modelis, skirtas organizacijos judrumo skirtingose rinkose ir šalyse vertinimui. Taigi, organizacijų judrumo tema yra aktuali tiek teoriniu, tiek praktiniu požiūriu.

Tikslas, uždaviniai, objektas. Disertacijos tikslas – išskyrus pagrindinius veiksnius, darančius įtaką organizacijų judrumo lygiui, pasiūlyti teorinį organizacijų judrumo modelį ir juo remiantis išmatuoti judrumo lygį greitai augančiose organizacijose. Tikslui pasiekti yra iškelti tokie uždaviniai:

1. Remiantis mokslinės literatūros analize susisteminti organizacijos judrumo teorines koncepcijas.
2. Išskirti judrumo variklius, galimybes, priemones ir veiklas.
3. Sukurti teorinį greitai augančių organizacijų judrumo lygio vertinimo modelį.

4. Išanalizuoti organizacijų judrumo lygio vertinimo metodus ir pasiūlyti metodologiją jam (judrumui) išmatuoti.
 5. Naudojantis sukurtu modeliu, empiriškai patikrinti modelio taikymą ir įvertinti veiksnius, darančius įtaką greitai augančių organizacijų judrumo lygiui Lietuvoje.
- Tyrimo objektas – organizacijos judrumas.

Moksliniai tyrimo metodai: Mokslinės literatūros analizė ir sintezė, lyginimo ir apibendrinimo metodai buvo naudojami analizuojant organizacijų judrumo teorinius aspektus, formuojant organizacijų judrumo koncepciją, išskiriant veiksnius lemiančius organizacijų judrumo lygį. Sudarant organizacijos judrumo vertinimo modelį, buvo naudojami grafinio modeliavimo, anketinės apklausos metodai, ekspertinio vertinimo metodai. Tyrimo rezultatams analizuoti naudojami aprašomosios statistikos, faktorinės analizės, neraiškiųjų skaičių logikos metodai.

Tyrimo naujumas.

1. Išanalizavus ir įvertinus mokslininkų siūlomus organizacijos judrumo sąvokas, pateiktas organizacijos judrumo apibrėžimas. Pasiūlytas apibrėžimas daro organizacijos judrumo sąvoką konkretesnę ir labiau apčiuopiamą. Suformuotas apibrėžimas gali būti naudotinas mokslininkų atliekančių organizacijos judrumo tyrimus.
2. Pateikiamas organizacinio judrumo teorinis modelis, pagrįstas pojūčių ir atsako sistema. Disertacijos autorius siūlo holistinį požiūrį į organizacinio judrumo tyrimą ir sujungia įvairius organizacinio judrumo elementus (galimybes, priemones ir veiklas), kurie anksčiau buvo nagrinėjami atskirai, į vientisą teorinį modelį. Organizacinio judrumo teorinis modelis atveria galimybes studijuoti, vertinti ir palyginti įvairių pramonės šakų ir šalių organizacijų judrumo lygį.
3. Disertacijoje nustatyti ir susisteminti veiksniai, lemiantys organizacijos judrumą. Aptariamoms ir pateiktoms tiek individualūs veiksniai, tiek jų grupės. Organizaciniai judrumo varikliai, galimybės, priemonės ir veiklos yra suvienodinti, kad juos būtų galima taikyti įvairioms organizacijoms. Tai leidžia taikyti tą pačią metodiką ir kriterijus, tiriant organizacinį judrumą ir rezultatų palyginimą skirtingose organizacijose.
4. Neraiškiosios logikos metodologija yra naudojama vertinant judrumo lygį įmonėje. Tai yra tikslesnė priemonė, leidžianti mokslininkams įvertinti daugybės organizacijų judrumo lygį ir palyginti duomenis naudojant vieningą požiūrį.
5. Siūlomas vieningas klausimynas, skirtas įvertinti organizacinį judrumą greitai augančiose organizacijose. Tai gali būti taikoma ir bus naudinga būsimoms judrumo studijoms kitų šalių organizacijose arba skirtingose aplinkose.
6. Organizacinio judrumo lygio vertinimo modelis siūlomas ir empiriškai testuojamas atsižvelgiant į sparčiai augančias bendroves. Be to, apskaičiuojamas neraiškis judrumo indeksas ir iškeliamos bei patvirtinamos trys hipotezės. Tai padeda nustatyti svarbiausius veiksnius, skatinančius ir darančius įtaką organizacijos judrumo lygiui.

Taikomoji darbo reikšmė.

1. Siekiant patobulinti organizacijos judrumą, praktikai (verslo savininkai, vadovai, lyderiai ir kt.) turi sugebėti jį išmatuoti. Šioje disertacijoje pateikiamas judrumo matavimo modelis, pagrįstas neraiškiaja logika. Modelį galima taikyti organizacijų judrumui vertinti.

2. Apklaustos, pateiktos ir naudojamos empiriniame organizacinio judrumo įvertinime, gali būti naudojamos praktiniais tikslais vertinant judrumo lygį įmonėje.
3. Šioje disertacijoje išskiriami pagrindiniai vidaus veiksniai, padedantys tobulinti organizacinio judrumo lygį. Tai, savo ruožtu, padės veiksmingai sutelkti dėmesį į organizacijos judrumo lygio didinimą.
4. Šioje disertacijoje atliktų greitai augančių organizacijų judrumo veiksnių analizė suteiks įžvalgų apie sėkmingų ir judrių organizacijų veiklą, galimybes ir savybes.

Tyrimo apribojimai.

1. Šioje disertacijoje vykdomi organizacinio judrumo tyrimai apsiribojo greito augimo organizacijų kontekstu Lietuvoje. Skirtumai tarp šalių gali kilti dėl juridinių skirtumų, įmonių rezultatų statistikos, įmonių klasifikavimo, patikimų duomenų prieinamumo ar kitų šalių skirtumų. Norint išbandyti modelio taikymą kitose šalyse, tyrėjas turi atlikti analizę tiriamojoje šalyje.
2. Kai kurios konkrečių pramonės šakų organizacijos gali turėti unikalių savybių, kurios yra itin svarbios organizaciniam judrumui konkrečioje įmonėje. Šioje disertacijoje pateiktame modelyje bandoma suvienodinti judrumo lygio vertinimą ir naudoti apibendrintus veiksnius, kurie atitiktų daugumos organizacijų veiklą. Tačiau šiuose nišiniuose ekonomikos sektoriuose gali būti atsižvelgiama ne į visus požymius. Todėl mokslininkai turėtų nustatyti veiksnius ir požymius, kurie gali būti unikalus jų organizacijoje, ir juos taikyti vertinant organizacinio judrumo lygį.
3. Organizacijos judrumas yra sudėtinga sąvoka, todėl dėl ekonominės ir politinės šalies situacijos pokyčių gali pasikeisti veiksniai, skatinantys judrumą. Dėl šios priežasties disertacijoje siūlomo judrumo lygio matavimo modelis turėtų būti periodiškai peržiūrimas ir patikrintas.

Disertacijos struktūra. Šią disertaciją sudaro įvadas, trys skyriai (teorija, metodologija ir empiriniai duomenys), išvados, literatūros sąrašas ir priedai. Pirmoje disertacijos dalyje nagrinėta judrumo koncepcija bei susisteminti mokslininkų požiūriai į šį reiškinį. Antroje disertacijos dalyje pristatoma tyrimo metodologija. Tyrimo metodologija parengta remiantis moksline literatūra, skirta organizacijų judrumui tirti. Empirinėje (trečioje) disertacijos dalyje pristatomas atliktas tyrimas, pateikiami apdoroti bei interpretuoti jo (tyrimo) rezultatai.

1. ORGANIZACIJŲ JUDRUMO TEORINIAI ASPEKTAI

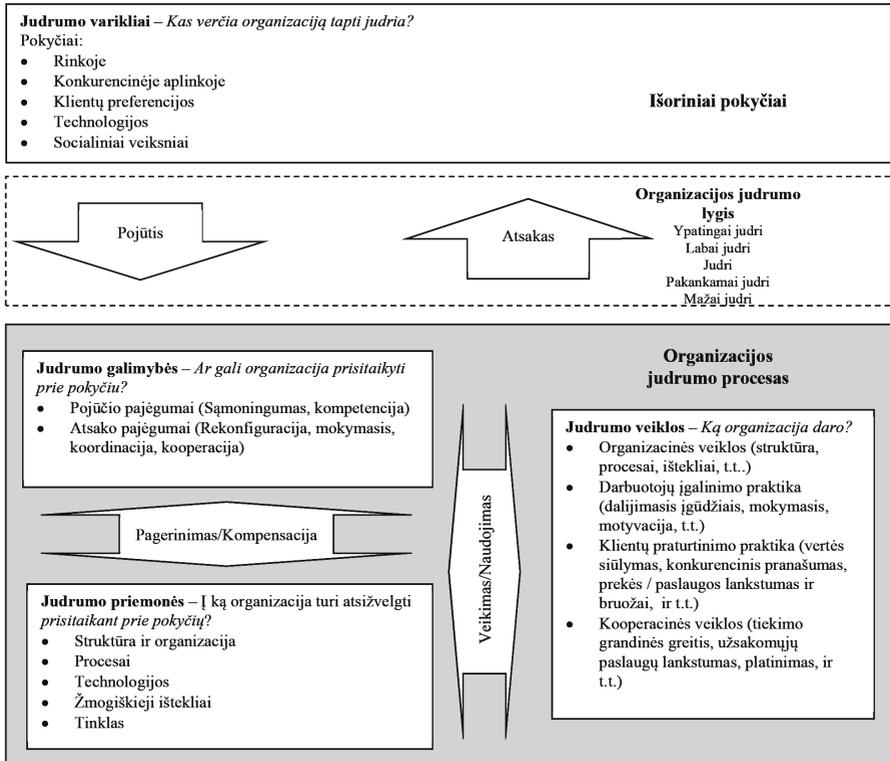
Pirmojoje disertacijos dalyje yra atlikta išsami mokslinių šaltinių analizė, kurioje pastebėta, kad diskusija apie organizacinį judrumą yra labai fragmentuota. Mokslinė literatūra atskleidžia, kad net pats terminas „judrumas“ vartojamas kaip termino „lankstumas“ sinonimas, o tai tik apsunkina tikslines organizacinio judrumo koncepcijos studijas. Šios disertacijos autorius aptaria šių dviejų sąvokų skirtumus ir siūlo juos (skirtumus) atskirti pagal sritis, situacijos ypatybes, atsakymų dažnį, rezultatus ir pokyčių tipą.

Nesutarimai mokslinėje literatūroje tęsiasi bandant apibrėžti organizacinį judrumą. Daugelis autorių žiūri į judrumo koncepciją iš skirtingų pusių, struktūrų ir kontekstų. Naudojami siauri apibrėžimai, kurie taikomi konkrečioms pramonės sritims (pvz., gamybai), funkicinei sričiai (pvz., tiekimo grandinei) arba atsižvelgiama tik į ribotus vidinius ar

išorinius veiksmus (pvz., darbuotojų įgūdžius). Literatūros analizė parodo, kad reikalingas vieningas organizacinio judrumo apibrėžimas, kuris gali būti taikomas plačiam organizacijų kontekstui, nepriklausomai nuo pramonės ar verslo profilio. Šios disertacijos autorius siūlo apibendrintą organizacinio judrumo apibrėžimą ir judrumą apibrėžia kaip organizacinę gebėjimą atpažinti netikėtus aplinkos pokyčius ir greitai, efektyviai bei tinkamai į juos reaguoti, panaudojant ir pertvarkant vidaus resursus, tokiu būdu įgyjant konkurencinį pranašumą šiame procese.

Tolesnė organizacinio judrumo tyrimų literatūros analizė atskleidžia pagrindines mokslo bendruomenės kryptis ir požūrius į organizacinio judrumo koncepciją. Šios disertacijos autorius susistemina šias kryptis į tris pagrindines struktūras: galimybių struktūrą, pajutimo-atsako struktūrą ir praktikų struktūrą. Dauguma organizacinio judrumo tyrimų yra pagrįsti viena ar kita struktūra. Šios disertacijos autorius siūlo suderinti kai kurias sąvokas ir studijuoti organizacinį judrumą pagal pajutimo-atsako struktūrą, naudojant organizacinės judrumo galimybes, ir praktikas kaip struktūrinius elementus.

Disertacijos autorius užbaigia literatūros apžvalgos skyrių, pristatydamas teorinį organizacinio judrumo modelį, pagrįstą pajutimo-atsako struktūra (žr. 1 pav.).



1 pav. Organizacijų judrumo matavimo teorinis modelis
 Šaltinis: sudaryta autoriaus

Teorinis organizacinio judrumo modelis gali būti naudojamas kaip proceso planas arba sprendimų priėmimo proceso algoritmas. Organizacinis prisitaikymas prasideda nuo aplinkos pokyčių per judrumo variklius. Vėliau, kai pokyčiai yra atpažinti ir įvertinti, sprendimus priimančias asmenys turėtų įvertinti esamą organizacijos padėtį, atsakydami į klausimus: „kokius išteklius turime atsakymui į aplinkos pokyčius?“ ir „ar mes turime būtinus gebėjimus reikalingus šių išteklių panaudojimui ir prisitaikymui prie pokyčių?“. Atsakius į šiuos klausimus, organizacijos sprendimus priimančias asmenys turėtų atsižvelgti į aplinkos variklius, pasinaudodami šiomis priemonėmis ir galimybėmis. Atsakymą atspindi veiksmai ar praktika, dėl kurio atsiranda rezultatas, pvz., naujos prekės / paslaugos kūrimas arba procedūrų pasikeitimas. Šis prisitaikymo prie aplinkos pokyčių procesas dar labiau padidina organizacinį judrumą dėl dalijimosi patirtimi. Kadangi verslo aplinka nuolat keičiasi, judri organizacija taip pat nuolat taiko savo galimybes, priemones ir veiklas prisitaikydama prie šių pokyčių. Judrumo lygis parodo, kaip efektyviai ir greitai organizacija reaguoja į išorinius pokyčius, grėsmes ir galimybes. Judrios organizacijos prisitaikys ir pasinaudos rinkos pokyčius efektyviau, lyginant su mažiau judriais konkurentais, kurie turi žemesnį gebėjimą prisitaikyti prie aplinkos.

2. ORGANIZACIJŲ JUDRUMO VERTINIMO METODOLOGIJA

Antroje disertacijos dalyje pasiūlyta organizacijų judrumo matavimo metodologija. Metodologinėje darbo dalyje yra išanalizuoti metodai skirti organizacijų judrumo lygio nustatymui ir remiantis atlikta analize suformuota metodologija organizacijų judrumo matavimui. Pirma, yra išskirti organizacijos judrumo varikliai, kurie yra: judrumo galimybės ir veiklos. Antra, yra identifikuotas judrumo atributų poreikis ir nustatomi jų vertinimo rėmai. Trečia, yra nustatomas judrumo lygis svorių priskyrimui naudojant neraiškiuosius skaičius.

Organizacijų judrumo matavimui buvo iškeltos trys hipotezės.

H₁: Daugumos greitai augančių organizacijų judrumo lygis yra „labai judri“.

Pirmosios hipotezės (H₁) bandymui taikoma klasterinė analizė. Klasterinė analizė reiškia duomenų grupavimą taip, kad vienarūšiai duomenys būtų įtraukti į grupę (grupę). Klasterinė analizė yra taikoma norint klasifikuoti prieinamus duomenis į keletą grupių taip, kad kiekvienos grupės elementai pasižymėtų panašiomis savybėmis. Šiame darbe klasterinė analizė naudojama tam, kad būtų galima suskirstyti nagrinėjamas įmones į grupes pagal jų judrumo lygį. Norint atlikti klasterinę analizę, naudojami keli metodai:

- Euklido atstumo metodas;
- K-vidurkio metodas;
- Dviejų žingsnių metodas.

H₂: Įmonės, dirbančios variklinių transporto priemonių ir motociklų didmeninės ir mažmeninės prekybos bei remonto pramonėje, yra judresnės nei įmonės, vykdančios savo veiklą statybų, gamybos ir transporto sektoriuose.

Pirmosios hipotezės (H₁) testavimui sudaryti klasteriai naudojami antrosios hipotezės (H₂) testavimui. H₂ hipotezės testavimui naudojamas SPSS stulpelių proporcijų palyginimo metodas.

H₃: Organizacijos judrumo lygiui įtakos turi šie judrumo realizavimo veiksniai, galimybės ir veiklos: tinklų kūrimas ir produktų kūrimas, žmogiškieji ištekliai, organizacinis supratimas ir kompetencija, išteklių ir procesų lankstumas, organizacinė struktūra.

Siekiant patikrinti trečią hipotezę (H₃) buvo taikoma faktorinė analizė. Faktorinė analizė yra plačiai naudojama socialiniuose moksluose. Faktorinę analizę galima apibūdinti kaip statistinių metodų sumą, kurios tikslas – pakeisti populiaciją požymių, apibūdinančių stebimus fenomenus, į keletą veiksnių (Šimanskienė & Paužuolienė, 2012). Kitaip tariant, faktorinė analizė padeda supaprastinti kompleksinių duomenų rinkinius. Tyrimų duomenų apdorojimo srityje tyrėjai, tyrinėjantys organizacijų judrumą, taiko tiriamąją faktorinę analizę (TFA) (Panda & Rath, 2016; Wendler, 2014, 2016).

Duomenims gauti buvo atlikta Lietuvos greitai augančių organizacijų vadovų apklausa.

3. EMPIRINIS ORGANIZACIJŲ JUDRUMO VERTINIMAS

Trečioje disertacijos dalyje atliktas organizacijų judrumo tyrimas, kurio tikslas – patikrinti antroje disertacijos dalyje iškeltas hipotezes.

Empirinis organizacinio judrumo tyrimas buvo atliktas 2016 m. Rugsėji. Aukšto augimo Lietuvos įmonių sąrašas buvo gautas iš verslo dienraščio „Verslo Žinios“ analitikos departamento įgyvendinto projekto „Gazelės“ („Verslo Žinios“, 2016 m.)

3576 įmonių buvo atrinktos iš „Gazelės“ sąrašo remiantis žemiau nurodytais kriterijais:

- a) Verslo operacijos pradėtos ne vėliau kaip 2011 m. sausio 1 d.;
- b) Bet kokia nuosavybės struktūra;
- c) Pajamos per pirmuosius ataskaitinius metus (2011 m.) siekė nuo 300 000 iki 1 000 000 EUR;
- d) Paskutiniai atskaitingieji metai (2014 m.) buvo pelningi;
- e) Pajamos išaugo daugiau nei 20% (2014 m., palyginus su 2011 m.);
- f) Skaidrumas ir atvirumas, kuriuos atspindi sutikimas pavišinti įmonių finansinius rezultatus ir su mokesčiais susijusių įsipareigojimų nebuvimas.
- g) Įmonė buvo toje pačioje pramonės šakoje visą ataskaitinį laikotarpį (2011-2014 m.).
- h) Įmonė pateikė galiojančią kontaktinę informaciją ir direktoriaus vardą.

Siekiant patvirtinti hipotezes, visos nagrinėjamos įmonės buvo sugrupuotos pagal pramonės šakas:

- žemės ūkis, miškininkystė ir žvejyba;
- statybos;
- finansinė ir draudimo veikla;
- žmonių sveikatos ir socialinio darbo veikla;
- gamyba;
- profesinė, mokslinė ir techninė veikla;
- nekilnojamojo turto veikla;
- transportavimas ir sandėliavimas;
- didmeninė ir mažmeninė prekyba; variklinių transporto priemonių ir motociklų remontas.

Tačiau yra sektorių, kuriuose yra nedaug įmonių, todėl analizuoti šiuos sektorius nėra tikslinga, kadangi gauti rezultatai neatspindės visos populiacijos. Todėl toliau analizuojamos keturios pramonės šakos, būtent

- statybos;
- gamyba;
- transportavimas ir sandėliavimas;
- didmeninė ir mažmeninė prekyba; variklinių transporto priemonių ir motociklų remontas.

Duomenų analizė rodo, kad kiekvienoje nagrinėjamoje pramonės šakoje dauguma įmonių yra labai judrios (patenka į antrąjį klasterį). Tai galima paaiškinti tuo, kad augančios įmonės augimo laikotarpiu susidūrė su dideliais pokyčiais išorinėje aplinkoje. Be to, reikėtų atsižvelgti į tai, kad sėkmingų įmonių vadovai linkę vertinti savo organizacijas ir jų gebėjimą prisitaikyti palankiau nei jų mažiau sėkmingi kolegos. Tai gali paaiškinti „Lėto“ ir „Pakankamo“ judrumo lygio stygių keturiuose pramonės šakose tirtose organizacijose. Kita vertus, „Labai judrus“ judrumo lygio klasterį sudaro mažiausias įmonių skaičius. Taigi, išanalizavus tyrimo rezultatus, galima tvirtinti, kad pirma hipotezė pasitvirtino. Taigi, galima teigti, kad dauguma sparčiai augančių organizacijų yra judrios arba labai judrios.

Be to, tyrimo rezultatai parodė, kad iš keturių analizuojamų sričių (variklinių transporto priemonių ir motociklų didmeninės ir mažmeninės prekybos bei remonto pramonės, statybos, gamybos ir transporto sričių) labiausiai judrios yra organizacijos, vykdančios savo veiklą variklinių transporto priemonių ir motociklų didmeninės ir mažmeninės prekybos bei remonto pramonėje. Tiesą sakant, palyginus visas keturias nagrinėjamas pramonės šakas iš verslo perspektyvos, „didmeninė ir mažmeninė prekyba; variklinių transporto priemonių ir motociklų remonto“ pramonės turi didžiausią sezoniskumą. Klientų pageidavimai yra dinamiškiausi ir priklauso nuo daugelio išorinių veiksnių. Statybos, gamyba, transportavimas ir sandėliavimas - visi kiti sektoriai dėl verslo pobūdžio yra lėtesni prisitaikant prie kintančios aplinkos. Taigi, gauti rezultatai parodė, kad antra hipotezė pasitvirtino.

Toliau buvo tiriama, kokie veiksniai daro įtaką organizacijos judrumo lygiui.

Atlikus tyrimą, paaiškėjo, kad tinklaveika ir produktų kūrimas, žmogiškieji išteklių, organizacinis sąmoningumas ir kompetencija, išteklių ir procesų lankstumas bei organizacinė struktūra daro įtaką organizacijos judrumo lygiui. Organizacinė struktūra yra labai svarbi ir daug apimantis veiksnys organizaciniam judrumui. Be lanksčios ir pritaikomos organizacinės struktūros įmonės negalės veiksmingai koordinuoti pokyčių. Išteklių ir procesų lankstumas yra tarpusavyje priklausomas nuo organizacinės struktūros ir abu veiksniai daro įtaką organizaciniam judrumo lygiui. Organizacinės struktūros įtaka įmonės judrumo lygiui nebus efektyvi be lanksčių ir judrių išteklių ir procesų. Organizacinis sąmoningumas ir kompetencija taip pat yra svarbus organizacinio judrumo lygio veiksnys ir nurodo įmonės gebėjimą pasterbėti rinkos pokyčius, konkurenciją, vartotojų pageidavimus. Žmogiškieji išteklių yra labai svarbus įmonės lankstumo veiksnys. Organizacinis sąmoningumas, kompetencija, gebėjimas koordinuoti, kontroliuoti ir tiesiogiai keisti - viskas remiasi žmogiškaisiais išteklių, jų patirtimi ir kvalifikacija. Dėl savo išorinės dimensijos tinklaveika ir produktų kūrimas yra svarbūs organizacijos judrumo lygiui. Daugelis įmonių priklauso nuo jų aplinkos, tinklo, partnerių, tiekėjų, platintojų. Taigi, teigiama, kad trečia hipotezė pasitvirtino.

IŠVADOS

Disertacijoje atlikta mokslinės literatūros analizė parodė, kad organizacijų judrumo vertinimas ir jo lygio nustatymas yra aktuali problema nagrinėjama skirtingų mokslininkų. Organizacijų judrumo lygis yra sunkiai išmatuojamas kintamasis ir iki šiol nėra pasiūlyta vieningos metodologijos, sprendžiančios šią užduotį. Disertacijoje analizuotas Lietuvos greitai augančių organizacijų judrumo lygis ir padarytos tokios išvados:

1. Mokslinėje literatūroje aptinkama skirtingų organizacijos judrumo apibrėžimų. Mokslininkai sutinka, kad organizacijos judrumas yra daugiadimensė sąvoka, reikalaujanti koncentruotis į šalį, rinką bei pramonės šaką, kurioje veikia organizacija. Tačiau, išanalizavus mokslinę literatūrą ir apibendrinus skirtingų mokslininkų požiūrius į organizacijos judrumą, šioje disertacijoje siūlomas bendras judrumo apibrėžimas taikytinas organizacijoms, vykdančioms veiklą įvairiose šalyse, rinkose ir pramonės šakose. Šioje disertacijoje organizacijos judrumas apibrėžiamas kaip organizacijos gebėjimas atpažinti netikėtus aplinkos pokyčius ir tinkamai, greitai bei efektyviai sureaguoti į juos, naudojant ir konfigūruojant vidinius išteklius, tokiu būdu įgyjant konkurencinį pranašumą. Pasiūlytas apibrėžimas padėjo sumažinti organizacijos judrumo sąvokos neapibrėžtumo problemą. Be to, pateiktas apibrėžimas prisideda prie organizacijų judrumo teorijos, tai padės padaryti pažangą moksliniuose organizacijų judrumo tyrimuose įvairiose pasaulio šalyse.
2. Norint išnagrinėti, kas daro įtaką organizacijos judrumo lygiui, svarbu išskirti jį (judrumą) skatinančius veiksnius bei priežastis lemiančias organizacijų kėtinimą keistis. Remiantis mokslinės literatūros analize buvo išskirti judrumą skatinantys veiksniai. Be to, veiksniai buvo sugrupuoti į keturias pagrindines grupes:
 - a) Judrumo varikliai – tai veiksniai skatinantys organizaciją išlikti judria. Šie veiksniai yra tokie: pokyčiai rinkoje, pokyčiai konkurencinėje aplinkoje, klientų pageidavimų pokyčiai, technologiniai pokyčiai, socio-ekonominiai pokyčiai.
 - b) Judrumo realizavimo veiksniai – tai organizacijos turimi ištekliai, padedantis jai (organizacijai) prisitaikyti prie pokyčių ir būti judria. Šie veiksniai yra tokie: organizacinė struktūra, procesai vykstantys organizacijoje, technologijos, žmogiškieji ištekliai, tinklaveika.
 - c) Judrumo pajėgumai – tai organizacijos gebėjimai identifikuoti išorinius pokyčius ir remiantis tuo atitinkamai vykdyti / keisti savo veiklą. Išskiriamos tokios judrumo pajėgumai: išorinių pokyčių identifikavimo galimybės ir reagavimo į pokyčius galimybės.
 - d) Judrumo veiklos – tai veiksmai, kuriuos atlieka judri organizacija prieš pokyčių periodą ir jo metu. Išskiriamos tokios judrumo veiklos: organizacinės veiklos, darbuotojų motyvavimo veiklos, klientų praturtinimo veiklos ir bendradarbiavimo su verslo partneriais veiklos.
3. Disertacijoje buvo sukurtas organizacijų judrumo vertinimo modelis. Modelis apjungia keturias judrumo grupes, minėtas aukščiau. Apibendrinus mokslinę literatūrą, modelyje buvo išskirti išoriniai veiksniai, priverčiantys organizaciją keistis. Taip pat modelyje plačiai pristatyti vidiniai organizacijos veiksniai, skatinantys ją

(organizaciją) tapti judria. Kitaip tariant, modelyje pristatyti procesai, kuriuos gali vykdyti organizacija norinti pasiekti tam tikrą judrumo lygį. Be to, analizuojant teorinį modelį buvo išskirtos gamybos sritys, kurių organizacijų pagrindu testuojamas disertacijoje pasiūlytas teorinis modelis. Kaip jau buvo minėta, disertacija yra orientuota į vidinių veiksmų analizę, todėl šie veiksniai modelyje pristatyti plačiau. Duotasis modelis yra koncentruotas į realizavimo veiksmus, pajėgumus, praktikas, kurias turi greitai augančios judrios organizacijos. Išorinius veiksmus ir sunkumus sunku paveikti, tačiau vidaus veiksmus galima pagerinti ir koreguoti. Todėl svarbu iširti, kokie vidiniai veiksniai veikia greitą organizacijos gebėjimus, siekiant greičiau ir efektyviau prisitaikyti prie išorinių pokyčių. Organizacijos judrumo vertinimo modelis yra naudingas praktikams, analizuojantiems jų organizacijų judrumo lygį pagal vidaus veiksmus.

4. Teorinio modelio testavimui buvo iškeltos trys hipotezės:

H_1 : Daugumos greitai augančių organizacijų judrumo lygis yra „labai judri“.

H_2 : Įmonės, dirbančios variklinių transporto priemonių ir motociklų didmeninės ir mažmeninės prekybos bei remonto pramonėje, yra judresnės nei įmonės, vykdančios savo veiklą statybų, gamybos ir transporto sektoriuose.

H_3 : Organizacijos judrumo lygiui įtakos turi šie judrumo realizavimo veiksniai, galimybės ir veiklos: tinklų kūrimas ir produktų kūrimas, žmogiškieji išteklių, organizacinis supratimas ir kompetencija, išteklių ir procesų lankstumas, organizacinė struktūra.

Hipotezių testavimas yra paremtas apklausa, kurios respondentai – greitai augančių Lietuvos organizacijų vadovai. Apklauskos metu respondentams buvo pasiūlyta įvertinti organizacijos judrumo veiksmus, išskirtus mokslinės literatūros analizės metu. Respondentai turėjo įvertinti dvidešimt teiginių ir atsakyti į du klausimus, priskirtus kiekvienam teiginiui. Pirmas klausimas buvo „Kiek pateiktas teiginys svarbus organizacijos judrumui“, antras – „Kaip įvertintumėte organizacijos, kurioje dirbate, judrumo lygį“. Respondentų atsakymų vertinimui buvo naudojami tokie metodai:

- Siekiant sumažinti atsakymų netikslumą ir neapibrėžtumą, buvo pasirinktas trikampių neraiškųjų skaičių metodas.
- Neraiškūs judrumo indeksas buvo naudojamas kiekvienos tiriamos įmonės judrumo lygiui matuoti.
- Klasterinė analizė buvo naudojamas grupuojant tiriamas įmones ir tęsiant kiekvieno klasterio analizę atskirai.
- Faktorinė analizė buvo naudojama tam, kad kiekvienam identifikuotam judrumo veiksmui būtų priskirtas tam tikras požymis.

5. Empirinio tyrimo rezultatai parodė, kad visos greitai augančios organizacijos, dalyvavusios apklausoje, laiko save judriomis, labai judriomis arba ypač judriomis. Tai gali būti paaiškinama tuo, kad tiriamos organizacijos buvo paimtos iš „Gazelė“ sąrašo, kuriame skelbiamos sėkmingiausios Lietuvos įmonės pagal pajamų augimą.

Pirmos hipotezės „Daugumos greitai augančių organizacijų judrumo lygis yra „labai judri“ testavimui buvo atlikta organizacijų klasterinė analizė. Klasterinei analizei atlikti buvo naudojami trys metodai: Euklido atstumas, K-vidurkių metodas, dviejų žingsnių metodas. Tyrimo rezultatai parodė, kad analizuojamas organizacijas galima sujungti į tris klasterius,

t.y. „judrios organizacijos“, „labai judrios organizacijos“, „ypač judrios organizacijos“. Be to, dauguma organizacijų patenka į antrą klasterį – labai judrios organizacijos. Taigi, galima teigti, kad dauguma greitai augančių organizacijų yra labai judrios ir pirma hipotezė (H_1) pasitvirtino.

Klasterinės analizės metu sudaryti klasteriai buvo panaudoti antros hipotezės testavimui. Hipotezės tikrinimas buvo atliekamas naudojant stulpelių proporcijų lyginimo metodą. Įmonių, dirbančių skirtingose srityse analizė parodė, kad įmonės dirbančios variklinių transporto priemonių ir motociklų didmeninės ir mažmeninės prekybos bei remonto sektoriuje yra judriausios. Taigi, tvirtinama, kad antra hipotezė (H_2) pasitvirtino.

Trečios hipotezės tikrinimui buvo naudojama faktorinė analizė. Remiantis faktorinės analizės rezultatais teigiama, kad kuo judresnė yra organizacija, tuo labiau aktualūs jai yra šie veiksniai: tinklaveika ir produktų plėtra, žmogiškieji išteklių, organizacinis informuotumas ir kompetencija, išteklių ir procesų lankstumas, organizacinė struktūra. Taigi, galima tvirtinti, kad trečia hipotezė (H_3) pasitvirtino.

Apibendrinant empirinio tyrimo rezultatus galima teigti, kad pasiūlytas greitai augančių organizacijų judrumo lygio vertinimo modelis leido nustatyti ne tik svarbiausius veiksnius, skatinančius organizaciją keistis ir tapti labiau judria, bet ir sektorių, kuriame veikiančios organizacijos yra labiausiai judrios ir gebančios prisitaikyti prie greitai besikeičiančios aplinkos. Nežiūrint į tai, kad modelio testavimas buvo atliktas Lietuvos greitai augančių organizacijų pagrindu, jis (modelis) yra universalus ir gali būti naudojamas skirtingose šalyse ir rinkose.

Tolesnių tyrimų kryptys

Tolesniuose tyrimuose vertėtų išnagrinėti išorinius veiksnius, lemiančius organizacijų judrumo lygį ir pasiūlyti modelį, apjungiantį vidinius ir išorinius judrumo veiksnius. Be to, būtų tikslinga parengti metodologiją, kuri leistų įvertinti išorinių veiksnių įtaką organizacijų judrumo lygiui bei pasiūlyti algoritmą, leisiantį organizacijoms pereiti prie aukštesnio judrumo lygio, kas leistų greičiau prisitaikyti prie socialinių-ekonominių pokyčių vykstančių rinkoje.

Publikacijos recenzuojamuose leidiniuose:

1. Deksnys, M. (2013). Lithuanian high-growth companies: Characteristics and dynamics. *XI International Scientific Conference "Management and Engineering '13": Conference Proceedings*. Volume II: June 23-26, 2013 Sozopol, Bulgaria, 2, 648-656.
2. Žitkienė R., Kazlauskienė E., Deksnys M., (2015). Dynamic capabilities for service innovation. *Managing sustainable growth MIC 2015: Conference Proceedings*. Portorož, Slovenia, November 2015
3. Deksnys, Mindaugas, & Žitkienė, Rima. (2016). Dynamic capabilities for strategic flexibility in retail firms. *Whither Our Economies - 2016: 5th International Scientific Conference*, October 20-21, 2016: Conference Proceedings, 5, 76-83.
4. Žitkienė R., Deksnys, M. (2018). Organizational Agility Conceptual Model. *Montenegrin Journal of Economics*. Vol. 14, No. 2 (2018), 115-129.
5. Žitkienė R., Deksnys, M. (2018). Organizational Agility Level Evaluation Model and Empirical Assessment in High-Growth Companies. *NORDSCI Conference on Social Sciences 2018*. Volume 1, Issue 2, 199 – 213.

Pranešimai mokslinėse konferencijose:

1. Deksnys, M. (2013). Lithuanian high-growth companies: Characteristics and dynamics. *XI International Scientific Conference "Management and Engineering '13": Conference Proceedings*. Volume II: June 23-26, 2013 Sozopol, Bulgaria, 2, 648-656.
2. Žitkienė R., Kazlauskienė E., Deksnys M., (2015). Dynamic capabilities for service innovation. *Managing sustainable growth MIC 2015: Conference Proceedings*. Portorož, Slovenia, November 2015
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4. Žitkienė R., Deksnys, M. (2018). Organizational Agility Level Evaluation Model and Empirical Assessment in High-Growth Companies. *NORDSCI Conference on Social Sciences 2018*. Volume 1, Issue 2, 199 – 213.

GYVENIMO APRAŠYMAS

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Gimimo data 1978.06.26

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ORGANIZATIONAL AGILITY IN HIGH GROWTH COMPANIES: daktaro disertacija. – Vilnius: Mykolo Romerio universitetas, 2018. 240 p.

Bibliogr. 104-113 p.

ISBN 978-9955-19-924-3 (internete)

ISBN 978-9955-19-925-0 (spausdintinis)

Disertacijoje išspręsta iškelta tyrimo problema – nustatyta, kokie veiksniai daro įtaką organizacijų judrumo lygiui ir kaip išmatuoti greitai augančių organizacijų judrumo lygį. Pirmoje disertacijos dalyje atlikta mokslinės literatūros analizė, išnagrinėtos teorinės organizacijų judrumo koncepcijos, pasiūlytas organizacijų judrumo matavimo teorinis modelis. Antroje disertacijos dalyje iškeltos trys hipotezės ir pasiūlyta metodologija jų testavimui. Trečioje disertacijos dalyje naudojantis pasiūlyta metodologija atliktas iškeltų hipotezių testavimas ir, remiantis atliktais skaičiavimais, padaryta išvada, kad visos trys hipotezės pasitvirtino. Disertaciją užbaigia išvados ir tolesnių tyrimų kryptys, literatūros sąrašas, priedai.

The dissertation has solved the raised research problem – the factors influencing the level of an organization's agility have been identified and it has been determined how to evaluate the level of agility in high-growth companies. The first part of the dissertation carries out the analysis of the scientific literature, examines theoretical concepts of companies' agility, and a companies' agility level evaluation model is proposed. The second part raises three hypotheses and offers the methodology to test them. The third part of the dissertation tests the three hypotheses using the proposed methodology and, based on the calculations carried out, it is concluded that all three hypotheses were verified. The dissertation is finalised with conclusions as well as the directions for further research, reference and appendix.

Mindaugas Deksnys
ORGANIZATIONAL AGILITY IN HIGH GROWTH COMPANIES

Daktaro disertacija
Socialiniai mokslai, vadyba (03 S)

ISBN 978-9955-19-924-3 (internete)
ISBN 978-9955-19-925-0 (spausdintas)

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Tiražas 20 egz. Užsakymo Nr. 19399

Parengė spaudai UAB „Baltic Printing House“
Svajonės g. 40, LT-94101, Klaipėda
www.balticprinting.com

Spausdino UAB „Baltijos kopija“
Kareivių g. 13B, Vilnius
www.kopija.lt
El. paštas info@kopija.lt

ISBN 978-9955-19-924-3

