



**HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE
SCIENCES**

**INVESTIGATION OF THE ADAPTABILITY AND CHANGE
CAPABILITIES OF HUNGARIAN MICRO AND SMALL
ENTERPRISES FROM THE PERSPECTIVE OF INNOVATION**

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DOCTORAL (PhD) THESES

JÁNOS BUJÁKI

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Name of the doctoral school: Doctoral School of Economic and Regional Sciences

Discipline of the doctoral school: Management and organizational sciences

Head of doctoral school: **Prof. Dr. Zoltán Bujdosó**
professor
Hungarian University of Agriculture and Life Sciences
Doctoral School of Economic and Regional Sciences

Supervisor: **Dr. Sergey Vinogradov**
associate professor
Budapest Metropolitan University
Institute of Methodology and Foreign Languages

.....
Approval of the school leader

.....
Approval of the supervisor

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1. HISTORY OF WORK, OBJECTIVES

In developed economies, micro, small and medium-sized enterprises account for more than 99% of all profit-making economic actors (Edwards et al., 2005). By employing 55% of non-public employees, and accounting for 51% of companies' sales revenue, they are a key driver of economies. Micro, small and medium-sized enterprises account for almost 99% of private enterprises in the UK, which together contribute significantly to the country's economic performance (Hamdan & Alheet, 2020, Ajaz Khan et al., 2019; Michaelidou et al., 2011; Ortega-Argilés et al., 2014; Phuangrod et al., 2017; SBS, 2001; Skowron-Grabowska, 2023). This is no different in Hungary: based on the definition currently applied in Hungary, micro, small and medium-sized enterprises together account for more than 99.8% of all Hungarian enterprises. The roleplayers in the three size categories are now very similar to the distribution of companies in the Member States that joined the European Union together with us in 2004. Following the political, social and economic changes that began in 1989, the number, national economic importance and employment base of small businesses in Hungary increased, however, taking into account all domestic enterprises, each employer employs less than five people on average (Hustiné, 2012; NGM, 2023). The surveys carried out by the European Union cover enterprises with at least ten employees, in other words, the EU do not examine the innovativeness of micro-enterprises, which is why researchers often exclude this size category when collecting and examining data (Littunen et al., 2021; Matejun, 2016).

In the field of economics dealing with innovation and innovativeness, micro and small enterprises are significantly underresearched. According to Pučėtaitė et al. (2016), researchers should identify all factors that determine the innovativeness of businesses and can develop it. By identifying and developing these capabilities, small businesses would be able to ensure a

steady flow of innovations, which increases the likelihood of their survival, and helps them achieve their financial goals (Yrigoyen, 2011). However, literature research indicates that, on average, each study deals with only two or three of the factors determining innovation. As part of their entrepreneurial attitude research, Lumpkin & Dess (1996) examine the areas of workplace autonomy, proactivity, competitive aggressiveness and risk-taking in the context of innovation, but do not address other factors. In her work, Amabile (1983, 1988, 1997, 1998; Amabile et al., 1986, 1996, 2004; Amabile & Fisher, 2015) paid special attention to the role of creativity in innovations, but ignored many other factors.

Teece (2007, 2010) and Teece et al. (1997) researched the role of dynamic capabilities in innovation, but unlike Cohen & Levinthal (1990), these studies did not cover several areas that influence innovation in enterprises. This phenomenon is similar in the case of research into other factors of enterprises' ability to adapt and change. For example, the joint study of idea generation and creativity is typical (Heunks, 1998; Matsuo, 2006; Sarooghi et al., 2015), but it is usually not related to the study of the effects of competitive aggressiveness, absorption capacity or autonomy at work. The examination of idea generation and creativity within the same research project is primarily associated with the research into the effects of learning orientation (O'Reilly & Tushman, 2013) or knowledge management (Block et al., 2017; Rhee et al., 2010) – in many cases both dimensions are related (Abrunhosa & Moura E Sá, 2008; Brettel & Cleven, 2011; Ode & Ayavoo, 2020). It should be emphasized that although the proactivity and absorption capacity of enterprises are 'close' in content, I could find only a few publications that examined both factors (Adams et al., 2006; Cohen & Levinthal, 1990; Damanpour, 1996; Hult et al., 2004; Mamun et al., 2018). However, these studies linked an average of six areas to companies' capability to adapt and

change, i.e. they were broader than the vast majority of the literature studied. However, the prevalence of such wide-ranging multi-faceted research is low. In my thesis, based on the above antecedents and research gap, I seek to answer what are the factors that make up the adaptation and change capabilities of enterprises, and whether there are statistically verifiable differences between micro and small-sized enterprises in the case of the identified dimensions.

During my doctoral research, I set the following research goals:

- 1) Identification of factors constituting the adaptation and change capabilities of enterprises based on national and international literature.
- 2) Interpretation of the concepts of innovation and innovativeness among the leaders of micro and small- sized enterprises in Hungary.
- 3) Determining the importance of innovation and innovativeness for the operation of micro and small-sized enterprises in Hungary.
- 4) Identify potential differences between micro and small-sized enterprises in terms of innovativeness and factors influencing it.

The initial hypothesis of my research was that all abilities that play a role to a greater or lesser extent in the innovativeness of enterprises also have a statistically verifiable positive influence on it. Another research hypothesis was the existence of a statistically verifiable difference between size categories in the values of the identified dimensions. Both my personal experience and the literature review suggest that companies operating in an ever larger size category are in a better position in most aspects than smaller enterprises.

Taking into account the adaptation and change capabilities identified during my literature research, I formulated the following hypotheses:

H1: Entrepreneurial proactiveness has a positive impact on employee innovation support (H1a) and openness to innovation (H1b).

H2: The risk-taking of enterprises has a positive impact on employee innovation support (H2a) and openness to innovation (H2b).

H3: Competitive aggressiveness has a positive impact on employee innovation support (H3a) and openness to innovation (H3b).

H4: Knowledge management has a positive impact on employee innovation support (H4a) and openness to innovation (H4b).

H5: Creativity has a positive impact on employee innovation support (H5a) and openness to innovation (H5b).

H6: Learning orientation has a positive impact on employee innovation support (H6a) and openness to innovation (H6b).

H7: Idea generation has a positive impact on employee innovation (H7a) and openness to innovation (H7b).

H8: Work autonomy has a positive impact on employee innovation support (H8a) and openness to innovation (H8b).

H9: Absorptive capacity has a positive impact on employee innovation support (H9a) and openness to innovation (H9b).

H10: Dynamic capabilities positively influence employee innovation support (H10a) and openness to innovation (H10b).

H11: Fostering employee innovativeness have a positive impact on openness to innovation (H11).

The significant difference between size categories was investigated based on the following hypothesis:

H12: Small-sized enterprises have a higher level of capability to adapt and change than micro-sized enterprises (H12a), employee innovation support (H12b) and openness to innovation (H12c).

2. DATA AND METHOD

The theoretical framework of my thesis was determined on the basis of international and domestic literature research, its bibliometric analysis, and semi-structured interviews. The literature review was based on Open Access publications (n=983) of the Web of Science (WoS) Core Collection database. The timeliness and significance of the research topic was verified during the bibliometric analysis with the help of thematic maps prepared based on of international publications. With the help of literature research, I identified the adaptation and change capabilities of enterprises. Among the dimensions explored, dynamic capabilities seemed to be the most important from the point of view of innovation and innovativeness, which I supported by further literature analysis with the help of the WoS database (n=4,371). Based on the literature, I prepared comprehensive tables for systematic review, created a theoretical model and formulated my hypotheses. During the literature search, I reviewed the most internationally accepted and established data collection and statistical processing methods for both qualitative and quantitative research. I conducted qualitative research for this thesis from February 2022 to May 2023. In total, I conducted semi-structured interviews with the owner-managers of nine small-sized enterprises and four micro-sized enterprises (n=13). The data required for quantitative research were collected using an online questionnaire. Data collection took place between June 2023 and November 2023. The questionnaire's five-point Likert scale statements were based on statements used in international studies. The questionnaire was divided into input dimensions (statements 1-45), output dimensions (statements 46-60) and sociodemographic questions (questions 61-67). At the end of the data collection, the database contained a total of 513 questionnaires started, out of which respondents answered all 67 mandatory questions in 229 cases. Of the 229 records that could be assessed, 103 came from micro-sized

enterprises, 104 from small-sized enterprises, 20 from medium-sized enterprises and 2 from large companies. The 229 questionnaires answered in full correspond to a response rate of 44.64%. Of this, the number of answers that could be processed based on the topic of the thesis was 207 (40.35%).

2.1. The process of empirical research

The process of empirical research is illustrated in Figure 1.

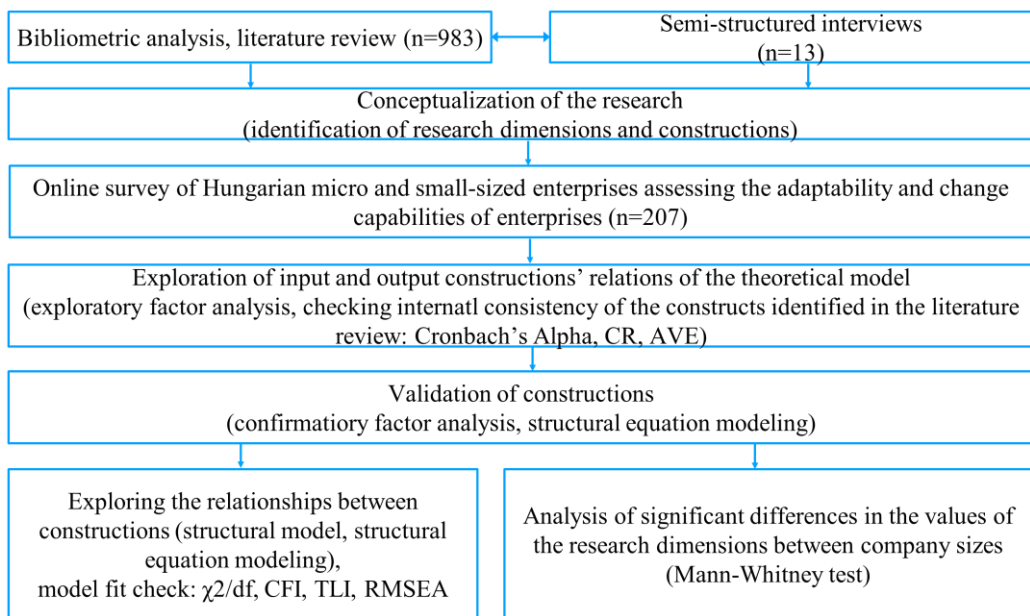


Figure 1: Research process

Source: own edit

Empirical research consists of two main parts. In the first part of the research, based on the established theoretical model, I examine whether the adaptation and change capabilities of enterprises are transformed into different types of innovations, and if so, to what extent they manifest themselves in them (Wang & Ahmed, 2004). Subsequently, I use the Mann-Whitney nonparametric test to examine whether significant differences can be verified between the individual dimensions and the size categories.

2.2. The research model

In reviewing the WoS Open Access database, based on 100 studies, I examined which factors researchers most often associate with innovation and innovativeness. During the study, I also took into account other (or earlier) literature not included in the publications of WoS Open Access, but cited by a striking number of literature reviewed. The ten most common factors thus produced in proportion to their prevalence are shown in Figure 2.

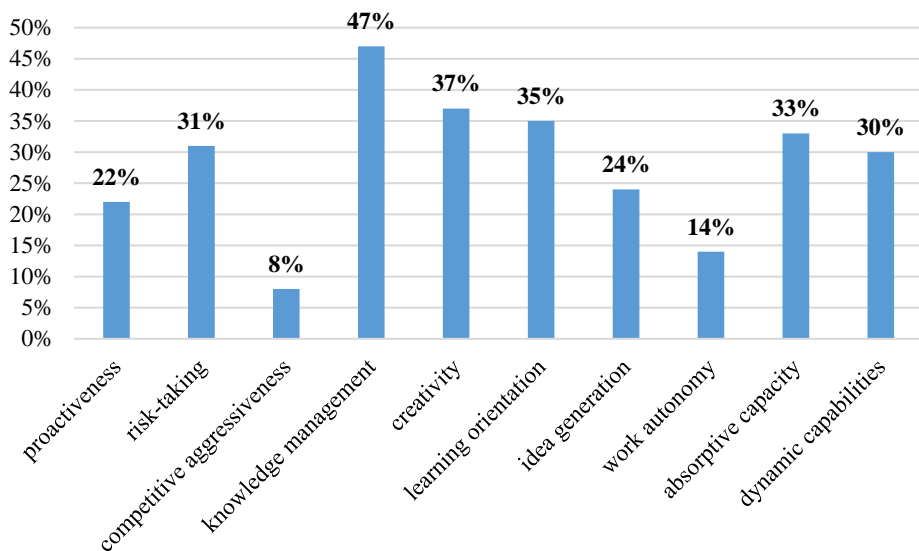


Figure 2: The ten most common dimensions of adaptability and change capabilities based on literature research

Source: own edit based on Web of Science Core Collection and Google Scholar database

The research model (Figure 3) includes dimensions measuring companies' capabilities to adapt and change, as well as support for employee innovation, openness to innovation and company size and the interdependences of those. My research hypotheses are shown in Figure 3.

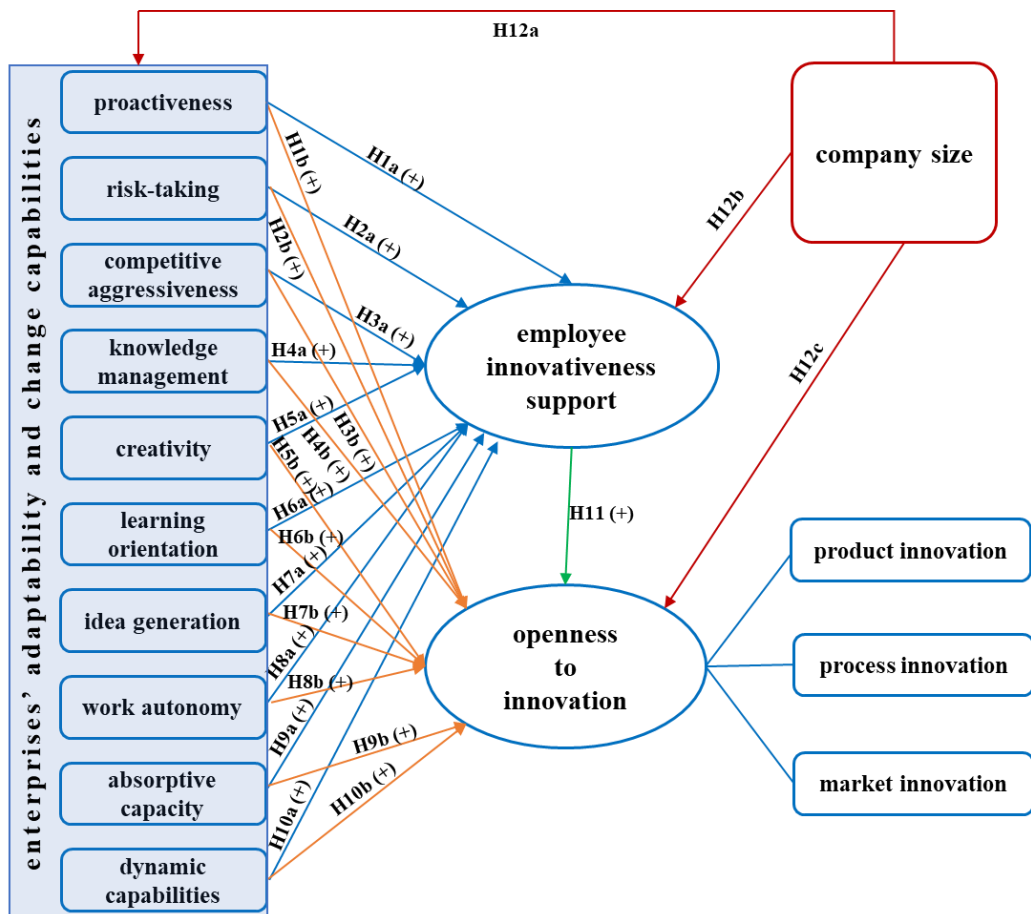


Figure 3: Hypothesis system of research

Source: own edit

The constructions (statements) used to measure the dimensions of the research model encompassing companies' capabilities to adapt and change, and their impact on employee innovation support and openness to innovation were selected from international studies published in relevant literature (Table 1).

Table 1: Research model dimensions and their measurement

Code	Construction / Statement	Source
PROACTIVENESS		
PROA-1	You frequently scan the environment for new technologies.	Mamun et al. (2016, p. 248)
PROA-2	You constantly consider how to better exploit technologies.	Mamun et al. (2016, p. 248)
PROA-3	Compared to competitors, you are often the first to introduce new methods etc.	Mamun et al. (2016, p. 248)
RISK-TAKING		
RISK-1	We encourage people in our company to take risks with new ideas.	Eggers et al. (2013, p. 545)
RISK-2	We value new strategies/plans even if we are not certain that they will always work.	Eggers et al. (2013, p. 545)
RISK-3	To make effective changes to our offering, we are willing to accept at least a moderate level of risk of significant losses.	Eggers et al. (2013, p. 545)
RISK-4	We seem to adopt a rather conservative view when making major decisions. *	Venkatraman (1989, p. 959)
RISK-5	A tendency to support projects where the expected returns are certain. *	Venkatraman (1989, p. 960)
RISK-6	Operations have generally followed the 'tried and true' paths. *	Venkatraman (1989, p. 960)
COMPETITIVE AGGRESSIVENESS		
AGGR-1	Sacrificing profitability to gain market share.	Venkatraman (1989, p. 959)
AGGR-2	Cutting prices to increase market share.	Venkatraman (1989, p. 959)
AGGR-3	Setting prices below competition.	Venkatraman (1989, p. 959)
AGGR-4	Seeking market share position at the expense of cash flow and profitability.	Venkatraman (1989, p. 959)
KNOWLEDGE MANAGEMENT		
KNOW-1	The management has a clear view of the unit's core knowledge.	Kianto (2008, p. 78)
KNOW-2	Our organisation has efficient and appropriate information systems.	Kianto (2008, p. 78)
KNOW-3	Employees are encouraged to seek information actively outside the organization.	Kianto (2008, p. 78)

Code	Construction / Statement	Source
KNOW-4	When experienced employee leaves, their knowledge and know-how are generally lost.	Kianto (2008, p. 78)
CREATIVITY		
CREA-1	The management at my workplace encourages the employees to think out of the box	Hamdan & Alheet (2020, p. 209)
CREA-2	Employees make efforts to be the first to propose new ideas for the product or service	Hamdan & Alheet (2020, p. 209)
CREA-3	Employees at my workplace think in novel ways	Hamdan & Alheet (2020, p. 209)
CREA-4	Employees are driven by creativity and innovation	Hamdan & Alheet (2020, p. 209)
LEARNING ORIENTATION		
LEARN-1	Managers basically agree that our organization's ability to learn is the key to our competitive advantage.	Wang (2008, p. 651)
LEARN-2	The basic values of this organization include learning as a key to improvement.	Wang (2008, p. 651)
LEARN-3	The sense around here is that employee learning is an investment, not an expense.	Wang (2008, p. 651)
LEARN-4	Learning in my organization is seen as a key commodity necessary to guarantee organizational survival.	Wang (2008, p. 651)
IDEA GENERATION		
IDEA-1	The company has teams dedicated to research and implementation of strategically relevant ideas for new business.	Aloini et al. (2013, p. 1149)
IDEA-2	We encourage people to come forward with ideas, even if they have only a vague idea of the potential market applications for the idea	Aloini et al. (2013, p. 1149)
IDEA-3	There is a centralized system for managing ideas, available throughout the enterprise, which each employee can submit ideas and receive feedback on which.	Aloini et al. (2013, p. 1149)
AUTONOMY AT WORK		
WRKAUT-1	I can set my own work agenda.	Nussbaum et al. (2021, p. 13)
WRKAUT-2	Employees here feel free to set their own priorities.	Nussbaum et al. (2021, p. 13)

Code	Construction / Statement	Source
WRKAUT-3	I can freely determine the methods for the execution of my work.	Nussbaum et al. (2021, p. 13)
WRKAUT-4	People here take their time to test new ideas.	Nussbaum et al. (2021, p. 13)
ABSORPTIVE CAPACITY		
ABSCAP-1	You regularly apply new technologies to new products.	Mamun et al. (2018, p. 215)
ABSCAP-2	You easily implement technologies in new products.	Mamun et al. (2018, p. 215)
ABSCAP-3	Your organization frequently markets new products/services.	Mamun et al. (2018, p. 215)
DYNAMIC CAPABILITIES		
DYN-1	We use established processes to identify target market segments, changing customer needs and customer innovation.	Wilden et al. (2013, p. 83)
DYN-2	We observe best practices in our sector.	Wilden et al. (2013, p. 83)
DYN-3	We gather economic information on our operations and operational environment.	Wilden et al. (2013, p. 83)
DYN-4	We invest in finding solutions for our customers.	Wilden et al. (2013, p. 83)
DYN-5	We adopt the best practices in our sector.	Wilden et al. (2013, p. 83)
DYN-6	We respond to defects pointed out by employees.	Wilden et al. (2013, p. 83)
DYN-7	We implemented new kinds of management methods.	Wilden et al. (2013, p. 83)
DYN-8	We carried out new or substantially changed marketing method or strategy.	Wilden et al. (2013, p. 83)
DYN-9	We carried out substantial renewal of business processes.	Wilden et al. (2013, p. 83)
DYN-10	We carried out new or substantially changed ways of achieving our targets and objective.	Wilden et al. (2013, p. 83)
EMPLOYEE INNOVATIVENESS SUPPORT		
BHVR-1	We get a lot of support from managers if we want to try new ways of doing things.	Wang & Ahmed (2004, p. 307)
BHVR-2	In our company, we tolerate individuals who do things in a different way.	Wang & Ahmed (2004, p. 307)
BHVR-3	We are willing to try new ways of doing things and seek unusual, novel solutions.	Wang & Ahmed (2004, p. 307)

Code	Construction / Statement	Source
BHVR-4	We encourage people to think and behave in original and novel ways.	Wang & Ahmed (2004, p. 307)
OPENNESS TO INNOVATION / PRODUCT INNOVATION		
PRDT-1	In comparison with our competitors, our company has introduced more innovative products and services during the past five years.	Wang & Ahmed (2004, p. 307)
PRDT-2	Our new products and services are often perceived as very novel by customers.	Wang & Ahmed (2004, p. 307)
PRDT-3	In comparison with our competitors, our company has a lower success rate in new products and services launch. *	Wang & Ahmed (2004, p. 307)
OPENNESS TO INNOVATION / PROCESS INNOVATION		
PRCSS-1	We are constantly improving our business processes.	Wang & Ahmed (2004, p. 307)
PRCSS-2	During the past five years, our company has developed many new management approaches.	Wang & Ahmed (2004, p. 307)
PRCSS-3	When we cannot solve a problem using conventional methods, we improvise on new methods.	Wang & Ahmed (2004, p. 307)
PRCSS-4	Our company changes production methods at a great speed in comparison with our competitors.	Wang & Ahmed (2004, p. 307)
OPENNESS TO INNOVATION / MARKET INNOVATION		
MRKT-1	In comparison with our competitors, our products' most recent marketing programme is revolutionary in the market.	Wang & Ahmed (2004, p. 307)
MRKT-2	Our recent new products and services are only minor changes from our previous products and services. *	Wang & Ahmed (2004, p. 307)
MRKT-3	In new product and service introductions, our company is often at the cutting edge of technology.	Wang & Ahmed (2004, p. 307)
MRKT-4	New products and services in our company often take us up against new competitors.	Wang & Ahmed (2004, p. 307)

Note: statements marked with an asterisk (*) are reverse-scored.

Source: own translation and edit based on the cited publications

2.3. Data collection process, main characteristics of the sample

In order to reach the target group as widely as possible, I chose the online questionnaire (Azar & Ciabusch, 2017; Makri et al., 2017; Najafi-Tavani et al., 2018). I created the online questionnaire using the LimeSurvey questionnaire editing platform. The introductory text of the questionnaire made it clear that the purpose of data collection is not to collect responses from different managers, but only from managers, primarily owners (entrepreneurs) of Hungarian enterprises. Data collection was conducted from June 12, 2023 to November 25, 2023. I asked for a smaller part of the entrepreneurs involved in the quantitative data collection of the primary research due to personal acquaintance or through personal recommendations, while the majority of them were reached through the support of various impact centers (national associations, trade unions, chambers, etc.). I did not wish to limit the circle of entrepreneurs surveyed by geographical location, activity or any other criterion in order to obtain a heterogeneous sample covering the whole country, with as many respondents as possible.

By the end of November 2023, the database contained a total of 513 questionnaires started, of which respondents answered all 67 mandatory questions in 229 cases. Of the 229 records that could be assessed, 2 came from large companies, and 20 from medium-sized enterprises, 104 from small-sized enterprises and 103 from micro-sized enterprises. The 229 questionnaires answered in full correspond to a response rate of 44.64%. However, the investigation of the thesis is limited to examining the similarities and differences between the answers received from managers and owners of micro and small-sized enterprises, so the number of answers that could be processed is 207, which means an effective response rate of 40.35%. Considering that in the international literature on research subjects close to the topic of the thesis, authors often carry out their research with an effective response rate

significantly lower than 40.35%, this ratio can be considered good (Azar & Ciabuschi, 2017; Cheng et al., 2014; Gölgeci & Ponomarov, 2015; Matsuo, 2006; Michaelidou et al., 2011; Parida et al., 2017; Vanhala & Ritala, 2016). To measure the adaptation and change capabilities of Hungarian enterprises, I used five-point Likert scale statements. The lowest value of the scale, 1, corresponded to complete disagreement, and the highest, 5, corresponded to complete agreement with the given statement. To measure all dimensions, I used a post-peer review Hungarian translation of statements applied in these studies' proprietary primary research published in international journals. In case of a few statements, minimal adjustments to the wording of the Hungarian translation of the statement were required, but these did not modify the original meaning. The questionnaire consisted of three main sets of questions:

- 1) input dimensions (statements 1-45),
- 2) output dimensions (statements 46-60) and
- 3) sociodemographic block (questions 61-67).

The characteristics of the interviewees of the qualitative research is shown in Table 2.

Table 2: Characteristics of respondents in the qualitative research and their businesses

#	Age of Interviewee	Company Profile	Number of employees	Year of foundation	Time of interview
1	48	tourism, hospitality	8-15	1997	February, 2022
2	54	trade in pumps, civil engineering, control technology	25-27	2003	February, 2022
3	(1) 45, 51	software development	14	1997	February, 2022
4	68	wholesale trade services of pharmaceuticals	14	2000	February, 2022
5	61	packaging production and trade	16	2003	March, 2022
6	63	manufacture and development of electrical equipment, design, contract manufacturing	46	1995	July, 2022
7	48	parcel and package logistics	33	2005	July, 2022
8	67	dispatcher service	13	2006	August, 2022
9	69	general construction	3-5	1990	August, 2022
10	61	design, maintenance and construction related to broadcasting	2 (+14 subcont.)	2003	September, 2022
11	71	electrical installation	3	1990	November, 2022
12	64	manufacture of wellheads and components for oil and gas wells	35	1991	April, 2023
13	63	accounting, payroll	20	1990	May, 2023

Note: (1) both owners of the company participated in the interview.

Source: own research and edit (n=13)

The groupings of quantitative research respondents by size category, geographic region, and industry are shown below in Table 3.

Table 3: Qualitative research interviewees and characterisation of their businesses

Appellation	Micro-sized enterprises (n=103)	Small-sized enterprises (n=104)
Staff number		
0-4 employees	42.72%	/
5-9 employees	57.28%	
10-29 employees	/	68.27%
30-49 employees		31.73%
HQ of respondents' businesses		
Budapest	22.33%	25.96%
County Pest	29.13%	10.58%
Outside Budapest and County Pest	48.54%	63.46%
– of which eastern counties	(54.00%) 26.21%	(60.61%) 38.46%
– of which western counties	(46.00%) 22.33%	(39.39%) 25.00%
village	16.50%	15.38%
town	47.57%	31.73%
county seat	35.92%	52.88%
– of which capital	(62.16%) 22.33%	(49.09%) 25.96%
Industry (combined above 5%)		
food industry	0.97%	10.58%
construction industry	19.42%	16.35%
IT & communication	7.77%	6.73%
trade	8.74%	9.62%
agriculture, forestry, fisheries, wildlife management	4.85%	7.69%
professional, scientific, technical activities	5.83%	4.81%
transportation, warehousing, logistics	17.48%	10.58%
other	34.95%	33.65%

Source: own research and edit (n=13)

2.4. Bibliometric analysis methodology

Bibliometric analysis is a method that involves statistical analysis of published articles and quotations in them to measure their impact. Bibliometric analysis was done using VOSviewer software (Vnukova et al., 2024). Literature sources were collected from the Web of Science Core Collection. For the purpose of bibliometric analysis, the main bibliographic data were extracted: article title, author's name, journal name, publication date, abstract and literature referenced in the article. Based on the different spelling of 'organizational' in British English and American (US) English, I searched for the following two terms:

- 1) organisational innov* and
- 2) organizational innov* – using an asterisk (*) that allows to search for 'innovation' and 'innovativeness' at the same time.

The Web of Science (WoS) Core Collection contained a total of 3,016 scientific studies between 1975 and 2022, of which 983 were Open Access publications. I started to review the abstracts sorted by their reference number (Total Citation) in descending order.

2.5. Semi-structured interview process

Non-representative qualitative research of the thesis is based on semi-structured interviews with 13 owner managers of micro and small-sized enterprises. The companies can be described as heterogeneous in terms of profile, geographical location and market, most of them were based in Budapest or County Pest, which reflects the national proportions. During the semi-structured interviews, general open-ended questions were followed by targeted questions about the company's investments and innovation practices in order to obtain a more comprehensive picture of the experiences and opinions of entrepreneurs in the field studied (Riivari & Lämsä, 2019). In line

with the recommendations of some literature, an additional goal of qualitative research was to lay the best possible foundation for a subsequent quantitative research based on the experience gained during the research (Abrunhosa & Moura E Sá, 2008; Bryan Jean et al., 2017; Cheng et al., 2014). The questions of the interview were as follows:

- 1) Describe your business in a few sentences!
- 2) What is the number of employees of the company, when was it founded?
- 3) What investments has your company made in the last five years?
- 4) Are there any ongoing or planned investments for the next five years?
- 5) What does innovation mean to you?
- 6) How important do you think innovation is? (Please rate from 1 to 6!)
- 7) What factors and circumstances make innovation difficult? Which ones support it?

The research questions were processed taking into account the comparison between size categories by topic of the thesis, so the presentation of the findings is divided into the following chapters:

- 1) general differences and similarities,
- 2) the differences identified in the circumstances that support and hinder innovation, and
- 3) differences and similarities in investments and innovations made in the five years preceding the interview.

2.6. Structural equations modeling (SEM analysis)

At the next stage of research, the validity of the theoretical model of research was checked. The reliability of latent constructions measuring research dimensions was investigated by Confirmatory Factor Analysis (CFA), which was performed as part of Structural Equation Modeling (SEM) (Byrne, 2010).

The reliability of latent structures was checked on the basis of the Cronbach's Alpha indicator, a value above 0.7 indicated the satisfactory internal consistency of latent constructions (Cortina, 1993; Tavakol & Dennick, 2011). The average variant extracted (AVE) and composite reliability (CR) were used to test the validity of latent constructions. The value of AVE indicates the average proportion of variances of statements that make up a given latent construct that is concentrated in that artificial variable. A value of this indicator higher than 0.5 is considered acceptable (Baumgartner & Homburg, 1996; Hair et al., 2010). The CR indicator expresses the common variance ratio of the statements that make up each latent construct, and all latent variables in the model must reach 0.7 (Fornell & Larcker, 1981; Hair et al., 2010). If the AVE value does not reach the threshold value of 0.5, but the CR value exceeds 0.7, the reliability of latent structures is considered acceptable (Fornell & Larcker, 1981; Lam, 2012). For the fit indicators of the structural model, the following acceptance ranges were used. The absolute fit index is usually below 3, although some experts believe that a value below 5 may be acceptable depending on the complexity of the model (Byrne, 2010; Kline, 2015). For the Root Mean Square Error of Approximation (RMSEA), acceptable value is usually below 0.08 (Hu & Bentler, 1999). I accepted values for the Comparative Fit Index (CFI) and TLI (Tucker-Lewis Index) reaching 0.9 (Hair et al., 2010).

IBM SPSS Statistics 27.0 and AMOS 23.0 were used to run the tests.

3. FINDINGS AND DISCUSSION

3.1. Findings of semi-structured interviews

Labour shortage problems, volatility of domestic currency and increases in material and labour costs can be described as common in both size categories. However, the surveyed companies do not face difficulties caused by labour shortages as long as the entrepreneur pays considerable attention to innovation. Without exception, those entrepreneurs concerned recognize this connection, which thus becomes a self-exciting, strengthening process. It follows that a smaller company size does not always imply a lower willingness to innovate compared to a company operating in a larger size category, since owner managers of small-sized enterprises also recognize the multifaceted positive effects of innovative behaviour and proactively focus on implementing different types of innovations. This statement proved to be true for several interviewees (#3, #5, #13) regardless of region or industry.

The interviewees' interpretation of the concept of innovation, its importance, supporting and hindering factors are summarized in Table 4. The investments made by concerned companies within five years prior to the survey, ongoing at the time of the survey and planned investments within five years thereafter are presented in Table 5.

Table 4: General interpretation, importance, supporting and hindering factors of innovation by interviewees

#	Understanding and importance of innovation (1-6)	Innovation drivers	Barriers to innovation
1	not just doing things according to the old practice, but in a new form, with new technology (5)	repaid credits	Covid, skills shortage, qualifications of specialists, human factors
2	current development and efficiency of electrical equipment and measuring instruments in the profession (5)	none	low profitability, unable to replace young workforce
3	continuous innovations, cloud services, digitalization trend (6)	customer expectation	the obscurantism of the interviewees' clientele
4	it is very important because of copycats, from a technological point of view, innovation is achieved by new chemical composition, which gives them a competitive advantage for a while (6)	stable demand due to an ageing society, constant demand for new products, more Covid-resistant area with adequate profit	regulatory environment, generics, copycats, high consumer price sensitivity, extremely low-priced substitutes can push those products marketed by the interviewee out of the market at any time
5	looking ahead, developing, creating novelties, renewal, development (6)	consumer expectations, pressure due to developments from competitors	uncertainty of the business environment, lack of money, time and energy, lack of partnership within the company in visions, open-mindedness, lack of affordable, professional colleagues
6	developments, new directions (5)	general technical development in the industry	high costs
7	no response (no value specified)	digitalization, continuous expansion of e-commerce	there is none, firm gets innovations 'ready' from the general contractor
8	improvement of existing services, improvement of standards, introduction of new services (5)	none	solvent demand, this is the first cost for the customer base that they want to get rid of
9	to keep up with the times (5)	customer expectations	price increases and hectic inventory, young workforce is impossible to find
10	small steps forward (3-4)	none	random demand for activity, uncertainty, unable to plan
11	use of modern things (6)	new investments, new constructions, customer expectations	interviewee could not name any barrier, electrical installation was the first thing that had to 'keep up with the times'
12	one of the most important things about effectiveness, staying on the market and improving products (6)	labour problems, energy costs	customers find it difficult to accept new products in the industry because they fear the risks and revenue losses inherent in innovations
13	the key to survival (6)	IT developments in the field	putting the use of new systems into daily practice, changing and unpredictable regulatory environment

Source: own research and edit (n=13)

Table 5: Investments by enterprises participating in qualitative research

#	Investments made in the five years prior to the interview	Investments ongoing and planned at the time of the interview
1	renovations to the building	kitchen technology, 3-4 additional investment ideas depend on source
2	ERP system development, solar panel installation, central data storage, GPS-based vehicle monitoring	completion of site expansion, modernization of CCTV
3	continuous development of the software, development of additional services	new, cloud-based, digital services
4	there is no investment in the classical sense, they invest in branding and marketing	Slovakia has emerged as a potential target market that will require an equivalent budget ('investment project')
5	recycling, wholesale import materials, new products, new designs, new ERP system, new warehouse and racking system, new trucks, new hybrid and plug-in hybrid cars, organizational development	further new products and packaging designs, purchase of machines used in the manufacturing plant
6	small developments are continuous, 6 m HUF worth of fixed assets have been purchased	renovation of an old building, replacement of doors and windows from own resources
7	firm gets everything ready from the general contractor, no own investment	firm gets everything ready from the general contractor, no own investment
8	new PCs and screens in the office	development of a new dispatcher program, a new database management system, a new service for diversification
9	none	none
10	telemetry system	none
11	none	none
12	purchase of new, automatic machines to replace qualified colleagues with machine operators	energy efficiency investment, installation of own geothermal heating, purchase of more efficient air conditioners, thermal insulation investment
13	6 new accounting and payroll automation systems	opening towards cloud-based services

Source: own research and edit (n=13)

3.2. Bibliometric analysis of the literature on organizational innovation and organizational innovativeness

The number of publications on organisational innovation and organisational innovativeness gradually increased during the period under review (1975-2022), peaking in 2017 (313 publications) (Figure 4). During the period under review, an average of 43.48 references were received for a single publication, and the evolution of the number of references follows the changes in the number of publications. The increase in both scientific publications and citations suggests that the topic of innovation and innovativeness is proving important and timely in scientific research.

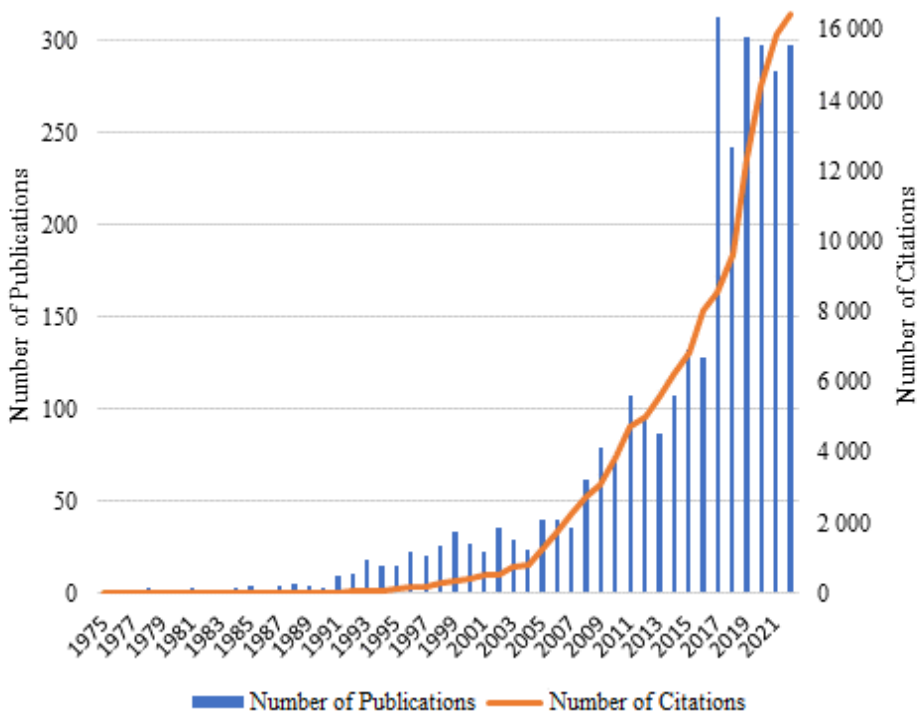


Figure 4: Evolution of the number and citation of publications on organizational innovation and organizational innovation between 1975 and 2022

Source: own edit based on Web of Science Core Collection (n=3,016)

The network of keywords (Figure 5) illustrates keywords in at least 30 publications on a common map. The thickness of the lines connecting keywords indicates the frequency of co-occurrence. There are four clusters on the map, the keywords defining the clusters are:

- 1) organisational innovation (red cluster),
- 2) performance and innovation (blue cluster),
- 3) knowledge, research and development (green cluster) and
- 4) product innovation (yellow cluster).

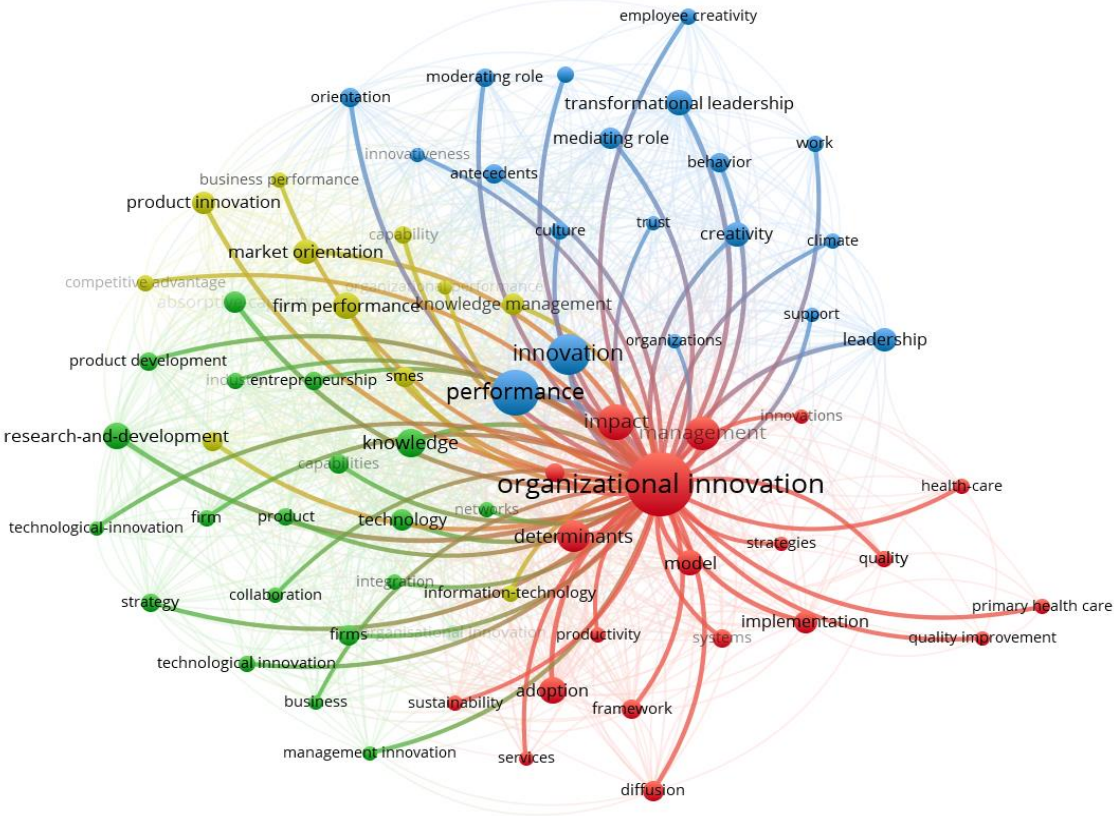


Figure 5: Keyword network of organizational innovation based on relevant Open Access publications

Source: own edit based on Web of Science Core Collection (n=983)

3.3. Findings of empirical research

Due to the low value of Cronbach's Alpha (<0.70), the dimension of knowledge management and idea generation was not included in the final model. Due to the low factor weight (<0.050), constructions DYN-1, DYN-6, MRKT-2, MRKT-4 and PRDCT-3 were excluded.

GFI, CFI and TLI values for the structural model were 0.904, 0.916 and 0.906, respectively, all within the acceptable range (Hair et al., 2014; Hu & Bentler, 1999). RMSEA's values were also found to be reliable as they were lower than the 0.08 threshold applied. All these indicators confirmed that the fit of the model is correct (Table 6).

Table 6: Structural model fit indicators

Fit indicators	X ² /DF	p-value	GFI	CFI	TLI	RMSEA
Acceptance values for indicators	≤ 5	$\leq 0,05$	$\geq 0,90$	$\geq 0,90$	>0.90	≤ 0.08
Structural model	3,728	$<0,001$	0,904	0,916	0,906	0,079

Source: own calculation and edit

The examination between the size categories was performed using the Mann-Whitney nonparametric test. The results of the test are indicated in Figure 6, with the radar chart indicating the average values, for dimensions producing significant differences, the Z-values and p-values of the test are indicated in bold.

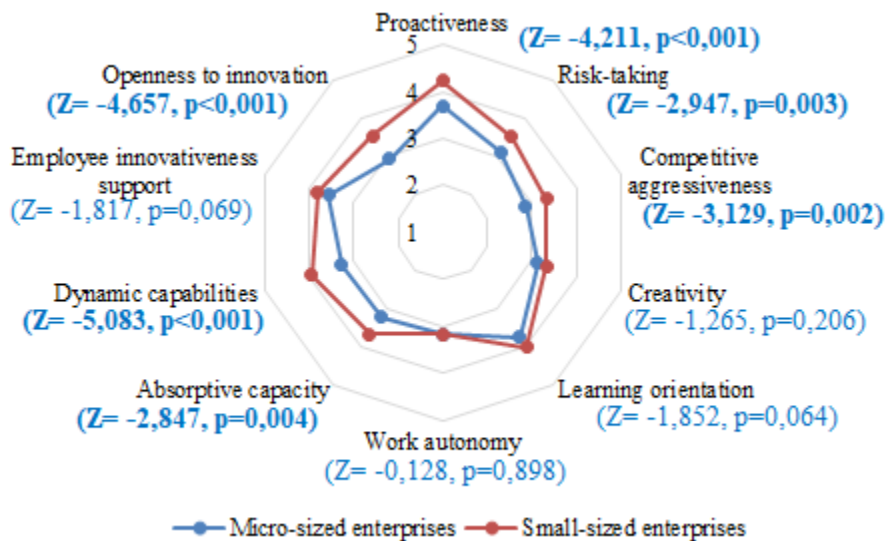


Figure 6: Statistically significant differences between size categories for each dimension

Source: own research and edit

Some of my hypotheses formulated on the basis of the theoretical model were rejected, a part of them partly accepted, the rest ones fully accepted. The results of the analysis of hypotheses are illustrated in Figure 7. Beta-values and p-values of the structural equation modeling, as well as the Z-values and p-values of the Mann-Whitney test are indicated in the figure. Arrows are not dashed if the statistical significance level ($p \leq 0.050$) is reached, and when it is not reached ($p > 0.050$), they are dashed.

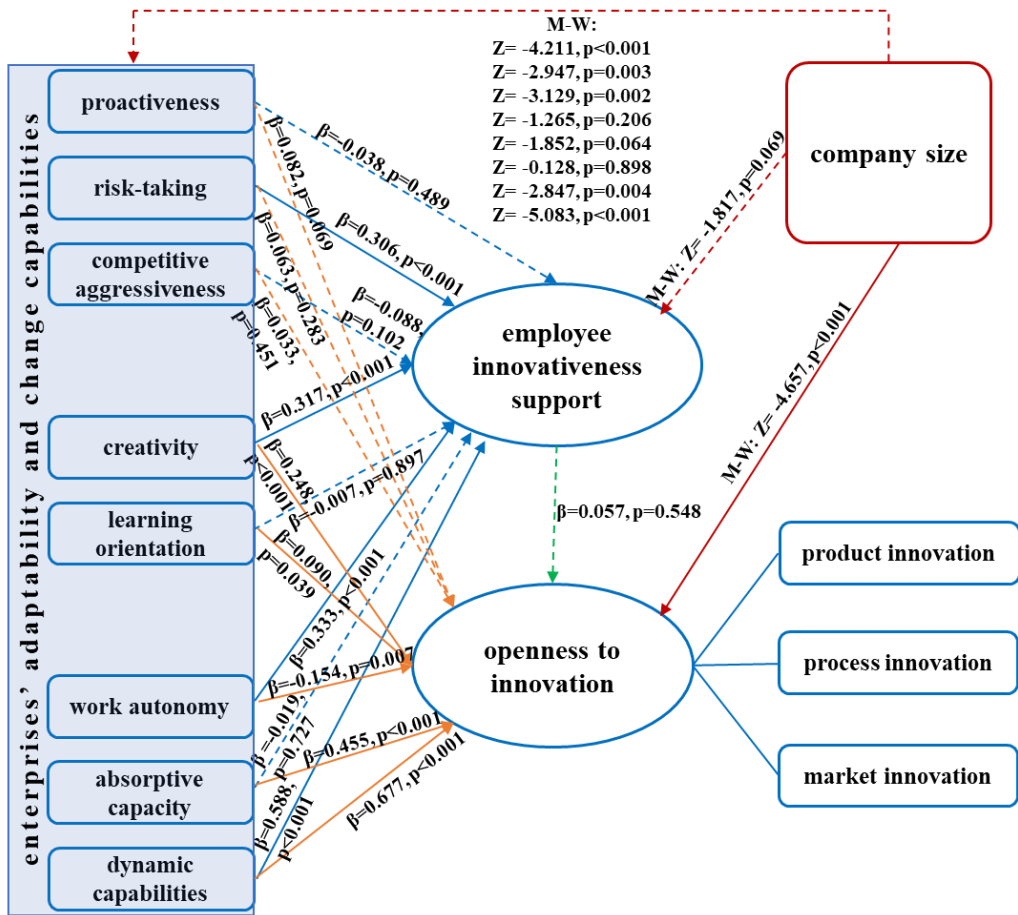


Figure 7: Results of hypothesis testing

Source: own research and edit

When testing hypothesis H1, the results did not confirm the effect of proactiveness on employee innovativeness support ($p=0.489$) and openness to innovation ($p=0.069$), so the hypothesis was rejected. This suggests that proactive businesses, while they can anticipate problems and opportunities, may not have an innovative approach that requires longer term thinking. Previous research has also shown mixed results on this topic: some studies have failed to prove a link between proactiveness and innovativeness, while others, such as the research by Wach et al. (2023), have found a clear correlation. The results of my research therefore fit with previous contradictory findings and show that proactiveness does not always go hand in hand with an innovative attitude.

A clear link between companies' appetite for risk and innovation cannot always be demonstrated. Although innovations often involve risks, this does not mean that all risk-taking enterprises are innovative and, conversely, not all innovative enterprises are characterized by risk-taking. Research results on this issue are mixed: for example, Hyrsky and Tuunanen (1999) found that companies with detailed business plans show higher risk appetite and openness to innovation, while Craig et al. (2014) found that risk-taking is more closely related to innovation outcomes for non-family businesses. However, other studies such as García-Granero et al. (2015) and García-Piqueres et al. (2019) have not confirmed a statistically verifiable relationship between risk-taking and innovativeness. In my research, too, the results were mixed. When examining the H2a hypothesis, I found a weak but positive effect, which means that risk-taking has only a minor effect on supporting employee innovativeness (Beta = 0.306, $p < 0.001$). In contrast, the impact on openness to innovation (H2b) was not demonstrable ($p = 0.283$). Thus, hypothesis H2 has only been partially confirmed, suggesting that the role of risk-taking in innovativeness is ambiguous and that other factors may have a significant impact on the innovative activity of enterprises.

The relationship between competitive aggressiveness and innovativeness is not always clear, as it can be influenced by many factors, such as industry specifics, market environment, different types of innovation (radical or incremental), corporate strategy, as well as cultural factors. Competitive aggressiveness is often manifested in fierce, fast and intense actions aimed at defeating competitors or driving them out of the market. This short-term goal does not necessarily go hand in hand with a long-term, strategic approach requiring openness to innovations (Kollmann & Stöckmann, 2013). Some researchers see the 'pioneering' phenomenon of competitive aggressiveness primarily in pricing strategies and market penetration, rather than in relation to innovation (Musawa & Ahmad, 2019). In addition, the lack of a link between competitive aggressiveness and innovation may also be associated with low resource availability and fear of failure (Rahman et al., 2016).

The results of my research do not support the findings presented in the literature (Panjaitan et al., 2021; Stambaugh et al., 2011; Sutejo & Silalahi, 2021; Zacca et al., 2015). According to the results of the examination of the H3 hypothesis, competitive aggressiveness does not affect either the support of employee innovation ($p=0.102$) or openness to innovation ($p=0.451$), so I rejected the H3 hypothesis.

The testing of the H4 hypothesis was not possible, since the knowledge management research dimension was excluded due to its weak internal consistency.

According to the results of the research, creativity has a weak, medium positive effect on supporting employee innovativeness (Beta = 0.317, $p<0.001$) and a weak positive effect on openness to innovation (Beta = 0.248, $p<0.001$), so I accepted the H5 hypothesis. This means that the development of creativity in enterprises directly and positively affects their innovativeness, which can open up new opportunities for development and advancement for firms. The results of the study are consistent with findings from the literature, including research by Amabile (1988, 1997), Bassett-Jones (2005), as well as Sarooghi et al. (2015) and Borisov (2022), which findings also confirmed the significant impact of creativity on innovation. This indicates that creativity not only increases an organization's ability to innovate, but can also directly contribute to employee innovation activity, as suggested by previous work by Hunter and Cushenbery (2011).

In my research, learning orientation does not influence employee innovativeness support ($p=0.897$), but it has a demonstrably weak positive effect on openness to innovation (Beta = 0.090, $p = 0.039$), so the H6 hypothesis has been partially accepted. Baker & Sinkula (1999) in their primary research of 411 U.S. businesses demonstrated a strong relationship between learning orientation and innovation. In their empirical research of 82 small businesses in Tehran, Eshlaghy & Maatofi (2011) demonstrated the significant positive impact of learning orientation on corporate innovation. However, in the empirical research of 150 businesses in Turkey, Calisir et al. (2013) were unable to prove the link between enterprises'

commitment to learning and innovation. Thus, we can see that although there are different research results in the international literature for the dimension studied, the majority of researchers come to similar conclusions, but the results of my research are only partially consistent with them (Day, 1994; Rhee et al., 2010; Slater & Narver, 1995).

The H7 hypothesis was not tested, as I excluded the idea generation research dimension due to its weak internal consistency.

Workplace autonomy has a statistically verifiable, weak positive medium effect on supporting employee innovation (Beta = 0.333, $p < 0.001$), which result is consistent with the research result of Ohly et al. (2006). However, openness to innovation is demonstrably influenced negatively (Beta = -0.154, $p = 0.007$), i.e. a higher level of autonomy in the workplace is associated with a lower openness to innovation in the sample examined. In other words, this result means that the higher the level of autonomy in the workplace in enterprises, the efforts to implement innovations are met with proportionately higher worker resistance, that is, autonomy in the workplace becomes partially counterproductive and hinders innovation (Burcharth et al., 2017; Yuorpor, 2013). Gebert et al. (2003) also confirmed this phenomenon in his empirical research involving 101 enterprises, drawing attention to the fact that autonomy in the workplace above a certain level implies a decline in innovation instead of a further increase. In their empirical research, Battistelli et al. (2013) examined the interdependences of work autonomy involving 270 workers in Italy's public sector. The research has demonstrated a significant relationship between autonomy in the workplace and resistance to change, the causes of which are rooted in adherence to established practices, short-term thinking and emotional reactions (Battistelli et al., 2013).

In my research, regarding absorptive capacity, the examined sample is only in line with a part of the presented literature results: it has no statistically verifiable relationship with the employee innovativeness support ($p = 0.727$), but it confirmed a weak medium positive effect on openness to innovation (Beta = 0.455, $p < 0.001$). The H9 hypothesis was thus partially accepted. In their empirical

research at employee level, Schweisfurth & Raasch (2018) processed data from more than 860 employees and demonstrated the positive effect of absorptive capacity on employee innovation. In their empirical research involving 286 large companies in Spain, Cepeda-Carrion et al. (2012) demonstrated the extremely important determinant role of absorptive capacity in developing the innovativeness of the companies studied. In their research involving 212 Chinese enterprises, Su et al. (2013) confirmed the synergistic positive effect of absorptive capacity with the product innovation. In addition to cultural differences, the reason for the different research results of international literature lies in the different target groups (employees, large companies), the results of which obviously do not necessarily coincide with the results of an empirical research consisting of owner managers of micro and small-sized enterprises in Hungary. The dynamic skills research dimension has a statistically verifiable medium positive effect on employee innovativeness support (Beta = 0.588, $p < 0.001$) and a moderately strong positive effect on openness to innovation (Beta = 0.677, $p < 0.001$). The H10 hypothesis was accepted accordingly. Among the factors analyzed, the effect of dynamic abilities on employee innovation support and openness to innovation proved to be the strongest, which is in line with its significance revealed during literature research in both areas studied. In my research, employee innovativeness support has no statistically verifiable effect on openness to innovation ($p = 0.548$). The H11 hypothesis was thus rejected. The correlation between employee innovativeness support and openness to innovation can be influenced by a number of circumstances. Employee innovativeness can be supported formally or informally by an organization, but in the case of a conservative organizational culture or widespread resistance to change, employees are unlikely to be able to exploit and implement their innovative, creative ideas. Research of 140 South Korean managers confirmed the link between employee innovativeness support and organizational innovation performance (Dedahanov et al., 2017). Employee innovativeness manifests itself in idea generation, search for and communicate ideas, launching innovative

activities and overcoming barriers (Lukes & Stephan, 2017). However, they can be hampered both by employees' personal attitudes and lack of motivation, as well as by the scarcity of resources provided by the organization.

Based on the examination of differences in company size, H12 was partially accepted. Most of the dimensions analyzed differed significantly between micro and small-sized enterprises (H12a), but employee innovativeness support (H12b) did not differ significantly. The openness of small businesses to innovation was significantly higher than that of micro-enterprises (H12c).

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Conclusions

Several of the entrepreneurs interviewed during the qualitative research resented and identified phenomena as obstacles to innovation, which have already been highlighted by previous domestic research (Csath, 2016). The qualitative research partially confirmed the previous research result of Szerb (2010), according to which the level of innovativeness of micro-sized enterprises can be called extremely low. Based on their answers, the interviewees can be distinguished by size category: although micro entrepreneurs had problems in common with small entrepreneurs, overall, it can be said that their situation was considered less favourable than that of small entrepreneurs in the areas studied.

The examination of the quantitative research of the thesis did not confirm the relationship between proactiveness and competitive aggressiveness proven in several cases in the literature. At the same time, hypotheses regarding dynamic capabilities and creativity were confirmed. Based on the results, hypotheses about risk-taking, learning attitudes and absorptive capacity were only partially accepted. Autonomy at work is associated with a weak positive medium relationship (H8a) with support for employee innovativeness and a weak negative relationship with openness to innovation (H8b). The study of the thesis, in line with other research results (Nussbaum et al., 2021), also failed to demonstrate the positive effect of autonomy in the workplace on openness to innovation. One of the undesirable consequences of too high level of autonomy at work may be deviation from established processes and routines, which may hinder the practical implementation of new ideas and innovations in the enterprise, causing a kind of resistance and rejection among employees (Burcharth et al., 2017). Employee innovativeness support does not have a statistically verifiable influence on openness to innovation according to the sample study (H11).

Based on the analysis of differences in size categories, small-sized enterprises have significantly higher levels of proactiveness, risk-taking, competitive aggressiveness, stronger absorptive capacity and dynamic capabilities compared to micro-sized enterprises. H12a was thus partially proven. The openness of small businesses to innovation also significantly exceeds (H12c) the openness of micro-enterprises to innovation. Based on the sample, support for employee innovativeness indicated no statistically verifiable difference between size categories (H12b).

4.2. Recommendations

Based on the experience of my research and the results of my dissertation, I formulated the following recommendations:

- 1) strengthening the innovation focus in micro and small enterprises: entrepreneurs should pay more attention to investing in innovation, as research indicates that these companies can be more successful if they use proactive innovation strategies. It may be appropriate to monitor the emergence of new technologies and seek to make better use of existing technologies,
- 2) managing autonomy at work: companies should use workplace autonomy with caution, as its excessive level can hinder openness to innovation, which may lead to resistance to innovation efforts,
- 3) developing creativity: entrepreneurs need to encourage employee creativity as it confirmed a positive impact both in supporting employee innovativeness and in openness to innovation. This can be improved by listening to employees' ideas, thinking about them in teamwork, developing them and rewarding proven, successful ideas,
- 4) development of dynamic capabilities: companies need to develop their dynamic capabilities (environmental monitoring and analysis, learning and knowledge management skills, change management), which have proven to

be the most important factor in the field of employee innovativeness and openness to innovation. Therefore, I recommend watching and learning about the best practice used in the industry, analyzing information about the operation of the business and learning from it. Dynamic capabilities are particularly important for companies not only to react to change, but also to proactively shape their environment and constantly innovate. Their development can contribute to the long-term success of companies in an increasingly changing and competitive market environment.

4. NEW SCIENTIFIC FINDINGS

- 1) I developed a model suitable for measuring the innovativeness of micro and small-sized enterprises – covering the investigation of adaptability and change capabilities – which was validated based on the data of the questionnaire survey conducted among owner-managers of Hungarian micro and small-sized enterprises.
- 2) I found that employee innovativeness support does not directly affect an organization's openness to innovation.
- 3) I proved that dynamic capabilities have the strongest influence on both employee innovativeness support and openness to innovation. I also demonstrated the positive impact of risk-taking, creativity and workplace autonomy on employee innovativeness support, as well as the positive impact of creativity, learning attitudes and absorption capacity on openness to innovation. I have shown the negative impact of autonomy in the workplace on openness to innovation.
- 4) I proved empirically that small businesses are more open to innovation than micro-sized enterprises, and I did not find a significant difference between the two size categories examined in terms of employee innovativeness support. Furthermore, I proved that among the dimensions investigated, small-sized enterprises are characterized by significantly higher values of proactiveness, risk-taking, competitive aggressiveness, absorptive capacity and dynamic capabilities compared to micro-sized enterprises.

5. PUBLICATIONS

In a Hungarian journal in Hungarian language

Pataki, J. I., & Bujáki, J. (2021): A mikro-és kisvállalkozások innovációs gyakorlatának különbségei. POLGÁRI SZEMLE: GAZDASÁGI ÉS TÁRSADALMI FOLYÓIRAT, 17(4-6), 165-181. DOI: 10.24307/psz.2021.1212

Szabó, G. K. – Bujáki, J. – Töröcsvári, Zs. – Csernák, J. (2012): A hitelek és megtakarítások alakulása a Bács-Kiskun megyei háztartások tükrében. ACTA CAROLUS ROBERTUS 2 : 1 pp. 101-108. , 8 p.

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Bujáki, J. (2023): Investigation of Innovation Performance of Hungarian MSMEs Based on Qualitative Research. Budapest. 9th Winter Conference of Economics PhD Students and Researchers.