PhD DISSERTATION

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MEASURING THE EFFECT OF FINANCIAL LITERACY, ALONGSIDE ENTREPRENEURIAL AND DIGITAL COMPETENCES ON FINANCIAL OUTCOMES OF MSMES IN THE SOUTHERN GREAT PLAIN OF HUNGARY

PhD Dissertation

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1. Introduction

Financial literacy has been a recurring theme of researchers following the outbursts of economic crises (such as the 2008 financial crisis or the recent economic outcomes of the pandemic), many blaming individuals for their inadequate level of financial literacy, making decisions that yielded no future benefits, but gave rise to the crisis (Kovács-Terták, 2016, 2019). In recent years individuals even though remained in the spotlight of researchers, new groups of entrepreneurs and small businesses gained momentum, as academics realized that these groups, such as micro-businesses or small and medium enterprises (MSMEs) face similar difficulties, and the consequences of poor financial literacy of MSMEs can be such as grave as of individuals. Financial literacy of them thus needs to be improved. Even though individual and company-level financial decisions affect the economy in different ways, and improving financial literacy might not necessarily benefit every individual enrolled in training, overall it is still worth assessing and developing financial literacy for either groups as it can positively influence welfare in a society (Kovács-Pásztor, 2022, Kovács-Terták, 2016, 2019, Lusardi-Mitchell, 2014).

Assessing and developing the financial literacy of individuals and entrepreneurs is not a micro-level issue but has serious macroeconomic implications as well. At individual and household level, lower financial literacy levels can jeopardise the markets through a higher demand for cash and thus giving rise to the operation of shadow economy. It can enhance the risk of accessing outside financing through credits and loans which are even though easy to access for consumers but hold a high risk of default. Finally, it can influence the income and savings of people in a country. People with lower level of financial literacy are more dependent on the social security system, posing a serious financial burden on the country's budget and as well are less likely to hold savings and even if they do, they prefer savings accounts, which indicate their lack of knowledge in other, more sophisticated savings and investment options (Béres-Huzdik, 2012). Development of financial literacy is equally as important as its assessment, as higher financial literacy levels can contribute to inclusive growth in an economy, one of the prerequisites for achieving which is equipping people with the skills to better manage finances in an increasingly complex financial world. For the poor and disadvantaged (such as rural population, minorities, the elderly), increased financial literacy clearly means greater access to the benefits of economic growth (Kovács-Pásztor, 2022).

Financial literacy of entrepreneurs can have similar implications through their income-generating potential, tax payments and value added produced.

The MSME sector, as the study of Tóth-Kása-Lentner (2022) emphasizes, is an important building block of our national economy, contributing greatly to macro-financial stability, economic growth, and job creation, SMEs "*employing more than two-thirds of Hungarian workers, producing almost half of the value added and more than 30% of corporate investment*" (Tóth-Kása-Lentner, 2022, p. 2). The domestic MSME sector has a stabilizing and balancing macroeconomic role, so the broad support of their competitiveness can be considered one of the most important driver of future economic growth (Tóth-Gyurcsik-Thuróczy, 2019). One of the most important factors of competitiveness in today's economic processes is the added value produced by business organizations, but in addition to that, a constant high level of sustainable growth can also be considered a driving force of competitiveness. Sustainable growth can have many macroeconomic conditions, such as openness, the organic integration of businesses into the world economy, macro-stability, low indebtedness, a high savings rate for households, a flexible labour market, a competitive tax system, as well as a conscious organizational culture and a high level of financial literacy. Additional criteria for economic competitiveness are the productivity, efficiency and financial awareness of economic actors, as well as their competence to continuously innovate and develop in accordance with the technical and social requirements of the time, therefore it is essential to pay attention to the analysis and development of financial literacy of MSMEs in the economy (Tóth-Gyurcsik-Thuróczy, 2019).

The content and dimensions of financial literacy depend greatly on whom we try to analyse. We need to distinguish individuals and business entities from each other, as the dimensions of financial literacy in most cases vary based on the characteristics and aims of a given target group. This also means that the dimensions that are relevant for assessing financial literacy at firm level are also going to be different from individuals, which also implies that different measurement tools are required for assessing different target groups. Therefore, studies addressing different groups of society and businesses investigated an array of different factors contributing to financial literacy, using a wide variety of analysis methods, which makes it hard to compare and generalize results.

Many measurement models exist for assessing financial literacy at firm level, and most of these identify firm-level financial literacy with the financial literacy characteristics of the main decision maker. However, analyses can not be simplified to the application of financial literacy tests at a business-related setting and neither financial literacy can be assessed independently, as financial literacy is not standing alone, but is a concept in close interaction with entrepreneurial and digital competences. Neither their complex interactions can be observed independently from each other, nor their influence on financial outcomes of the company. As Lusardi and Mitchell (2014) stated, as financial markets became greatly available and accessible to the ordinary people and smaller investors as well, such as MSMEs, it became increasingly important to possess a reasonable amount of financial awareness both at the level of individuals and companies and such awareness can be developed through hands-on training. The issue of financial literacy development raises two considerations: first, there is no one-size-fits-all solution to financial literacy training (and that is not the aim of the trainings). Areas, which could be important to one, might not necessarily be beneficial or of importance to others, as e.g. we could try to teach people about savings while it might be more useful to improve their skills in managing debts. Second, financial literacy is not a skill that can be regarded in separation from other competence areas but is composed of various cognitive and behavioural traits. Similarly to how the competences of life-long learning overlap, which is how financial literacy is in connection with other competences, such as numeracy skills or digital competences and can only be improved in parallel with other, overlapping competences. In this research financial literacy is examined jointly with entrepreneurial and digital competences among MSME financial decision-makers, and as it will be seen later, these three competences overlap quite greatly in literature and in financial decision-making as well (contributing together to the financial decisions made by entrepreneurs), especially with the spread of FinTech and digital business solutions.

1.1. Research objectives

Financial literacy, entrepreneurial competences and digital competences are usually positively associated with the ability to make informed decisions and therefore lead to an increased performance of the company. Research shows that by developing the above competences, companies can improve their economic and financial performance and on the long run can boost profitability and success. The main research question, my dissertation seeks to answer, is the following:

How and to what extent do financial literacy, entrepreneurial and digital competences influence the financial outcomes of an MSME in the Southern Great Plain of Hungary?

My aim is, therefore, to analyse if these three competences (financial literacy, entrepreneurial competences, and digital competences) have a significant impact on the financial outcomes of the company and if they have any synergies in doing so. Based on the prior literature, it is assumed that these three competences are not completely independent from each other, however the already existing literature did not address their interrelatedness; in most of the cases assessed their own individual effects on firm performance or financial performance (e.g. Adomako-Danso, 2014) or only addressed the relationships of two of them (e.g. the relationship between digital competences and financial literacy in Oggero-Rossi-Ughetto (2019), Nemoto-Koreen (2019) or Panos-Wilson (2020) or between financial literacy and entrepreneurial competences in Nwachukwu-Chládková-Žufan (2017) or Rahmandoust et al. (2011)). In my study, therefore, I am aiming at examining their joint effect on the financial outcomes of the company and as well at discovering the relationships between the different competence areas. Due to the complexity of the research and the difficulties at reaching out to companies at a national level, my research is limited to MSMEs of the Southern Great Plain region of Hungary, which encompasses of three counties, Bács-Kiskun, Békés and Csongrád-Csanád counties.

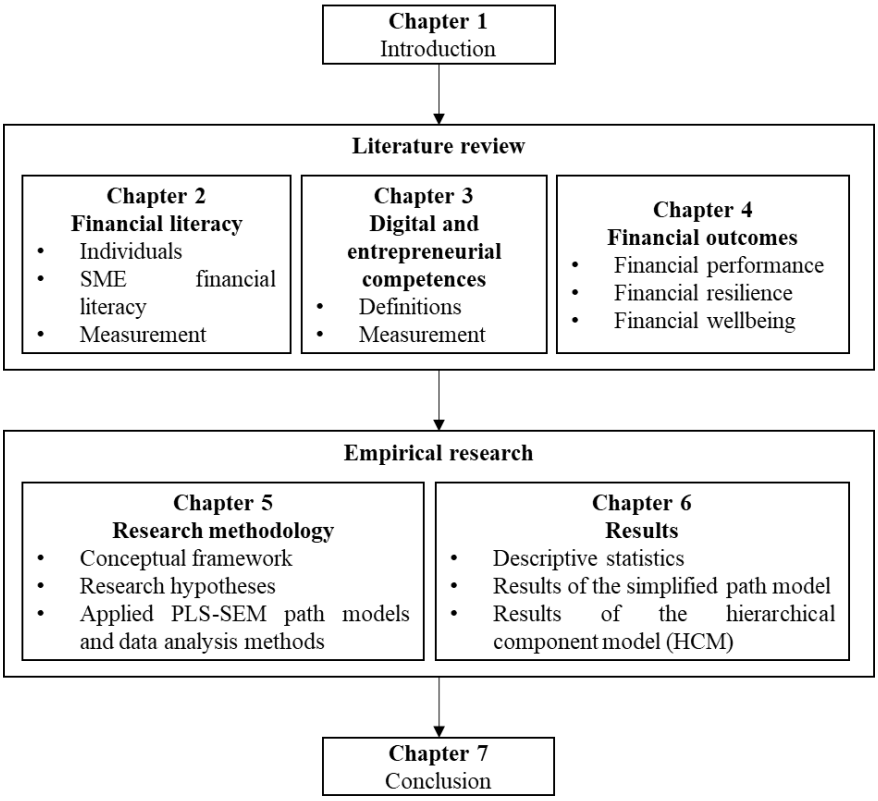
Many of the financial literacy studies focused on studying the effect of individuals' and businesses' financial literacy level on how they could handle the aftermath of the global financial and the following sovereign debt crisis, however a new, majorly different threat emerged in recent years: the Covid-19 pandemic. The pandemic caused an economic shock which was different than any of the economic crises experienced before. The lockdowns and resulting fallbacks affected businesses unequally, making the smallest businesses and certain industries (such as the tourism and hospitality industry) suffer the most, on the one hand from losing their income from one day to the other when one lockdown came effective and as well due to the behavioural changes of consumers. Since the pandemic stroke right in the middle of my studies and doctoral research, I could not decide to ignore the pandemic. Since one of the reoccurring reaction on behalf of companies to tackle the difficulties was to speed up the digitalization process, I am taking a brief look at the initial reaction of businesses to the Covid-19 pandemic at

the earlier stages of the global pandemic. Data collection has been carried out in mid-2021, focusing on the previous years, therefore the conclusions to be drawn are limited to the earlier stages of the pandemic and disregard those events that unfolded at the later stages, when the impact on businesses was greater.

1.2. Structure of the dissertation

This thesis work follows a structured path, first providing a literature review of the three competences constituting the input side of the research model, financial literacy (Chapter 2), digital and entrepreneurial competences (Chapter 3), followed by the output side of the model, financial outcomes (Chapter 4). The next two chapters are dedicated to the conceptual framework and methodology (Chapter 5), followed by the results of the empirical research (Chapter 6). The below flowchart (*Figure 1*) summarizes the structure of the dissertation, highlighting the most important elements of each chapter.

Figure 1. Structure of the dissertation



Source: own editing

Chapters 2 to 4 are dedicated to the theoretical backgrounds of financial literacy, digital and entrepreneurial competences, and financial outcomes. Financial literacy is approached from two aspects, first discussing individual financial literacy and then SME

financial literacy, as an extension of the theory on individuals, followed by the measurement methods (both qualitative and quantitative) in financial literacy research. One of the novelties of this thesis is that there has not been any research models, which included each of the three competences and broke them down to three dimensions, knowledge, attitude and behaviour at the same time. These three competencies have already been examined in earlier papers but including them in one joint model is a novelty of the thesis work.

Chapters 5 to 6 are addressing the empirical research of the thesis. The methodological part introduces the conceptual framework based on which multiple possible path models can be constructed, the research hypothesis which are derived from the literature and the applied statistical methodology. Apart from descriptive statistics, Partial Least Squares Structural Equation Modeling (PLS-SEM) is carried out to evaluate the path models. Another added value of the thesis work is that a hierarchical component model (HCM) is applied to break the competences down to their dimensions. Since traditional PLS-SEM models do not allow for constructs to exist in models without their own, direct indicators, this novel HCM method is applied to make it possible to treat the competence dimensions and financial outcomes dimensions as separate constructs in the path models. The results contain descriptive statistics about the sample, and the results of the applied PLS-SEM path models, based on which decisions are to be made on the research hypothesis. Limitations of the study and recommendations for further research are also included at the end of the thesis work.

2. Defining financial literacy

In my research question I asked how financial literacy, entrepreneurship and digital competences affect the financial outcomes of the company. In order to be able to assess their influence, we need to first be able to define these concepts, starting from the independent variables of my later described measurement model, namely financial literacy, entrepreneurship competences and digital competences.

The first competence being described is financial literacy, a combination of knowledge, behaviour and attitudes in business-specific competency areas, which even though has many ways of being defined, this thesis work adapts the most well-known and widely accepted definition by OECD (2018a). Then entrepreneurial and digital competences are defined using the most widely acclaimed EntreComp and DigComp frameworks, created and published by the European Commission's Joint Research Centre. Before describing these competences, it is important to first take a look at what competences are as defined by the updated *Council Recommendation of 22 May 2018 on key competences for lifelong learning* (the very first appearance of these competences was in the *Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning*[1] which served for many years as the foundation for competence frameworks). The Council Recommendation defines these competences as a combination of knowledge, skills and attitudes, concerning which:

- *"**knowledge** is composed of the facts and figures, concepts, ideas and theories which are already established and support the understanding of a certain area or subject;*
- ***skills** are defined as the ability and capacity to carry out processes and use the existing knowledge to achieve results;*
- ***attitudes** describe the disposition and mind-sets to act or react to ideas, persons or situations*" (Council Recommendation, 2018, p. C189/7).

[1] The European Parliament and the Council of the European Union (2006). *Recommendation of the European Parliament and of the Council of the European Union of 18 December 2006 on key competences for lifelong learning* (2006/962/EC).

The reason for mentioning this definition so early on is that even though financial literacy, digital and entrepreneurial competences were adapted from frameworks independent from each other, each of them can be originated from the same dimensions, being a combination of knowledge, attitudes and behavioural traits or skills (names for these latter two will vary in different definitions.

Financial literacy even though not being a completely new research area (the topic arose for the first time at the beginning of the previous century), gained momentum around the 2008 financial crisis, as many were blaming individuals for their inadequate level of financial literacy, making decisions that yielded no future benefits, but gave rise to the crisis. Many started assessing financial literacy of adult population which resulted in an ample but controversial literature even in the name of this notion: is this phenomenon called financial literacy or financial capability (see Lusardi-Mitchell, 2011a, 2011b)? Supporters of the former claim it to be called financial literacy as this way the name embodies the basic set of skills people must possess to be able to read, write, calculate and understand basic financial concepts. at the same time, supporters of the latter say it should be called financial capability as this phenomenon is strongly connected to people being capable of making sound financial decisions. The latter name is more widely used in the US, such as the name of the official organization responsible for financial literacy development, the President's Advisory Council on Financial Capability (PACFC) shows quite well (one interesting fact related to the debate of financial literacy and capability: the above-mentioned organization was called President's Advisory Council on Financial Literacy before 2010)[1]. In my research, I will use the name financial literacy as it is not my aim and is out of the scope of my research to decide who is right in this debate, not to mention those other articles that claim it to be called financial knowledge, financial awareness or economic literacy (Remund, 2010).

The content and dimensions of financial literacy depend greatly on whom we try to analyse; we need to distinguish individuals and business entities from each other, as the dimensions of financial literacy are in most cases vary based on the aims of a given target group. Even among individuals, different age groups need to face different financial challenges, meaning that the dimensions that are relevant for assessing financial literacy are also going to be different. In the upcoming chapters, I am providing a summary of what financial literacy means for individuals or corporations, and what methods are available for assessing financial literacy.

Financial literacy as a notion raised many debates even regarding its name, not to mention its content. For both individual and SME-related financial literacy an extensive variety of literature exists defining the notions many different ways, the aims of financial literacy being similar, while the elements and assessed dimensions differing from paper to paper. The most widely adopted definition for both notions come from the OECD (Atkinson - Messy (2012), OECD (2015)), but the interpretation of these definitions also differs for each paper using it.

2.1. Financial literacy of individuals

The most widely cited and used definitions of financial literacy all came from individual financial literacy research (e.g. Atkinson-Messy, 2012, Remund, 2010, etc.) where scholars attempted to identify the main areas of household-level and individual financial decisions and what knowledge and skill areas are connected to such decisions. Individual-level research focuses on both business-related decisions (e.g. investments) and financial decisions related to everyday personal finances (e.g. budgeting). Even though the financial literacy of any individuals (let it be adults, youth, students, etc.) is not the main scope of this research, it is indispensable to review individual financial literacy definitions and concepts. It needs to be considered that these definitions provided foundations for further research in the areas of financial literacy of SMEs, having the same dimensions taken over and complemented to fit the rather different decisions and circumstances in business-related settings. In this chapter, an overview of the definitions and determinants of the financial literacy of individuals is provided.

2.1.1. Definitions and conceptual approaches of individual financial literacy

Many definitions have been created to describe what financial literacy is. At the beginning, individual financial literacy was in the focus of attention which is essential to review since corporate decision makers are also individuals with their own financial literacy. Their behaviour and decisions are also driven by their knowledge, skills and own personal attitudes, and as well, it has been proven that financial literacy of companies show a significant co-movement with individuals' financial literacy (Avlijas-Avlijas-Heleta, 2014). Some say individual financial literacy is not different from financial knowledge, while others say it is beyond only knowledge or skills.

Financial knowledge is from one side needed to understand financial processes and from another side it could be the source of financial well-being and financial

wellness: without adequate knowledge people are not capable to make good decisions that eventually not only threatens their income situation but other aspects of their lives as well. To expand this view at a higher level than an individual, making sound financial decision at individual level can also contribute to the financial well-being and financial stability of the economy (Kovács-Pásztor, 2022, Braunstein-Welch, 2002, Buch, 2018, Cupak et al. 2018). Two kinds of definitions have been created: those that describe the phenomenon in one sentence and those that treat it as a complex concept consisting of a set of elements, skills, behaviour etc. OECD has created the most notable definition of financial literacy (and since then has been adopted by dozens of researchers, including own previous works):

> "*Financial literacy is a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing.*" (Atkinson-Messy, 2012, p. 14.)

Similarly, the Hungarian Central Bank in 2008 also created its own definition that describes financial literacy of individuals as that level of financial knowledge and skills that is required to identify and understand basic financial data and to assess the possible future effects of financial decisions they make. The definition of Suganya (2013) is in line with the above definitions: financial literacy is not equal to the knowledge itself as that way it should only be called financial knowledge. Instead, financial literacy embodies all those skills as well that individuals use when considering the future outcome of their financial actions (this definition also assumes people having a certain degree of rational thinking as well).

These definitions describe the phenomenon in one simple sentence; however, one disadvantage of the above definitions is that they fail to describe what are those specific skills and elements people should possess to make sound financial decisions. One might also pose that question of what kind of behaviour is expected or required when making sound financial decisions? Even though they do not answer the above questions all in detail, some literature suggests such concepts that treat financial literacy as a complex set of skills, attitude, and behavioural elements. In the case of individuals, these concepts more or less succeed to identify the key elements but in the case of corporate financial literacy, a good concept still awaits to be created to identify what affects and influences financial literacy of enterprises. The above definition even though mentions a few

influencing factors of corporate financial literacy, such as knowledge, skills, experience and some key knowledge areas what it fails to describe is the role of the different agents, such as leaders and subordinates in forming corporate financial literacy.

The previously mentioned organizations PACFL/PACFC have also created their own definitions in which financial literacy and knowledge are strictly distinguished from each other. Financial knowledge in their understanding is all that individuals can obtain through training and studying, while financial literacy is a concept above financial knowledge, embodying it together with already possessed skills, decision-making skills and the ability to handle financial resources, including information as a resource (Hung-Parker-Yoong, 2009).

Joining the debate concerning financial literacy and capability, Remund (2010) collected the most frequently appearing phrases that scholars use alternately with financial literacy and capability. In his understanding, capability in its real meaning is the ability to do something, so who is financially capable has some skills and abilities that is needed to be able to make sound financial decisions. At the same time, literacy is a notion closely connected to being able to read and write and to understand the read concepts, hence who is financially literate can understand what financial concepts mean. Apart from these two, Remund (2010) mentions the below names as well:

- *financial knowledge*: is a recurring notion, some claim that the background of financial decisions can be explained exclusively by the knowledge of individuals, disregarding personal characteristics and behaviour.

- *financial empowerment*: Remund found this expression when analysing studies assessing financial literacy in African countries, however this refers to a process, at the end of which new financial opportunities become available for the by then financially empowered individuals. Financial empowerment is thus a learning process the result of which people become able to make more elaborate financial decisions.

- *financial responsibilization*: also refers to a process or rather a set of rules that limits individuals, ensuring that they make the most appropriate financial decisions making them reliable in the eyes of financial suppliers as well.

- *economic literacy* or *economic understanding*: is a notion broader than financial literacy, including non-financial, economic knowledge, attitudes and behavioural elements.

- *credit literacy*: is a segment of financial literacy, referring to such knowledge, skills, attitudes and behaviour that is related to credits and loans (Remund, 2010).

Main articles in assessing financial literacy are coming from Remund (2010), Hung-Parker-Yoong (2009) Huston (2010) and Lusardi-Mitchell (2011a, 2011b, 2014), and despite they contribute highly to the research of financial literacy, they also make it quite complicated to compare their results as all of the above experts have created their own definition or concept of what financial literacy is. Some identify financial literacy as solely knowledge and understanding, some put emphasis on decision-making while others highlight the practical use of financial knowledge and experiences. As a compromise between several approaches, Hung and her co-authors (2009) propose the concept of financial literacy as a mixture of perceived and factual knowledge, experience, skills and attitudes. Remund, understanding the complexity of the existing definitions and the controversies in understanding the content of financial literacy, in his 2010 study reached out for a clearer definition of the phenomenon, categorising the already existing definitions into five main areas:

- "*knowledge of financial concepts,*
- *ability to communicate about financial concepts,*
- *aptitude in managing personal finances,*
- *skill in making appropriate financial decisions, and*
- *confidence to plan effectively for future financial needs*." (Remund, 2010, p. 279-281)

Apart from the above, Remund emphasizes basic literacy (the ability to read and write) and the ability to process information as the most important preconditions of financial literacy. Without these, financial knowledge is worthless, e.g. without the ability to read, we can only have limited tools to make financial decisions. The study also emphasizes that financial decisions are not solely based on financial literacy, the simultaneous usage of several cognitive abilities is needed to make any decisions, and hence financial literacy cannot be treated as a unique field. The recommended conceptual definition by Remund (2010) is the following:

"*Financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions.*" (Remund, 2010, p.284)

The second definition of Remund approaches the notion of financial literacy from a more practical view. The essence of this "operational definition" is to place the conceptual definition into a more realistic environment and to specify the measurement methods. The most common methods for measuring financial literacy are surveys and polls, and according to Remund (2010) the most commonly appearing topics in such surveys are personal finances, basic financial knowledge, savings, credits and loans, and finally, investments. Occasionally appearing topics are insurances, the misuse of credits and loans (both from the side of the creditor and the borrower) and real estate or property issues. Based on these above topics, in the operational definition financial literacy is *the degree to which people understand and put into practice basic financial concepts in handling personal finances, savings, credits and investment, and provides a measurement method to specify financial literacy levels of individuals.*

Lusardi and Mitchell (2011b, 2014) also identified four key areas of financial literacy that are recurring categories in their own research and are also applied by other researchers: compound interest (through the example of savings), inflation and risk diversification. Approaching financial literacy from the methodological aspect, Huston (2010) reviewed 71 previous assessment that have all been carried out by using different definitions and content, and succeeded to identify the key areas to be examined:

- "*Money basics (including time value of money, purchasing power, personal financial accounting concepts).*
- *Intertemporal transfers of resources between time periods, including both*
    - *borrowing (i.e., bringing future resources into the present through the use of credit cards, consumer loans or mortgages) and*
    - *investing (i.e., saving present resources for future use through the use of saving accounts, stocks, bonds or mutual funds).*

- *The fourth content area is protecting resources (either through insurance products or other risk management techniques).*" (Huston, 2010, p. 303)

Financial literacy is, according to Hung-Parker-Yoong (2009), a state defined by a number of complex interrelated factors. This state has several distinguishable elements: financial knowledge, cognitive abilities, financial attitudes and behavioural patterns. In this state financial knowledge means special understanding of financial notions the development of which is supported greatly by both education or training and cognitive skills. Financial attitudes are isolated from financial knowledge but is connected to behavioural elements, influencing each other constantly. Behaviour can be simultaneously influenced by perceived and actual financial knowledge, financial and cognitive skills. If we regard one's actions or behaviour as the output of financial literacy then we can see what a complex system is financial literacy, which can be summarized in a conceptual definition:

"*Financial Literacy: knowledge of basic economic and financial concepts, as well as the ability to use that knowledge and other financial skills to manage financial resources effectively for a lifetime of financial well-being*." (Hung-Parker-Yoong, 2009, p. 12)

These areas cover almost all aspects of personal financial decision-making and even though these categories are applied for assessment of individuals, except for managing personal finances-as personal finances are less related to corporate strategic goals-the above areas can all be applied in the case of companies as well.

2.1.2. Dimensions of individual financial literacy

Some of the surveyed papers applied the Atkinson-Messy (2012) or Lusardi-Mitchell (2008, 2011a, 2011b) dimensions (Bannier-Schwarz, 2018; Bianchi, 2018; Brent-Ward, 2018; Karakurum-Ozdemir-Kokkizil-Uysal, 2018; Ország-Kosztopulosz-Kovács, 2015; Stolper, 2018), however, many others listed a complex set of factors forming financial literacy. Three studies identified three subsets of financial literacy, investor literacy (Alexander-Jones-Nigro, 1997), debt literacy (Lusardi-Tufano, 2015) and credit literacy (Lyons-Rachlis-Scherpf, 2007). Investor literacy refers to being familiar with stock and bond mutual funds, insurances, investment decisions, returns, or derivatives, which are areas that appear in non-investment-specific studies as well (e.g. Hsiao-Tsai, 2018). The main dimensions of debt literacy are the ability to

calculate compound interest (related to credit card debt) and debt repayment time (interest), and the understanding time value of money (Lusardi-Tufano, 2015). Credit literacy embodies general credit report knowledge and the familiarity with credit history impact, credit report contents, credit score, factors that affect credit scores and the dispute resolution process (Lyons-Rachlis-Scherpf, 2007). *Table 1* contains a short summary of factors contributing to individual financial literacy.

Table 1. Dimensions and determinants of individual financial literacy

Study	**Dimensions/determinants of financial literacy**
Alexander-Jones-Nigro (1997)	investor financial literacy: stock and bond mutual funds, insurances, investment decisions, returns, derivatives etc.
Atkinson-Messy (2012)	knowledge (division, simple and compound interest, risk and return, inflation), behaviour (considered purchase, timely bill payment, keeping watch of financial affairs, long-term orientation, household budgeting, active saving, financial products, borrowing), attitude (attitudes towards money, planning for the future)
Bannier-Schwarz (2018)	Lusardi-Mitchell (2008) dimensions, compound interest, money illusion, return volatility, stock market, balanced funds, bond prices
Béres-Huzdik (2012)	self-care, trust, planning, long-term thinking, profitability
Bianchi (2018)	Lusardi-Mitchell (2008) dimensions, compound interest, knowledge of financial products, information about market trends, mathematical abilities
Botos et al. (2012)	income (through the amount of savings, credits and loans), financial instruments, saving behaviour, consumption
Brent-Ward (2018)	Lusardi-Mitchell (2014) dimensions, savings, return on investment and bonds related to purchasing energy durables
Brown-Henchoz-Spycher (2018)	interest (simple and compound), budgeting, purchasing decisions, understanding of bank statements, understanding of stock price developments, inflation, diversification
Henager-Cude (2016)	objective financial knowledge, subjective financial knowledge (confidence), subjective financial management ability
Hilgert-Hogarth-Beverly (2003)	savings, credits and loans, mortgages, general financial management, investment
Hsiao-Tsai (2018)	money management and saving, credit and loan management, financial and investment planning, insurance and retirement planning
Huzdik-Béres-Németh (2014)	financial knowledge, experiences, skills, awareness, attitudes
Karakurum-Ozdemir-Kokkizil-Uysal (2018)	basic numeracy (division), time value of money, simple and compound interest, inflation
Kovács et al. (2021)	general financial knowledge savings and investments, credits and loans, the world of work (labour market-related topics), insurances and pensions, general economic knowledge
Luksander et al. (2014)	general financial knowledge, savings and investment, credits and loans, labour market related topics, general economic knowledge, insurances, pension
Lusardi (2020)	The "Big Three": numeracy (calculating simple interest), inflation, risk diversification (based on Lusardi-Mitchell, 2008, 2011a, 2011b)

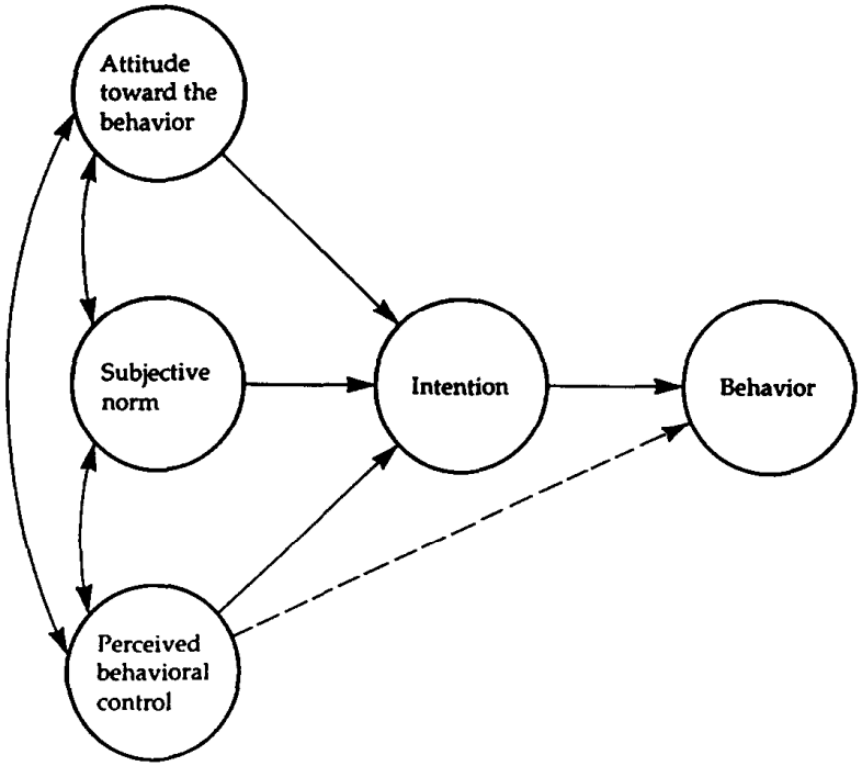
Table 1. continued

Study	**Dimensions/determinants of financial literacy**
Lusardi-Mitchell (2008, 2011a, 2011b)	saving: compound interest, inflation; risk diversification
Lusardi-Tufano (2015)	debt literacy: compound interest (related to credit card debt), calculating debt repayment time (interest), understanding time value of money
Lyons-Rachlis-Scherpf (2007)	credit literacy: general credit report knowledge, credit history impact, credit report contents, credit score, factors that affect credit scores, dispute resolution process
Mandell-Klein (2007)	dimensions based on the Jump$tart Coalition for Personal Financial Literacy: income, money management, spending and credit, saving and investing determinants: education, planned occupation, expected full time income
Mashiza-Sibanda-Maumbe (2019)	Atkinson-Messy (2012) and Lusardi-Mitchell (2014) dimensions: interest, inflation, diversification, risk and return, risk reduction, numeracy (subtraction, multiplication, division, percentages)
Sarpong-Danquah et al. (2018)	understanding and knowledge in: personal financial management, savings, borrowing, investment, insurance, personal finances, financial education, financial capability, financial distress
Servon-Kaestner (2008)	stocks and bonds, credits and loans, personal financial management and planning, digital finances, risk diversification, savings
Stolper (2018)	Lusardi - Mitchell (2008) dimensions

Source: own editing

Even though attitudes are most commonly considered as a one building block of what we call financial literacy today, the actual research of financial attitudes by itself dates way back than financial research literacy. Before we turn towards the analysis of financial attitudes, the theory of planned behaviour (TPB), a psychological behavioural model by Ajzen (1991) linking beliefs, norms, and attitudes to behaviour, must be mentioned. The model claims that behaviour (e.g. financial decisions) is preceded by the intention to perform a certain behavioural act. This intention is influenced by the attitudes towards the behaviour, subjective norms and perceived behavioural control (*Figure 2*). It needs to be noted that in financial literacy research TPB is very often used as the basis for hypothesizing that attitudes have a direct influence on behaviour (e.g. in Koropp et al. 2014, Sariwulan et al. 2020, Sivaramakrishnan-Srivastava-Rastogi, 2017, Yong-Yew-Wee, 2018).

Figure 2. The model of the theory of planned behaviour by Ajzen (1991)



Source: Ajzen (1991), p. 182.

Individuals are exposed to money from childhood onwards and thus develop certain attitudes towards the use of money, financial products, service providers or even banks throughout their lives, which can affect not only their economic but also their social situation, influencing their social relationships or behaviour (Nagy-Tóth, 2012). The study of financial attitudes began long before financial literacy research, with the first major research in the topic appearing as early as the beginning of the 1980s.

In their 2012 study, Nagy and Tóth provide a detailed account of how the study of financial attitudes evolved in the three decades preceding their paper. As a first step in the study of financial attitudes, they mention the *Money Attitude Scale* of Yamanchi and Templer (1982), which examined individuals' financial attitudes along four dimensions, each of which is present in individuals to varying degrees and influences their behaviour depending on the area in which they have stronger attitudes:

- Power-Prestige: individuals with a strong power-prestige attitude see money as a symbol of power and success and as a tool to impress or influence others. Power- and prestige-oriented consumers often seek to justify their status through increased consumption.

- Retention-Time: individuals with this attitude are more likely to be mindful of their spending and plan their finances accurately, and less likely to engage in impulse buying.
- Distrust: individuals with this attitude are insecure and suspicious when it comes to money. When making financial decisions, they tend to lack confidence in their own decision-making abilities.
- Anxiety: An anxious person sees money as the source or solution to all their anxieties. Not having enough money can also negatively affect their well-being, but having too much money can also cause internal strife (Yamanchi-Templer, 1982, Liu-Wang, 2008).

The above four dimensions have been reworked and added to by numerous authors over the next 30 years, one example being Medina and co-authors in 1996, who combined the dimensions of anxiety and distrust and added quality as a fourth factor to the attitudes (Nagy-Tóth, 2012).

Another very important determinant of attitudes, but one could also consider it as a dimension, is the emotional intelligence (EQ) of individuals, the cognitive ability to manage and regulate their emotions. Numerous research has demonstrated that individuals with higher emotional intelligence are not only more open in their social relationships and more able to form relationships than their counterparts with lower emotional intelligence but are also much less 'cramped' in their finances. For them, money is not associated with power and status, whereas individuals with low emotional intelligence are more likely to have strong power-prestige attitudinal traits and to see money as a means of acquiring and retaining power (Nagy-Tóth, 2012). As a combination of the above, Nagy and Tóth (2012) created an integrated model of financial attitudes of bank customers, which not only examines the 4 dimensions of Yamanchi and Templer's model, but also combines it with the emotional intelligence of individuals and the areas of activity of banks (Nagy-Tóth, 2012).

Financial attitudes can be grouped in other ways. Only two years after Yamanchi and Templer's study, another significant study of financial attitudes appeared, Furnham (1984) examined financial attitudes along six dimensions:

- Obsession: in this dimension, it may be characteristic of individuals that they obsessively want to get as much money as possible, are proud of their financial successes and think a lot about their future finances.
- Power/Spending: similarly to the Yamanchi-Templer model, for those with power attitudes, money is a means of controlling others, they see money as the one that can solve all difficulties.
- Retention of money: also similar to the above model, individuals worry about their finances, manage them carefully and save even when they would not otherwise need it.
- Security/Conservative: In Furnham's terms, these individuals' attitude to money is quite "old-fashioned".
- Inadequacy: individuals with an inadequate attitude always feel that they do not have enough money, that it always slips out of their hands, that they are not masters of their personal finances.
- Effort/Ability: effort is the dimension of individuals accessing their money (Furnham, 1984, Herdijono et al. 2018).

Based on the two groupings above, we can identify several common dimensions of financial attitudes. Individuals may view money as a means of power and prestige, but it may also be seen as a source of security or even insecurity, and individuals may be characterised by caution in their own finances. The two studies also have in common the methodological background of their investigation of the topic, the former study having 29 statements to be rated on Likert scales, the latter having 150 statements, the scores for which were then reduced to four and six dimensions (Yamanchi-Templer, 1982, Furnham, 1984) after dimensional reduction (i.e. principal component and factor analysis).

Similar scaling assessments were used in the 2012 joint survey of the University of Szeged and the Budapest Business School and in the 2015 survey of the Pénziránytű Foundation. In the latter study, young participants were asked to rate 36 statements on a 5-point Likert scale. The authors in the 2015 survey first and foremost classified two groups of respondents into 3 clusters each based on their responses to the 36 statements, among the adult population, using a sample of 3088 respondents, and also in a sample among university students, using a sample of 2070 respondents (Zsótér-Béres-Németh,

2015, Zsótér-Németh-Béres, 2016); and ultimately, they identified seven main personality types, which were:

- The "*allocators*": those, who are prudent with their money, with attitudes that reflect saving time and security/conservatism.
- The "*workers*": those, who are similarly prudent with money as the "*allocators*", but are more prone to overspend, yet they cover their expenses by working more rather than reallocating, so their attitudes reflect effort.
- The "*dabblers*": the group with the most negative financial attitudes, who by their own admission are unable to allocate their money, so that at the end of the month they usually have nothing left and no savings.
- The "*tidy ones*": who are, again, as prudent as the "*allocators*" in their finances, planning and keeping a close eye on their finances, but spending more than them, yet being careful not to overspend like the "*workers*".
- The "*undisciplined ones*": those whom, like the "*dabblers*", may often be in debt, try to spend less than their peers, but would not take a job to settle their debts.
- The "*planners*": the most careful group, they know exactly how much they can manage, they have no debt but do have savings, are active savers and have the most positive financial behaviour of the seven groups.
- the "*once in a while, twice out*" group, who are a kind of transition between the "*workers*" and the "*tidy ones*", trying to improve their financial situation but not always succeeding, with no debt but no savings either; are not always able to resist shopping, but nevertheless feel they have a good control over their finances (Luksander et al. 2016).

The results of this research can help individuals to understand why their financial situation is the way it is and, once they have identified their mistakes, can help them to target their financial behaviour to improve it, by addressing or overcoming negative attitudes. The results can also help financial decision-makers to identify the attitudes and behaviours that should be developed alongside financial knowledge (Luksander et al. 2016, Zsótér-Németh-Béres 2016).

The above introduced studies are merely pilot projects to the magnitude of the most recently published study by the authors which was based on a sample of 22933 valid responses (Németh-Deák-Zsótér, 2022). Using the same 36-item Likert-scale questionnaire, the statements were used to create 8 personality trait factors ("*spender, reactor, diligent creative, collector, money pit, low income vulnerable, order creates value, family and home-oriented"*). These were then used to classify 8 clusters of the adult population by their financial personality types and the financial vulnerability of the adult population was assessed in the identified eight clusters:

1. "*Hard workers*": in this group, the *order creates value* factor, and the *diligent creative* factor scored the highest average. There are clusters where these factors scored higher, but their value is not negligible in this group either. The average for the low *income vulnerable factor* is higher here than in other similar clusters (e.g. cluster 3).
2. "*Reactors*": this cluster has the highest average of the *reactor* factor. Members of this cluster are also strongly family and home-oriented and are characterized by order.
3. "*Order creates value*": this group is also highly characterized by the *reactor* factor value, and what makes this group substantially different from the "*Reactors*" is that this cluster is much less family and home-oriented but more characterized by the *order creates value* trait.
4. "*Spenders*": members of this cluster are the most family and home-oriented, yet are also very much like to spend, however not as much as other clusters.
5. "*Passives*": this cluster has moderate values for every trait and scored very low on the *reactive* trait, they do not exhibit any traits that makes them remarkable in any sense, making them very passive in their finances.
6. "*Money pits*": in this group, members are even though very family and home-oriented, they are prone to overspend, with the highest score in the *money pit* trait and as well have high score in the *reactive* trait.
7. *"Once in a while, twice out*": a very volatile group of respondents, the characteristics are similar to the group of the same name in earlier studies.
8. *"Vulnerable, with low income"*: this group, as the name already suggests, is very vulnerable, with a low income, and are very much characterized by

the money-pit trait and as well the family and home-oriented trait (Németh-Deák-Zsótér, 2022).

As shown above, the study of financial attitudes goes back much further than the study of financial literacy itself. This is due both to the ease with which attitudes can be studied (attitudes are a complex task, but less complex in themselves than all elements of financial culture) and to the recognition by researchers of the important role attitudes play in the behaviour of individuals and, in particular, in the financial decision making process. What is common in the majority of the definitions is that they usually tend to differentiate between the three dimensions of knowledge, behaviour and attitudes, which is also what is applied in this current research. There are various common elements in the definitions, such as the importance of numeracy, or the most commonly mentioned topics of inflation, personal financial and budgeting, long-term orientation, credits and loans, savings and investment etc. However -and that might be due to the timeliness of the papers reviewed- many lack digitalization, digital finances and FinTech altogether, which should be now included in the definitions. Nonetheless, it is not the aim of this thesis to redefine what financial literacy is, this present work is based on the existing framework, but the shortcomings of the definitions are why it could be useful to combine the three factors of financial literacy, digital and entrepreneurial competences together, in a joint research framework.

2.2. SME financial literacy

2.2.1. Definitions and conceptual approaches of SME financial literacy

In the case of financial literacy of firms, many concepts have been created and are at use by authors. The definition of OECD (2015) mentions the dimensions of SME financial literacy, such as knowledge, skills, experience and some key knowledge areas and serves as an important basis for many definitions created since:

„*SME financial literacy is a combination of knowledge, skills and practice of financial products, concepts, risks and regulatory and legal matters to take the most appropriate finance-related decisions at every stage of SME life - cycle to ensure further business development, growth and profit generation of the firm*" (OECD, 2015, p. 11.)

The above definition got further refined in the 2018 as the OECD/INFE published a core competences framework for the financial literacy of micro, small and medium enterprises (collectively referred to as MSMEs). In this framework, MSME financial literacy is defined as:

> "*the combination of awareness, knowledge, skills, attitudes and behaviour that a potential entrepreneur or an owner or manager of a micro, small or medium sized enterprise should have in order to make effective financial decisions to start a business, run a business, and ultimately ensure its sustainability and growth*" (OECD, 2018a, p. 7.).

This definition stresses that the subject of it is not an entire enterprise, as financial literacy -as it is a common misconception appearing in many papers- is not such that can be interpreted at company level, only at the levels of individuals, which individuals can be entrepreneurs, owners or managers of MSMEs or even aspiring entrepreneurs who are just about to start their business. Financial literacy is therefore, within the framework of this current definition, is a very complex competence, individuals should possess and constantly develop to be able to operate a business successfully and securely. The above OECD definition is derived from the individual definition by Atkinson and Messy (2012) and can be regarded as a specialized extension of that, keeping the original dimensions of knowledge, behaviour and attitudes, but modifying its content so that it fits business-related (with special regards to the traits of SMEs) context.

Being a financially literate entrepreneur by this definition requires a skillset which is clearly distinct from individuals' financial literacy concerning personal finances, therefore the main areas of competency are more business-related, more specific to business-related finances rather than personal finances. Entrepreneurs can therefore possess some degree of financial literacy skills in both areas, personal and business-related finances, and even though there could be some overlaps between them, e.g. calculating interests and financial planning appears in both skillsets and competency areas, the expertise and the concerned knowledge is always different, specific to the given circumstances of personal and business finances. Entrepreneurs should hence be able to separate their personal and business-related finances and be able to make financial decisions concerning their business (e.g. taking a credit or loan) independent from their personal finances (OECD, 2018a).

In the context of Hungarian SMEs, Tóth, Kása and Lentner (2022) have created their own definition for corporate financial culture. The authors stress that there is no consistent approach to understanding financial literacy, but what is common in most definitions is that a high level of financial literacy can positively affect the quality of financial decisions, and through that can enhance financial performance as well. Parallel to that, the lack of financial literacy can not only deteriorate the quality of financial decisions, hinder business growth, but can even lead to the failure of the business in the worst case. The authors, based on the reviewed literature have created their own definitions for what they call as 'corporate financial culture', a notion highly similar to what is called SME financial literacy in this current research:

> *"A corporate financial culture is, thus, a conscious and company-specific application of knowledge and tools from the financial management tools within the company and macro-environmental financial variables outside the company that improves the company's efficiency, effectiveness, and competitiveness"* (Tóth-Kása-Lentner, 2022, p. 4.)

A similarity of this definition with the previously introduced conceptual approaches is that it is treating financial literacy as a complex notion with does not only comprise of factual knowledge about financial constructs and tools, but also include the ability of the application of said concepts and tools to make decisions. This definition also goes beyond the use of financial tools and instruments, it also includes the impact financial decisions have on the operation of the company and directly implies that this effect should be positive (Tóth-Kása-Lentner, 2022). This latter will be important in my research as well, as the theoretical model –as it will be seen later- will be based on the same assumption.

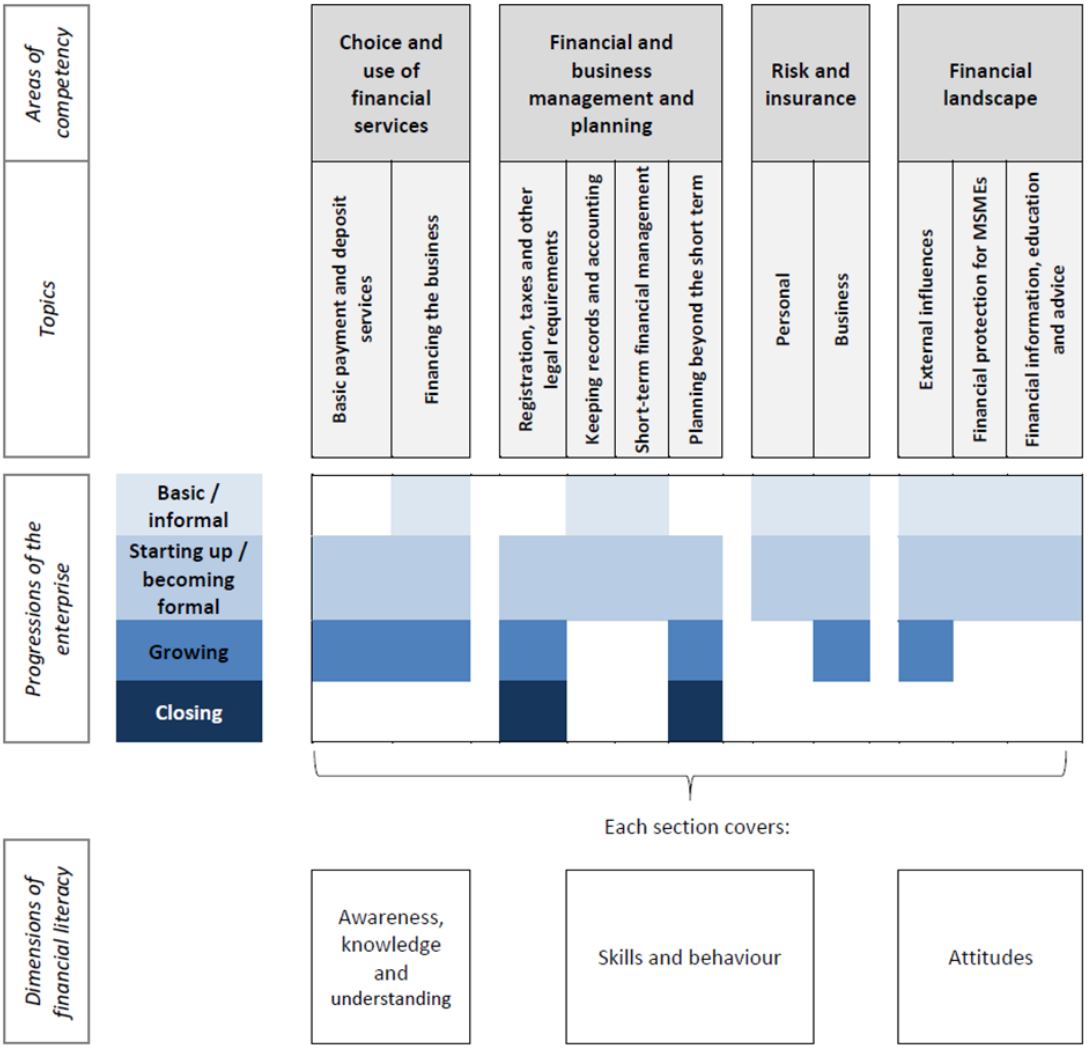
The OECD (2018a) financial literacy competency framework is a multidimensional framework which does not only defines the main dimensions of financial literacy (knowledge, attitudes and behaviour, similarly to its earlier definitions and frameworks) but the actual areas of competency and topics within them, and as well specifies at which state of the life-cycle or development a firm should possess those certain skills. According to the framework different skills are required at different stages of development from the idea of starting a business, until the closing of the business,

which can either be voluntary (e.g. sale or succession of the business) or involuntary, as a result of some failure on the market (e.g. insolvency or bankruptcy).

Competences even though might appear or become important at different stages of the company life-cycle, they are meant to be cumulative concerning their progression, built on top of each other, as successfully upgrading a competency area is not possible without possessing the earlier skills on that given competency area as well. Concerning therefore their development overtime, competences at a given level are meant to be cumulative with their preconditions, meaning that e.g. possessing a higher knowledge in business risk management is not possible without having the preliminary knowledge on it, having the basics of business risk. Even though it might seem that every competency area is required at every phase of a business's life, according to the framework, some are not required at earlier stages (e.g. long-time planning and knowledge on deposit services are not necessarily required before starting a business) and some remain unchanged at later stages. For example, the competences on financial protection for MSMEs are meant to reach their "full potential" by the time the company is becoming formal. It does not mean that this competency is not meant to be further improved over time, but essentially means that an equally high level of financial protection related competences are important throughout the entire life-cycle of the business) as it can be seen on *Figure 3*.

One important takeaway of the below figure is that the areas of competency, the progression of the firm and the dimensions of financial literacy could be understood as a three-dimensional framework. Areas of competency are on the horizontal axis (abscissa), development over time is on the vertical axis (ordinate) and dimensions are on the "depth" axis (applicate), where in any points in this three-dimensional figure we can find a given dimension of a competency area at a given phase of development of the firm. Even though the progression of competences through the life cycle of the firm is regarded cumulative, areas of competences are not, and as well, there is no specific order between these topics and competence areas. This means that even though to progress in a topic over time an entrepreneur needs to possess the preliminary skills in that area, but concerning the different areas they might have competences in one area while might not need competences in other, concerning the characteristics of the business. Similar to this, concerning the dimensions (knowledge, behaviour, and attitudes) do not need to be acquired in a specific order, but could be developed simultaneously (OECD, 2018a).

Figure 3. MSME financial literacy framework by OECD (2018a)



Source: OECD (2018a), p. 13.

In this research this definition by OECD is applied to describe financial literacy of micro, small and medium enterprises. However, many other concepts and definitions exist which approach SME financial literacy from different points of view, and which are equally as well-detailed as the OECD framework, however in many cases focus on just a sub-group of topics compared to which the OECD framework is much more inclusive and complete concerning the business-related topics it includes.

2.2.2. Dimensions of SME financial literacy

Regarding other definitions on financial literacy of SMEs, in recent years, many surveys were published related to the financial literacy of either micro-entrepreneurs or small and medium size enterprises. One regularly appearing aim of these studies is to map the competences of companies in handling different financial issues and recovering their

strengths and weaknesses in order to formulate training programs or recommendations on how to improve these faults. Another very common aim of these studies is to assess the effect of financial literacy on financial growth or firm success (in some cases equating these two terms, see Abebe-Tekle-Mano (2018), Dahmen-Rodríguez (2014), Drexler-Fischer-Schoar (2010), Eresia-Eke-Raath (2013), Fatoki (2014), Hakim-Oktavianti-Gunarta (2018), Limpek-Kosztopulosz-Balogh (2016), Sucuahi (2016)). In general, these studies succeed at determining if financial literacy has an effect on firm performance (the common answer is that it does, higher financial literacy levels contributing to higher performance and greater success).

Another similarity of these studies is the emphasized role of education and training in improving financial literacy, and as well many claim basic mathematical skills should not be ignored either (Brown-Saunders-Beresford (2006), Dahmen-Rodríguez (2014)). Even though the results are mixed concerning what and how needs to be taught, the consensus is that financial literacy can be improved through training and that companies usually ignore the importance of continuous learning and development. Financial literacy of firms, beyond general and financial knowledge or education, can be affected by various other factors, as a few example, culture or trust towards company actors or even the use of technology at the company, as summarized in *Table 2.*

Table 2. Dimensions and determinants of financial literacy of firms

Study	**Dimensions/determinants of financial literacy**
Agyei (2018)	culture, religion, corporate governance, savings, investment
Brown-Saunders-Beresford (2006)	perceptions of financial awareness and literacy, business knowledge (e.g. finances, accounting, planning, sales, marketing etc.), financial education/training, confidence in own personal skills, basic literacy
Chen-Volpe (1998)	general financial knowledge, saving and borrowing, insurance, investment
Dahmen-Rodríguez (2014)	quantitative literacy, business management, general business practices, marketing, sales and revenues, business products and/or services, competition, inventory, accounting practices, employee policies and procedures
Delić-Peterka-Kurtović (2016)	study focuses exclusively on knowledge of available financing sources and knowledge and management of the company's accounting information
Eresia-Eke-Raath (2013)	perceived knowledge, financial training/education, records kept at the company
Fatoki (2014)	financial planning, book-keeping, understanding of funding sources, business terminology, finance and information skills, use of technology, risk-management (insurance)

Table 2. continued

Study	Dimensions/determinants of financial literacy
Hakim-Oktavianti-Gunarta (2018)	SME age, age, gender and education of main decision-maker, credit access
Kasim-Ahmad (2020)	Chen-Volpe (1998) dimensions: basic knowledge of financial management, credit management, savings and investment management, risk management
Molina-Garcia et al. (2020)	4+2 elements: updated sectoral information, policy development, alternative financial sources, investment alternatives (knowledge elements), decision-making, relevance of staff training (behavioural elements)
Ország-Kosztopulosz-Kovács (2015)	Remund (2010) dimensions, trust towards company actors, information sources, family and company assets
Sindani (2019)	financing of receivable options available, credit monitoring methods, computation of discounts and financial ratios, credit analysis methods and credit collection
Sucuahi (2013)	record keeping, savings, budgeting, financing

Source: own editing

Financial literacy at firm level is slightly more difficult to describe and, in many cases, relies heavily on individual characteristics. Studies concerning micro-businesses showed that the smaller the business the more it can be described by individual financial literacy, and financial literacy of these entrepreneurs can be improved the same way as of individuals, through any financial training (Abebe-Tekle-Mano (2018), Drexler-Fischer-Schoar (2010), Fatoki (2014), Sucuahi (2013)).

The above summary in *Table 2* shows it well that firm level financial literacy thus is based on individual characteristics and financial literacy of its agents and is expanded with a wide range of business-specific notions, such as accounting, marketing, technology usage or even employee policies. Therefore, even though one might think that financial literacy might be a notion even more complex and hard to define, we might regard it as an extension of individual financial literacy: at firm level, personal characteristics of company agents and business related knowledge and experience form financial literacy of firms together, just like how the OECD (2018a) definition stresses it.

2.3. Measuring financial literacy

2.3.1. Foundations of measurement models: methods to assess financial literacy of individuals

Financial literacy research and assessment begin among individuals with the most noted studies being attributed to the OECD (Atkinson-Messy, 2012) and Lusardi and Mitchell (2008, 2011b, 2014) and were determining analysis methods for many years, having been adapted by various authors. In this chapters a brief overview is provided of the most important financial literacy assessments among individuals, describing target groups of the analyses, focus areas, measurement methods and whether they classified the respondents to financially literate or illiterate. These surveys need to be mentioned, as many elements were then adapted to the level of companies.

Assessments carried out by OECD and Standard and Poor's set a minimum level that respondents had to reach to identify them as having "good" or "high" level of financial literacy (Klapper-Lusardi-van Oudheusden, 2015, Ország-Kosztopulosz-Kovács, 2015), the former dividing the assessment to three key areas: financial knowledge, behaviour and attitude. The OECD adult financial literacy survey was a survey carried out in 14 countries among a total of 19212 respondents, distributed by national central banks and processed and analysed by a division of OECD called International Network on Financial Education (OECD INFE). This questionnaire composed of a total of 22 questions, 8 were knowledge test questions (open response, multiple choice questions and true or false statements), 9 were behaviour-related statements (measured in 5-point or 7-point Likert scales) and the remaining 3 were attitude statements (also measured in 5-point Likert scales). Depending on the number of correct answers and as well the agreement with the Likert scale statements, each of these dimensions were measured with scores of 8 points, 9 points and 5 points respectively.

The methods used for evaluating the dimensions in the OECD questionnaire were very diverse and elaborate. For the knowledge test questions, the number of correct answers was counted, while for the behaviour statements, depending on the agreement or disagreement with certain statements, scores were assigned to the Likert scale items and last, for the attitude statements, the average of the Likert scale responses was calculated. The survey set a threshold for a person to be considered financially literate: those who could reach a minimum of 5 (out of 8), 6 (out of 9) and 3 (out of 5) points in each of the

above dimensions, respectively. By rescaling the scores along each dimensions to a scale of 0 to 100 the authors could also calculate an overall financial literacy score for the countries. The average of this combined score was 62,3 (scoring on average about 13,7 points) among all of the surveyed countries which indicated a moderate level of financial literacy among all of the respondents. However, it is important to note that after grouping the participating countries to 7 subsets with similar scores, Hungary was classified in the group with the highest scorers, along with Malaysia, Germany and British Virgin Islands (Atkinson-Messy, OECD 2013). This survey with slight modifications and with the introduction of new questions assessing e.g. the use of financial products, financial well-being and financial resilience (both latter will be introduced in a later chapter) provided the foundations for the 2016 OECD/INFE International Survey of Adult Financial Literacy Competencies, using a sample of 51650 adults from 30 countries, and later the OECD/INFE 2020 International Survey of Adult Financial Literacy, based on a sample of 125787 respondents from 26 countries (OECD, 2016, 2020a).

The other widely cited and adapted tool for measuring and classifying financial literacy is the 2015 Standard and Poor's assessment (based on the works of Lusardi and Mitchell, 2008, 2011). This tool, contrary to the OECD questionnaire, chose a much simpler methodology: the questionnaire the respondents had to fill in was rather short, comprising of four topics (risk diversification, inflation, basic financial concepts and compound interest) and one question for each topic, two for compound interest (thus, a total of 5 multiple choice questions). This survey also classified whom can be regarded financially literate: the minimal required level was 3 correctly answered questions out of five (Klapper-Lusardi-van Oudheusden, 2015). In my opinion, it is not possible to deduce someone's financial literacy level with the help of such a short questionnaire but is neither useful to go towards the other extreme and embody several areas and dozens of questions.

Another trend in assessing financial literacy is the use of qualitative methods, however these are more widespread in assessing individual financial literacy than in assessing SME financial literacy. Many analyses have been created in this topic with the help of-mostly semi-structured-interviews, (see Alexander–Jones–Nigro 1997, Kempson 2009, Lusardi–Tufano 2015, Lyons–Rachlis–Scherpf 2007, Servon–Kaestner 2008). The structure of these interviews were more or less the same, asking about demographics, personal finances, and other dimensions of financial literacy, generally including those

dimensions that Lusardi or OECD works specified. OECD also publishes all of its frameworks for measuring financial literacy including interview questions, questionnaire, and methods to evaluate the obtained results as well (e.g. OECD 2015a). The results of such interviews can be analysed either by manually trying to identify the patterns among the respondents, however with a large sample of dozens of people interviewed it might be problematic to handle such amount of interview results. Another method for analysing interviews is the sentiment analysis with the help of software such as NVivo that can easily identify the most commonly appearing phrases in an interview transcript. As more examples for qualitative analyses in assessing financial literacy, Durodola-Fusch-Tippins (2017) can also be mentioned whom analysed the financial well-being of immigrants in Canada with the help of interviews and focus groups. Another example is Sprow (2011), who analysed the effect of financial training on the financial literacy of Latina single mothers in the US through interviews or finally, Blanco et al. (2015), whom also analysed a Latino group, however in their case focusing on elderly people, and their use of financial services and saving habits.

Individual financial literacy research, as this introduction has shown well, can be approached through both a quantitative and a qualitative approach, depending on the aims and magnitude of the research. The goal of this chapter was not to give a comprehensive overview of every research done within the frame of the financial literacy assessment of individuals. The goal was merely to show the foundations, the possible tools (e.g. Likert scale items, scores attributed to correct responses, knowledge test questions etc.) which were then adapted at firm level, which will be described more in detail in the next section. To summarize this chapter, questionnaires and surveys are undeniably easy and comfortable tools that can yield a large sample fast, however as we can see from the example of the S&P assessment, even though it is rather simple to analyse such a short questionnaire, the results might not provide us with a valuable insight into what factors influence financial literacy of individuals. Qualitative techniques, on the other hand, can give us detailed insight into attitudes or behaviours of certain groups of individuals, however, due to the characteristics and limitations of qualitative methods, the results in many cases cannot be generalized for entire populations. As the review of Huston (2010) showed, currently there is no consensus on what the most efficient way might be to measure financial literacy.

2.3.2. Measurement models to assess SME financial literacy

Financial literacy at firm level, as the previous chapters have introduced, can be approached from several different aspects, concerning either individual or firm characteristics, knowledge, skills, behaviour, or specific topics. These different approaches require different measurement models. The toolkit for measuring financial literacy has grown greatly in the past decade, and focus shifted from simple knowledge tests to more intricate models using which even the effect of nominal variables (such as gender or attitudes) could be considered. However, these studies focus only on some sub-groups of the population or certain sized businesses and are not applied widely.

At the very beginning, when turning towards business entities, assessing sole entrepreneurs and self-employed seemed a safe option, as in their case, personal and business assets were not really separated and as long as decisions are made by one person, financial literacy could be measured using more or less the same methods as for individuals. However, in the case of businesses, the general aim of measuring financial literacy is not only to get an overview of the average levels of financial literacy of business owners and provide recommendations on areas to be developed. On top of that, most frequently the aim is to build a causal model explaining its effect on the performance, competitiveness, growth or innovation of the firm, as it can be seen below.

Studies assessing micro-businesses and small enterprises used the previously mentioned descriptive methods, complemented with rather simple hypothesis testing to assess financial literacy levels and found high levels of financial illiteracy, which had a seemingly negative effect on firm profitability and business growth (Eresia-Eke-Raath, 2013, Fatoki, 2014). Assessment became more complicated with larger companies, giving rise to new, more polished assessments, which, even though are much complicated than the simple knowledge test, still utilize these methods to some degree, by using e.g. a simple knowledge test to determine financial knowledge levels. Hungarian (see Ország-Kosztopulosz-Kovács, 2015, Béres-Huzdik, 2012, Botos et al. 2012) and international studies at the earlier days mostly carried out either paper-based or online "traditional" surveys that did not contain an index or measurement to describe respondents' financial literacy. Concerning their topics, these assessments were in line with the OECD definition.

With the appearance and spread of more sophisticated measurement and analysis methods financial literacy assessment became more refined as well. Even though most

studies still use simple descriptive statistics methods or count the number or share of correctly answered knowledge test questions, some experimented with using inferential statistics and more complex modelling and analysis methods, such as OLS or logit regression models, ANOVA and ANCOVA, crosstabs analysis, rank correlation or even principal component analysis, etc. One might mistakenly assume that these methods only exist because of the rapid development of today's information technology. However, there are a few earlier studies that employed e.g. clustering and bivariate probit models already at the end of the previous century (Alexander - Jones-Nigro, 1997).

These methods generally aim at finding the most important determinants of financial literacy and use it as a dependent variable along with such explanatory variables as demographic variables, financial knowledge scores or even cultural determinants. *Table 3* contains a summary on the most commonly used methods. Correlation, analysis of variances and some Chi-Square tests are generally used to uncover the relationship of pairs of variables, however, regression models are more widely used as they are not only able to show whether a significant relationship is prevalent between variables but can also describe causal relationships and can handle multiple variables in one model.

What immediately catches the eye on *Table 3* is the high number of studies using OLS regression. 26 studies in the below table utilised some sort of a linear regression model to analyze which factors influence financial literacy or to study the effect of financial literacy on other factors, such as financial well-being (Bannier-Schwarz, 2018) or business success (Limpek - Kosztopulosz-Balogh, 2016). OLS regression is undeniably a popular method to use, due to its ease of use and interpretability, and its ability to cope with dummy variables, which can account for such demographic variables as gender, education, employment status, or even cultural factors, such as religion (Brown - Henchoz-Spycher, 2018).

Table 3. Analysis methods for assessing financial literacy

Study	**Analysis methods**
Abebe - Tekle - Mano (2018)	OLS regression, ANCOVA
Adomako-Danso (2014)	factor analysis, multivariate linear regression
Agyapong-Attram (2019)	structural equation modeling
Agyei (2018)	OLS regression, logit regression, ANOVA
Alexander - Jones - Nigro (1997)	bivariate probit model, clustering
Ali et al. (2018)	correlation, OLS regression

Table 3. continued

Study	Analysis methods
Bannier - Schwarz (2018)	OLS regression, principal component analysis
Bianchi (2018)	OLS and IV regression
Brent - Ward (2018)	OLS regression, logit regression (mixed, latent class, generalized multinomial)
Brown - Henchoz - Spycher (2018)	OLS regression, correlation
Carraher - Van Auken (2013)	OLS regression, correlation, logit regression
Chen-Volpe (1998)	logistic regression (logit)
Dandibi-Ben Pam-Umaru (2019)	factor analysis, multivariate hierarchical linear regression
Delić-Peterka-Kurtović (2016)	T-test, Levene's test of equality of variances
Drexler - Fischer - Schoar (2010)	descriptive statistics, OLS regression
Győri-Czakó-Horzsa (2019)	logistic regression
Hakim - Oktavianti - Gunarta (2018)	descriptive statistics, OLS regression
Hsiao - Tsai (2018)	OLS regression, principal component analysis, bivariate probit regression
Henager - Cude (2016)	ordered logistic regression
Ishtiaq et al (2020)	confirmatory factor analysis, structural equation modeling
Karakurum-Ozdemir - Kokkizil - Uysal (2018)	OLS regression
Kaban-Safitry (2020)	structural equation modeling
Kasim-Ahmad (2020)	model Path Analysis (two path equation), correlation analysis, multivariate linear regression
Kulathunga et al. (2020)	structural equation modeling
Koropp et al. (2014)	ANOVA, correlation, structural equation modeling
Limpek - Kosztopulosz - Balogh (2016)	descriptive statistics, Chi-Square tests, correlation, hypothesis testing, principal component analysis
Liu et al. (2020)	OLS regression
Luksander et al. (2014)	OLS regression, ANOVA, correlation
Lusardi - Mitchell (2011b)	multivariate probit
Lusardi - Tufano (2015)	clustering, multinomial logit analysis
Lyons - Rachlis - Scherpf (2007)	descriptive statistics, quantile regression, OLS regression
Maziriri-Mapuranga-Madinga (2018)	structural equation modeling
Nohong et al. (2019)	structural equation modeling
Potrich et al. (2015), Potrich-Vieira-Kirch (2018)	confirmatory factor analysis, structural equation modeling
Potrich-Vieira-Kirch (2015)	logistic regression (probit, Tobit model)
Molina-Garcia et al. (2020)	correlation, multivariate linear regression
Romano - Tanewski - Smyrnios (2000)	principal component analysis, structural equation modeling
Sarpong-Danquah et al. (2018)	descriptive statistics, Chi-Square test
Servon - Kaestner (2008)	OLS regression *(and content analysis for the qualitative part)*
Sindani (2019)	multivariate linear regression
Stolper (2018)	logistic regression (probit, Tobit model)
Sucuahi (2013)	descriptive statistics, OLS regression
Suparlinah et al. (2019)	multivariate linear regression

Table 3. continued

Study	Analysis methods
Tóth-Kása-Lentner (2022)	structural equation modeling
Tuffour-Amoako-Amartey (2020)	structural equation modeling
Usama-Yusoff (2019)	multivariate linear regression
Ward - Lynch (2018)	dyadic-factors regression, OLS regression, factor analysis
Wise (2013)	principal component analysis, structural equation modeling
Ye - Kulathunga (2019)	principal component analysis, structural equation modeling
Zaitul-Ilona (2022)	structural equation modeling

Source: own editing

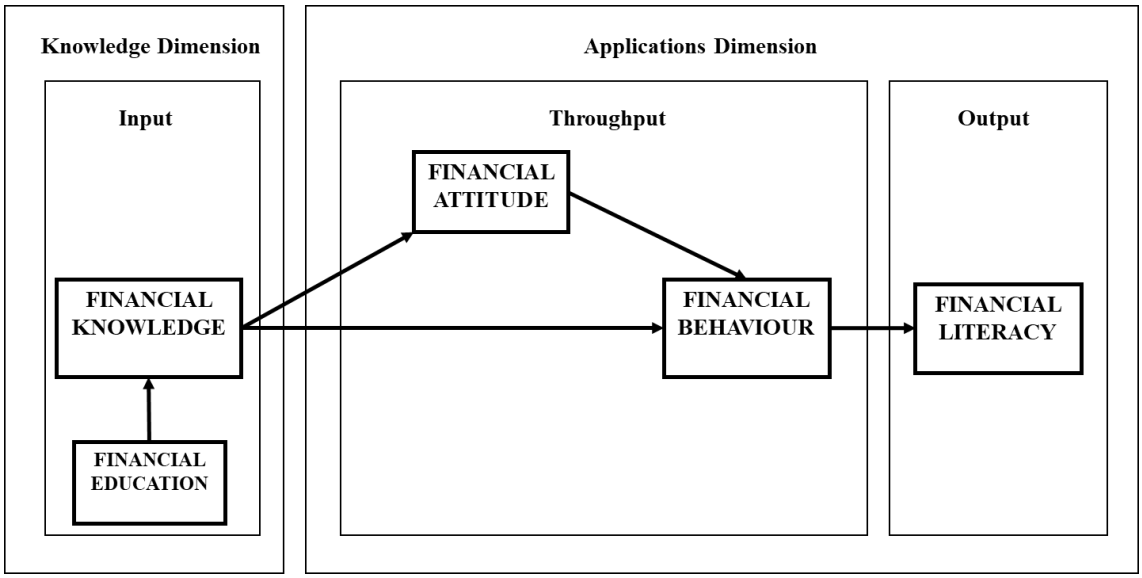
Apart from OLS regression, logistic regression models are also quite popular among academics in this field. Logit and probit models have that advantage over OLS regression models that the dependent and independent variables in the models need not be solely metric or dummy variables but can be categorical variables as well. These models can be used to e.g. categorize individuals to a specific level of financial literacy as a function of their multivariate demographic characteristics, like educational attainment level, marital status or even profession (Hsiao-Tsai, 2018) or to assess financial planning behaviour of elderly US citizens as a function of financial literacy dimensions and demographic variables (Lusardi - Mitchell (2011b)). Besides the above-mentioned scales based on knowledge test performances, another trend in quantifying financial literacy is the use of Likert scales. As later examples will show, Likert scales are either used to collect the self-perceived financial literacy of respondents (e.g. Adomako-Danso, 2014) or in the case of more complex constructs, to measure agreement with certain statements (e.g. Zaitul-Ilona, 2022).

2.3.3. The use of structural equation modeling in financial literacy research

Another method which served as inspiration for formulating my own proposed model is the application of principal component analysis and then building a structural equation model (SEM) using the obtained components. This chapter introduces empirical studies which examined financial literacy using SEM, which runs regressions simultaneously (where both direct and indirect effects can be assessed) and can apply both factor and principal component analysis. The main focus of this chapter is financial literacy assessment among SME owners and managers, yet first we need to take a look at the study of Yong and co-authors (2018) which examines the dimensions of financial literacy using a sample of 1915 young adults (between 18 and 40 years old) working in Malaysia. There have been studies that addressed the effect of knowledge on behaviour

(e.g. Capuano-Ramsay, 2011) or of attitudes on behaviour (e.g. Luksander et al. 2016, Nagy-Tóth, 2012 or Zsótér-Németh-Béres, 2016), yet this study combines both knowledge, attitudes and behaviour into one complex path model, in which knowledge is expected to have a direct impact on behaviour and an indirect effect through the moderating effect of attitudes (*Figure 4*).

Figure 4. Research framework of Yong-Yew-Wee (2018)



Source: own editing based on Yong-Yew-Wee (2018), p. 31.

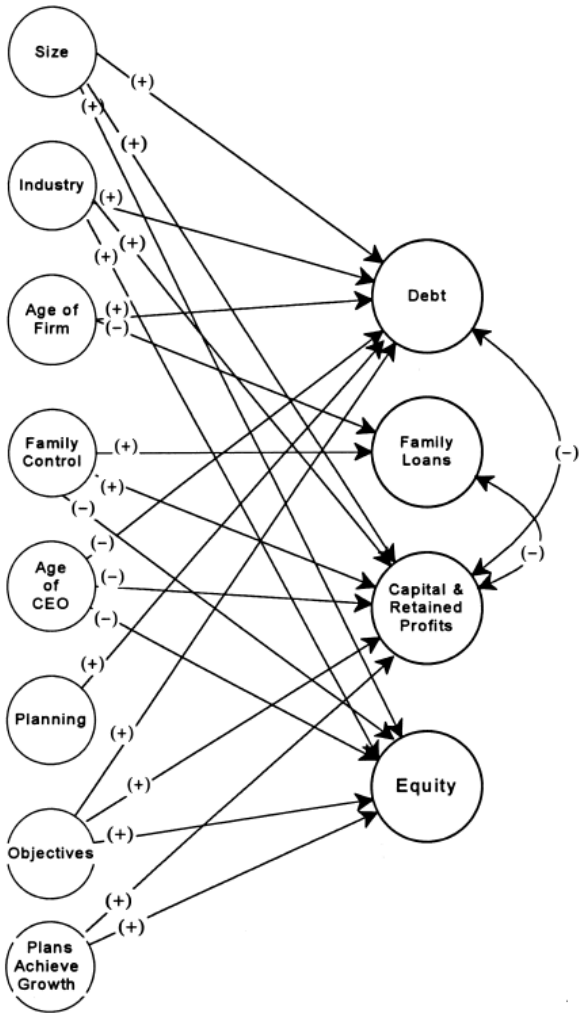
Knowledge in their study was measured with the help of eight multiple choice knowledge test questions, where their financial knowledge score was calculated by the frequency of correct answers. The remaining latent variables were measured through five-point Likert scales. Financial education was included in the model, as the authors stated -in accordance with Lusardi and Mitchell (2011a)- that financial education can improve factual knowledge and can potentially have an overall positive impact on financial literacy. This emphasizes the need for financial education, which they measured with two 5-point Likert scale statements indicating whether they have been exposed to financial education through their family background and as well if they have participated in education programs or trainings. The target variable of the path model was financial literacy, which was assessed with Likert scale items based on the World Bank financial capability measurement framework (Kempson-Perotti-Scott. 2013, Yoong et al. 2013), focusing on financial management and decision making practices. The results show that financial education can significantly improve financial knowledge, which has significant, positive direct and indirect effect (with the mediating effect of attitudes) on financial

behaviour. Their study did not find a positive effect of financial behaviour on financial literacy (Yong-Yew-Wee, 2019). Even though their hypotheses were only partially supported by their empirical research, the important takeaway of the model is the relationship between the different dimensions of financial literacy which will later be incorporated into this work's conceptual model as well.

Many studies (e.g. Romano-Tanewski-Smyrnios, 2000, Wise, 2013, Koropp et al. 2014 or Ye-Kulathunga, 2019) have applied the PLS-SEM methodology to assess the effect of financial literacy on firm outcomes. The earliest study of the above, by Romano-Tanewski - Smyrnios (2000) was sought to examine financial decision-making processes, financial antecedents and outcomes in Australian family businesses. Even though the study does not refer to the assessment of financial literacy explicitly, its aim is similar to what has already been explained by the OECD definition as the goal of financial literacy, namely sound capital structure decision-making.

As the authors explained it well, the study went "*beyond traditional finance paradigms by incorporating elements from divergent perspectives, including family businesses, finance, economics and management*" (Romano - Tanewski-Smyrnios, 2000, p. 295.) to explore how decisions are made at firm level. The model also included such parameters as the size and age of the firm, the industry it is operating in, objectives of the firm and whether it is planning to achieve growth or not. Their measurement model can be seen on *Figure 5*, the signs indicate the hypothesized relationship between the elements of the elements, e.g. plans to achieve further growth correlates positively with equity, and hence firms planning to achieve growth are more likely to have more equity. This study proposes an excellent example of what methodology to follow, however what might make it unlikely to be used in the setting of my research is the fact that the input for building the model was a 250-item questionnaire, which is not likely to yield a huge response rate (neither did their survey, the response rate of that study has been around 29% of the 5000 item random sample they addressed the questionnaire at).

Figure 5. Model for family business financial decision making by Romano - Tanewski - Smyrnios (2000)



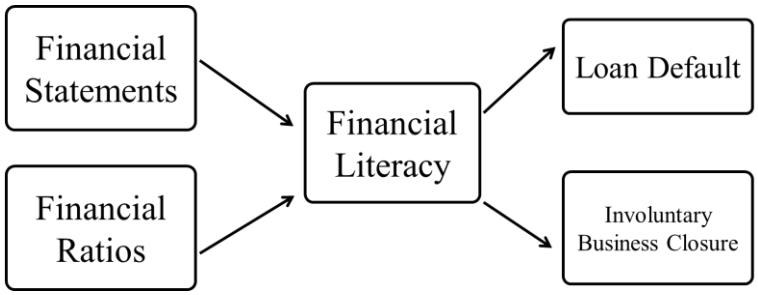
Source: Romano - Tanewski - Smyrnios (2000), p. 296.

The third example for the application of structural equation modeling is by Wise (2013). The paper assesses the effect of financial literacy on the survival of new ventures founded by young Canadian entrepreneurs and proposes a financial literacy framework (see *Figure 6*). According to their model

> "*an increase in an entrepreneur's familiarity with financial statements financial and ratios leads to an increase in financial literacy. An increase in financial literacy leads to less loan default and less involuntary business closure. Defaulting on a loan is impacts the chance that the entrepreneur will have to close the business*." (Wise (2013), p. 32)

The paper investigated financial literacy of young entrepreneurs taking part in a microcredit program using a questionnaire, which consisted of questions about the respondents' financial knowledge, and their use of financial statements and ratios, and whether they repaid the obtained microcredit and whether they had to close down the business following the credit program. The results of the structural equation modeling confirmed a positive relationship between the elements of the model. Thus, an increase in the use of financial statements and ratios (which indirectly indicates a more positive attitude by the entrepreneurs and an increase in their financial knowledge as well) leads to better financial literacy levels and better chance in repaying the loan, and as expected, in a less likely occurrence in having to close down the business.

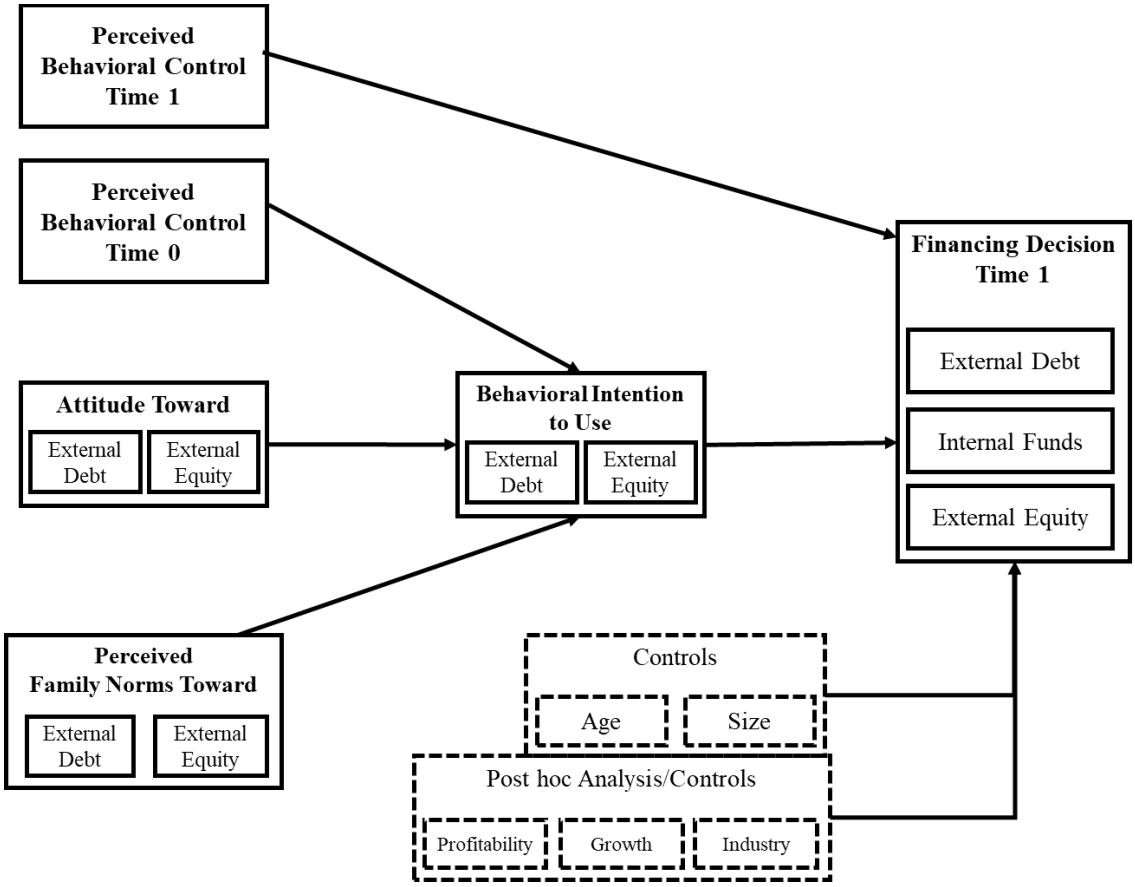
Figure 6. Proposed financial literacy model by Wise (2013)



Source: own editing based on Wise (2013), p. 32.

The fourth paper using structural equation modeling introduced here is very similar to the first paper as it focuses on family firms as well. The paper by Koropp et al. (2014) is applying the theory of planned behaviour (TPB) to assess financial decisions of German firms. The aim of the study is to prove that financial decisions at firm level are largely affected by family norms, behavioural elements, attitudes and intentions and are not based entirely on the business perspectives. The input to the study has been again a questionnaire, however in this survey items were mostly measured in a Likert scale to indicate whether respondents more agreed or more disagreed with given statements. The resulting model consists of much more elements than the previously introduced study, as it can be seen on *Figure 7.*

Figure 7. Model of financial decision making in family firms by Koropp et al. (2014)



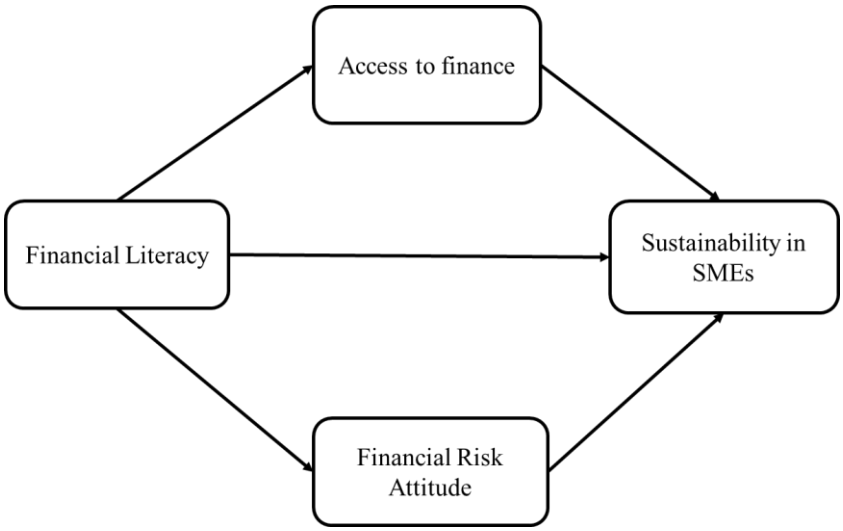
Source: own editing based on Koropp et al. (2014), p. 310

The elements of this model resembles the closest the above explained OECD (2015) definition as it embodies attitudes and behavioural elements in the model and as well has some links to behavioural economics as well. One important element of the model is perceived family norms, which are nonetheless the most important elements of the planned behaviour theory as well, stating that agents might be more likely to make a certain financial decision of family norms are in support of that decision, otherwise less likely (Wise, 2013).

The fourth example for the application of SEM models in assessing financial literacy is by Ye - Kulathunga (2019) and assesses the effect of financial literacy on the sustainability of Sri Lankan small and medium enterprises. The model is built from 4 main elements whose relationship is then analysed: financial literacy, access to finance, financial risk attitude and sustainability (see *Figure 8*). Financial literacy acts as the starting point of the model and is expected to have a positive effect on each elements of the model, hence the development of financial literacy (again similarly to almost all

previous models) is expected to improve the chances of the firm. Each elements of the model are measured along several Likert scale items that serve as the input variables for the latent variables of the model following a confirmatory factor analysis. This model is fairly similar to the model I am about to employ in my own research, however this model targets only one agent of the companies, the chief financial officers, as this study assumes that CFO's are the most involved in SME-level financial decision making.

Figure 8. Conceptual framework of financial literacy on sustainability by Ye - Kulathunga (2019)



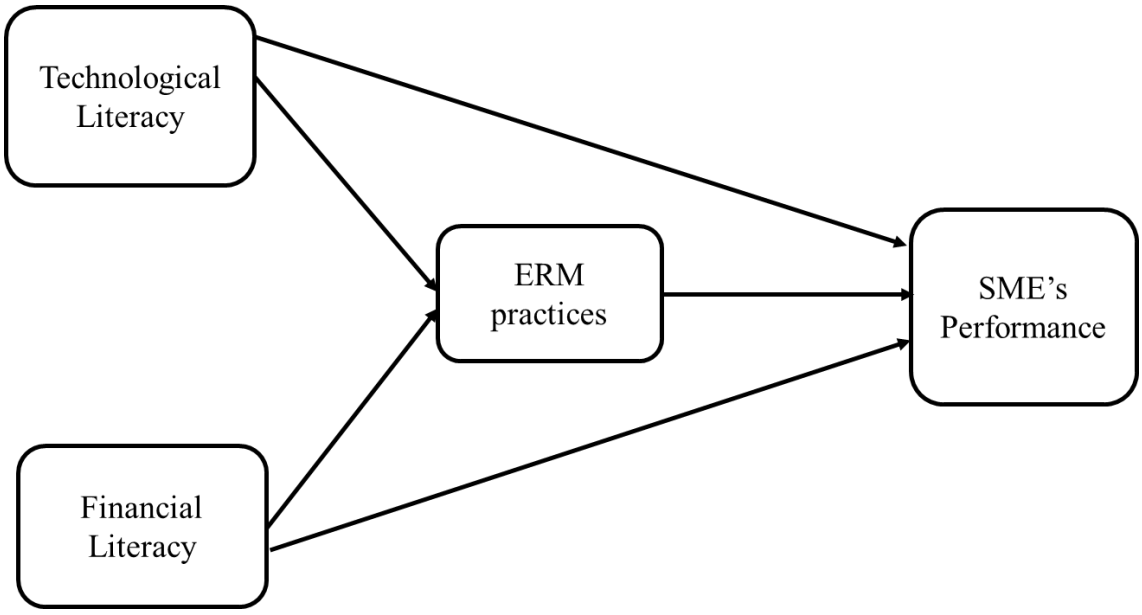
Source: own editing based on Ye - Kulathunga (2019), p. 7.

The results of the study underpin the positive effect of financial literacy on firm sustainability, which might impose that this model could be useful when applied to assess financial decision outcomes (assuming that more financially literate firms make better financial decisions). However, as this model only focuses on one agent of the firm, the application of this model does not make it possible to assess whom and to what extent can influence financial decision-making.

In their paper, Kulathunga et al. (2020) define financial literacy and technological literacy as possible influences on enterprise risk management (ERM) practices and through that, on SME financial performance (*Figure 9*). The paper is following a knowledge-based view (KBV) which emphasizes that individual and firm-level knowledge can both contribute to SME success. The aim of the paper is to investigate two possibly knowledge-based resources, financial and technological literacy (or jointly called as techno-finance literacy in the paper) and both their direct and indirect effect on SME performance through the use of ERM practices in 319 Sri Lankan SMEs. The

knowledge-based view applied in the paper differentiates between explicit and implicit (tacit) knowledge, both of which can contribute to the competitive advantage, and ultimately, the success of SMEs. According to the authors, techno-finance literacy is an important knowledge base not only because these individual knowledge areas can independently contribute to SME financial success, but also because of the appearance of digital financial resources. Through digital financial resources, company decision makers have to be able to navigate and to do so they have to be knowledgeable in both financial and technological matters (Kulathunga et al. 2020). Financial literacy is defined as the ability to adapt to the changes in the financial environment, exploiting opportunities and an important knowledge base contributing to financial decision making in the company. These two knowledge areas are mutually supportive on each other and based on their PLS-SEM analyses both have a significant positive effect on SME financial performance. This essay does not investigate any relationship between the determinants of financial performance, both financial and technological literacy act as individual, exogenous explanatory variables in the model (Kulathunga et al. 2020).

Figure 9. Conceptual framework of financial literacy on SME performance by Kulathunga et al. (2020)

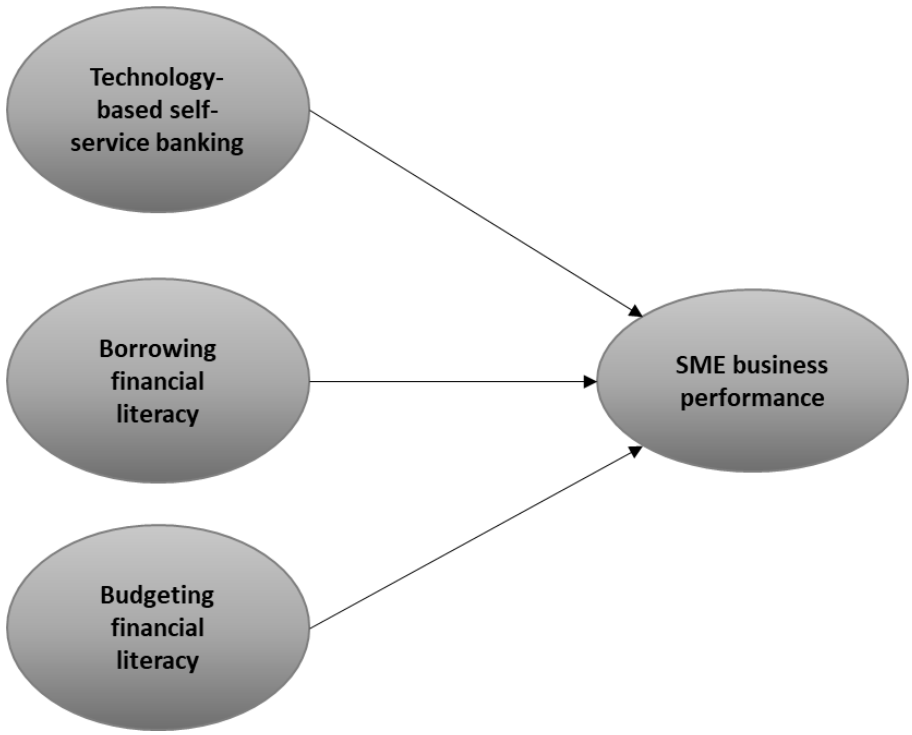


Source: own editing based on Kulathunga et al. (2020), p. 10.

Financial literacy does not necessarily appear as just one latent variable in structural models. Maziriri and co-authors (2018) provide us with a great example for the use of Likert scales in structural equation modeling and as well show how different areas of financial literacy, borrowing and financial literacy can act as independent latent

variables in the same model. In their study, a questionnaire consisting of five-point Likert scale items was administered to a sample of 151 Zimbabwean SMEs. Their hypothetical model can be seen below in *Figure 10* which consists of SME business performance as the dependent latent variable, and three independent variables, technology-based self-service banking, borrowing and budgeting financial literacy. Each of these constructs were hypothesized to have a significant, positive effect on SME financial performance. Digitalization and the use of financial services can benefit the company both from a financial point of view and as well considering efficiency. High levels of borrowing and budgeting financial literacy are believed to help in managing the finances of the businesses in a more sound and effective way. Their results supported their hypotheses, and even though each latent variable in the model had similar, positive effects on SME performance, budgeting financial literacy seemed to have the strongest of the three, meaning that it is very important for business owners to know how to manage budgeting of the company to ensure successful operation (Maziriri-Mapuranga-Madinga, 2018).

Figure 10. Conceptual framework of Maziriri-Mapuranga-Madinga (2018)



Source: own editing based on Maziriri-Mapuranga-Madinga (2018), p. 4.

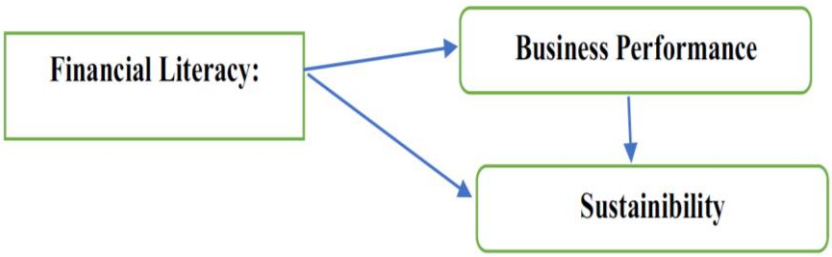
A simple model has been created by Agyapong and Attram (2019) to examine the effect of financial literacy on the financial performance of Ghanian SMEs using a sample of 132 SME owner-managers. Their model is composed of two latent variables, financial

literacy and performance, where the prior is measured through seven and the latter through five 5-point Likert scale statements, measuring the agreement of the respondents with statements concerning financial management, debt, insurances, savings, or investments and concerning financial performance, sales growth, profit margin, cost-effectiveness or market share. The survey was administered to owners of SMEs and the responses reflect their self-perceived financial literacy (does not provide an actual metric for the level of financial literacy) and as well their subjective opinion on how their business is performing (again, lacking formal accounting-based measures). Their results showed that financial literacy of the SME owner-managers have a strong, positive, significant impact on the performance of Ghanian SMEs. This means that a more financially literate owner can provide their business with competitive advantage through the improved quality of their financial decisions. They recommend that SME owners and managers should seek opportunities to further develop their financial skills and as well to not fear to ask for consultation with financial advisors if they lack the skills necessary to make informed decisions (Agyapong-Attram, 2019).

Kaban and Safitry (2020) have created a similarly simple model as the previous. In their paper, the effect of financial literacy on business performance and sustainability was measured among culinary MSMEs in Greater Jakarta (Indonesia). The research has been carried out with a sample of 100 owners and managers of MSMEs who take part actively in the strategic development of the companies (hence focusing mainly on the owners, but not ruling out those, who even though not being the owner, have a say in strategic development of the companies). Financial literacy has been measured using quiz items based on the Basic Indonesian Financial Literacy Index, while to measure financial performance, self-perceived measures have been collected using 5-point Liker-scale items (12 statements). Sustainability was measured likewise using 5-point Likert scale items along the three dimensions (economic, social and environmental) dimensions of the Triple bottom line (TBL) indicator. The research model is rather simple (see *Figure 11* below) and hypothesises that financial literacy has a significant effect both on performance and sustainability and as well that performance has a significant effect on sustainability. The results verified the significance of the relationship between financial literacy and performance and as well between performance and sustainability, thus underpinning an indirect effect of financial literacy on sustainability, however a direct effect of financial literacy on sustainability was not found. The main outcome of the

research that it is worth developing financial literacy as it can contribute to the improvement of financial performance and indirectly to that of sustainability on the long run (Kaban-Safitry, 2020).

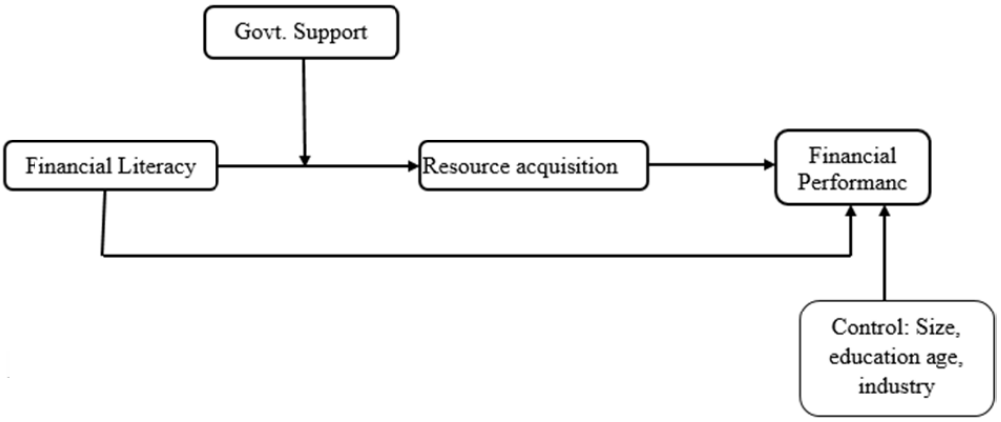
Figure 11. Research model of Kaban-Safitry (2020)



Source: Kaban-Safitry (2020), p. 6.

Ishtiaq et al. (2020) used confirmatory factor analysis and PLS path modelling to examine the direct and indirect effect of financial literacy on financial performance, the latter through resource acquisition (i.e. tangible and intangible resources, such as technological and financial sources, CSR or goodwill) among Pakistani SMEs, together with the moderating effect of government support, based on the resource-based view (RBV) theory. Their research model (as seen on *Figure 12* below) hypothesized financial literacy to have a significant, positive direct and indirect effect on financial performance. 800 questionnaires were distributed in the target population of more than 9,5 thousand SMEs in Rawalpindi and Islamabad, from which a total of 349 responses arrived; 300 of these contained valid responses which were used in the analyses. Firm owners and top managers took part in filling the survey the results of which confirmed that financial literacy contributes significantly to business performance and help owners and managers to obtain tangible and intangible resources easier, further improving performance and at the same time the authors encourage Pakistani SME owners to focus both on financial literacy and government support to gain competitive advantage on the market (Ishtiaq et al. 2020).

Figure 12. Research model of Ishtiaq et al. (2020)

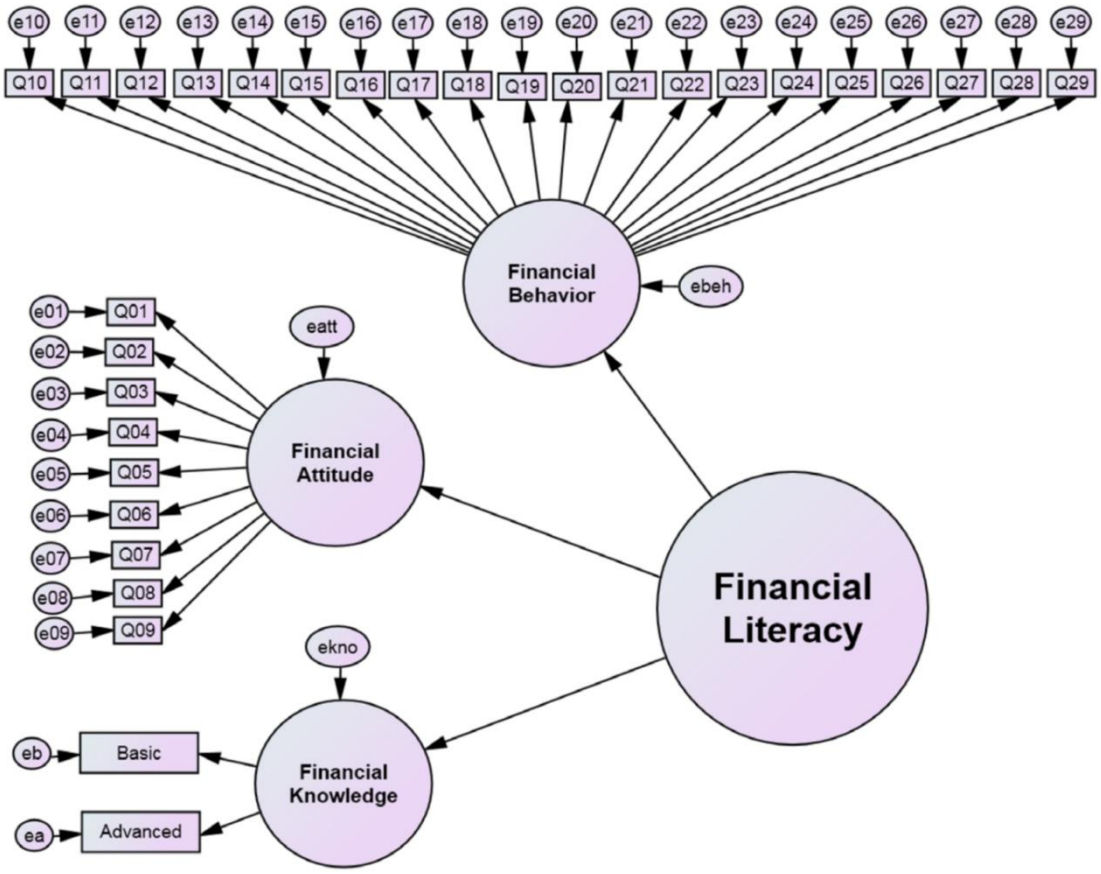


Source: Ishtiaq et al. (2020), p. 32.

Potrich et al. (2015) even though conducted a survey not focusing on SMEs but on individuals, their methodology provides us with valuable takeaways concerning the use of an advanced path modeling technique. In their study, the authors analysed the financial literacy of 991 Brazilian individuals and aimed at finding the differences between males and females. Financial literacy in the model was composed of the constructs of knowledge, attitude and behaviour, and each were measured with the help of scale variables. Knowledge scores have been calculated based on correct answers to basic and advanced financial knowledge questions, where a total of 8 questions were asked: 3 questions targeted basic financial topics and 5 were advanced financial knowledge questions. The responses were then cumulated into two variables which together formed the financial knowledge dimension. Attitudes and behaviour were measured through 5-point Likert scale items, 9 variables measured attitudes, while the financial behaviour dimension was composed of 20 variables. The novelty of the applied model (see *Figure 13* below) is that the model even though used a path model to verify the effect of the diverse dimensions on overall financial literacy, the model did not simply used a single path model, but a second-order model (which will be introduced more in detail in the methodological chapter of this dissertation), whose uniqueness or novelty is that such models make it possible to analyse phenomena in a deeper, more complex way, by not simplifying dimensions into a few indicators, but including them as lower-order constructs or latent variables. This model resonates much with the methodology I apply in one of my later introduced analysis, as the three sub-dimensions of knowledge, attitude and behaviour are also included as lower-order constructs in one of my used models, and

so does the result, since this study verified that behaviour has the strongest impact on overall financial literacy, similarly to my results.

Figure 13. Proposed financial literacy measurement model by Potrich et al. (2015)

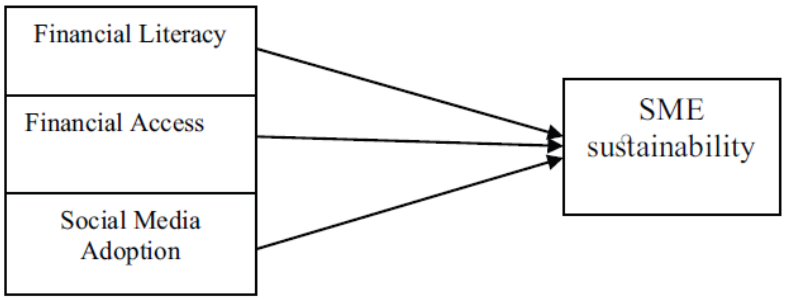


Source: Potrich et al. (2015), p. 5.

As for one of the most recent examples, Zaitul and Ilona (2022) examined the effects of financial literacy, alongside with financial access and social media adoption on Indonesian SMEs' sustainability during the Covid-19 pandemic. In their study, they hypothesized that since a higher level of financial literacy is associated with better financial decision-making and performance, those SMEs that exhibit better financial literacy were more sustainable during the pandemic. Their path model (see the research framework on below *Figure 14*) is constructed with three latent independent variables (financial literacy, financial access and social media adoption) and one latent dependent variable (SME sustainability) all of which are measured using Likert scale items. Their results showed that even though the level of (self-perceived) financial literacy of SME owners and financial access of SMEs were relatively high among the respondents, neither resulted to have had a significant impact on SME sustainability during the pandemic. Not

so surprisingly though, social media adoption proved to have a significant positive effect on sustainability. This supports the opinion that even though the financial effects of the Covid-19 pandemic were just as harsh on SMEs as those of the 2008 financial crisis, this time different skills were needed to cope with the pandemic, such as the ability of SMEs to go digital and to adapt their business to operate online (Zaitul-Ilona, 2022).

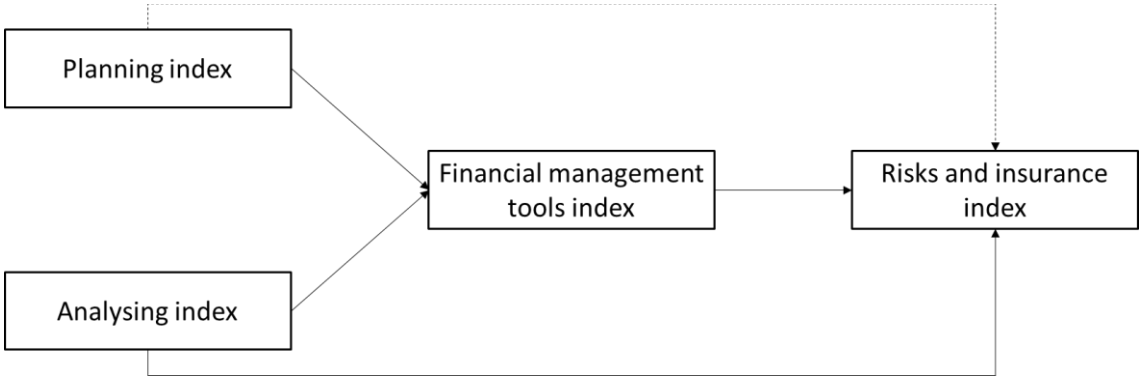
Figure 14. Conceptual framework of Zaitul-Ilona (2022)



Source: Zaitul-Ilona (2022), p. 103.

Tóth, Kása and Lentner (2022) examined a similar notion as the previous study, in their research they looked for the answer to the question: how did financial culture affected the operation of Hungarian SMEs before and during the pandemic? They obtained samples of 2167 and 3281 SMEs in the respective years of 2019 and 2021 to answer this research question. As mentioned above, they have created their own definition of corporate financial culture, a notion similar to and heavily based on financial literacy, and based on the definition and their theoretical framework a complex path model has been constructed (see *Figure 15* below). This path model is composed of two exogenous latent variables, the planning and analysing indices, which act as the independent variables of their causal model, a moderating variable, the financial management tools-index and the dependent variable of their model, the risks and insurance index. In their model, proxy variables are created for each latent variables of the model. These proxy variables are indices, scales ranging from 0 at the bottom to 6 to 13 at the top, measuring how much different phenomena are true for the examined firm. The reason for the creation of such indices is that "*these measured variables show significant variation in terms of their scales and variances (mostly dummy variables)*" (Tóth-Kása-Lentner, 2022, p. 8), therefore creating the indices by adding up their values can help to get an overall grasp of each construct they explain in different ways. These proxy variables are then further transformed: standardized (Z-scores) so that they become directly comparable (Tóth-Kása-Lentner, 2022).

Figure 15. Conceptual model of Tóth-Kása-Lentner (2022)



Source: own editing based on Tóth-Kása-Lentner (2022), p.

Apart from the path model, the research also examined the average performance of the companies along the normalized planning, analysis, financial management and risk and insurance index, and found that by age the youngest, and by size the smallest businesses performed the worst along each indices, one reason for which could either be the lack of experience or that of formalized practices in financial management. Concerning the results of their path model, the results show that in both of the years, planning and analysing had significant, positive, direct and indirect effects on the risk and insurance indices, meaning that businesses with better financial awareness and better use of financial management tools are more aware of the importance of risk management. These effects became even stronger during the times of Covid-19, which served us with the conclusion that dealing with such a different kind of financial fallback or crisis caused by the pandemic can be better tackled in companies where there are better financial management practices and higher level of protection against risks (Tóth-Kása-Lentner, 2022).

It can be concluded that financial literacy research has evolved greatly in the past decade, and the trends show that scholars turned from simple descriptive methods to such model that are capable of a deeper analysis of financial literacy and its interactions with either individual or corporate traits. Financial literacy research today possesses a very rich toolkit; however, the introduced papers all focus on different societal or geographical sub-groups, therefore their findings cannot be generalized and gives room for further analyses to be carried out.

2.4. Understanding financial decision-making

Financial literacy as such embodies many elements, knowledge, skills, attitudes, behaviour, thus both cognitive and emotional elements, some of which are easier to measure, and some are not. In this chapter[2] I would like to take a look at another element of financial literacy, which often gets forgotten by those adopting the OECD definition of SME financial literacy which is the notion of taking „*the most appropriate finance-related decisions at every stage of SME life-cycle*" (*OECD* [2015], p. 11). Financial decision-making process is something I have included among my research questions, however, never looked at how the process of financial decision-making really works.

Financial decision-making has been in the spotlight for many decades, even before financial literacy has been, as sound financial decisions can influence competitiveness, sustainability and profitability of any company. As *Buchanan-O'Connell* [2006] and recently *Szántó-Zoltayné* [2019] described it in detail, the study of decision-making dates back to way earlier than economics itself, and is an interdisciplinary field including ethics and philosophy, economics, statistics and mathematics, psychology and sociology as well. Studies focusing more on the economics point of view of decision making usually try to address questions such as *what makes a good decision* or *how rational decision-making processes look like*? Apart from that, essential elements of the study of economic decision-making are multi-dimensional (or multi-criteria) decisions, risks and uncertainties, as one important aspect of decisions is mitigating risks and facing future uncertainties (*Szántó-Zoltayné* [2019]).

Buchanan-O'Connell [2006] in their study distinguishes between two main types of decision-making: one based on deliberation and gut decision-making. The latter occurs when decision-makers are faced with urgent decision-making situations, with little information provided and no precedents known, usually in crisis situations:

> "*Gut decisions testify to the confidence of the decision maker, an invaluable trait in a leader. Gut decisions are made in moments of crisis when there is no time to weigh arguments and calculate the probability of every outcome. They are made in situations where there is no precedent and consequently little evidence*" (*Buchanan-O'Connell* [2006] p. 39).

[2] Certain parts of this chapter have previously been published in Kuruczleki (2020).

Gut decision-making happens in unexpected situations and is generally unpredictable. Some support it while others argue against it. Because of its unpredictable nature, most studies do not focus on it but on deliberation-based decision-making which roots from the theory of rational behaviour (*Buchanan-O'Connell* [2006]). According to mainstream economic theory, individuals act so that they satisfy their needs and make optimal (or suboptimal) choices along their preferences. In mainstream theory decisions are only and exclusively influenced by our preferences and individuals always seek to maximize their utility and always make optimal choices. Behavioural economics challenge the rational human's image, claiming that human decisions are by far not made along optimization criteria and through lengthy deliberation, as human beings face several cognitive and other limitations, such as the lack of time, information of knowledge to make any rational decisions. On the contrary, even though in most cases humans try to optimize, these decisions are only boundedly rational and even though they seem to be a purely rational and optimal decision along certain circumstances, they are rather suboptimal decisions, as argued by such psychologists and economists as Simon (bounded rationality), Gigerenzer (heuristics, bounded rationality) or Kahneman and Tversky (prospect theory).

The most often recurring theme in financial decision-making is the role of rationality (or on the contrary, bounded rationality) in financial decision-making. The image of the rational human being has been dominating mainstream economics for hundreds of years and the appearance of behavioural economics is assumed to be the invention of the second part of the 20th century. It is in fact true that the majority of papers studying the behavioural aspects of decision-making appeared after Simon's 1960 resurgence of the study of human behaviour as a contributor to decision-making, however, even the earliest economists like Adam Smith or John Maynard Keynes acknowledged that emotions or psychological factors both have a prominent role in explaining the outcomes of economic decisions (*Szántó* [2011]). Hence behavioural economics have made their way into the study of decision-making and provide useful help in understanding how and why financial decisions are made at not only individual, but corporate level as well (*McFall* [2015]).

Swami [2013] provides an overview of decision-making in corporate setting with special focus on managerial functions. As described by the paper, decision making is part of the executive functions of a company leader together with information processing

(working memory and recall), motivation (self-motivation), emotional control, leadership (controlling one's behaviour), complex problem solving, thinking ahead, planning and monitoring. Decision-making, as defined by Swami [2013], "*refers to the mental (or cognitive) process of selecting a logical choice from the available options. In other words, it implies assessing and choosing among several competing alternatives" (Swami* [2013] p. 204). The paper describes many errors and biases in managerial decision-making and the use of heuristics such as the rule of thumb as common practice (and common source of error in decision-making) and as well sorts the four main practical aspects of executive decision-making, which can contribute to sound business-related decision-making, and which are the following:

- Intuition: similar to the above introduced "*gut feeling*", intuition-based decision-making can yield excellent outcomes if the decision-maker has enough professional experience and expertise, however, can be greatly distorted by external factors (i. e. to make the same intuitive decision again, circumstances should be identical, which are usually not)
- Rules: when companies follow a pre-defined set of rules, they can make generally more accurate decisions than if they were following their intuitions. Both intuitions and rules are fast and easy to use when a decision-making situation arises, however if circumstances change, rules need to be updated, otherwise the decisions won't be that accurate anymore.
- Importance weighting: is a less intuitive but more analytical tool to use when making decisions. After identifying the most important factors (criteria) of a decision, their relative importance needs to be weighted, then alternatives can be evaluated along these pre-defined criteria. However, as a shortcoming of the importance weighting model, we can never be free of biases as the relative importance of each factor might be different for decision-makers.
- Value analysis: is a complex and realistic way of deliberation, when analysing the value of possible outcomes, analysis is done along multiple criteria and is less based on personal impressions of the decision-maker but on an outcome's value added. Value analysis ultimately leads us closer to what is called an optimization problem in economics (*Swami* [2013]).

According to *Swami* [2013] then these four methods are generally used when making executive decisions at a company, including financial decisions as well. Linking

these findings to the definition of financial literacy and what is the aim of financial literacy (contributing to sound financial decisions) we can easily acknowledge that the above techniques are similar to the elements of financial literacy. Skills and knowledge are needed to conduct more elaborate deliberation methods, while attitudinal and behavioural elements play a greater part in intuitive decision-making.

Herbert Simon, one of the founders of behavioural economics, postulated that individuals make choices that are optimal for their physiological, psychological and decision-making limitations. He described this (as cited in Altman, 2013) as satisficing and non-maximizing behaviour, whereby individuals behave in a bounded rational and non-rational manner, the latter not even taking into account the actual process of human decision-making. This optimizing behavior can be clever and intelligent, but it can also be consistent with gaps in financial knowledge and potential errors in decision making (Altman, 2013).

To capture the combination of financial knowledge gaps and decision-making errors, Altman (2013) argues that two main methodological approaches in behavioural economics can provide an explanation. The first is the bounded rationality approach following the work of Simon and March, and the second is the errors and biases approach following the work of Kahneman and Tversky. The Simon-March approach argues that individuals are inherently incapable of behaving in the way that traditional economic theories require. As a result, they use heuristics to reduce the cost and time of deliberation in their decision making, and as a result, they make seemingly rational decisions that may be contrary to traditional economic norms. These decisions will not be optimal for the decision maker but may be perceived as suboptimal decisions for decision makers in the given context (Altman, 2013).

The presence of bounded rationality in financial decisions is also supported by the study of Capuano-Ramsay (2011): in their study, they distinguish four groups of individuals based on the study of Beckett-Hewer-Howcroft (2000):

- Rational-active: these decision-makers make rational choices, taking into account all options and choosing between financial services based on rational criteria such as their price or future payments. Consumers in this group tend to choose the most valuable product.

- Repetitive-passive: these consumers repeat the same pattern over and over again in their purchasing decisions, without looking for alternatives. Their behaviour can be considered as loyal, for example, they would not necessarily be willing to switch banks even if the bank no longer offered favourable conditions. There may be a number of factors behind this behaviour, for example, consumers may be motivated by the need for stability, they may be afraid of change, they may not see much difference between financial service providers, or they may consider switching too costly.
- Non-purchasing consumers: these consumers do not use financial services and do not buy financial products, which may be due to low confidence in the product or because they do not encounter enough products. A good example of this group is the rural Hungarian population in villages, where ATMs are less accessible, so the cash needs of the population are significantly higher and the use of credit cards and related services is significantly lower, as the possibility to pay by credit card is not available (Botos et al. 2012).
- Relationally-dependent: these consumers are present in the market, but their choices are influenced by the complexity and uncertainty of the products, which makes them uncertain in their decisions. They often rely on the advice of banks and third parties for their financial decisions, becoming dependent on assistance. Their behaviour - inquiring, asking for help - may seem rational in principle, but because they do not question the advice they receive, they blindly trust the financial advisor, who may influence the choice in his or her own interests, or they do not think critically about the possible alternatives, so the result may be a suboptimal decision (Capuano-Ramsay, 2011).

According to an approach based on Kahneman and Tversky's (1979) prospect theory, the root cause of individuals' flawed, or suboptimal decisions is their decision-making process, the heuristics they use in it and their cognitive biases. Individuals are fundamentally biased, with innate biases that influence their decision-making processes that are summarised extremely well in numerous studies (Altman, 2013, Lefevre-Chapman, 2017, De Meza-Irlenbusch-Reyniers, 2008):

- Use of heuristics, rules of thumb: the use of quick, informal and intuitive loopholes to simplify the decision-making process, a good example of which is

the equal distribution of the amount invested in investment options between different assets instead of a carefully constructed portfolio.

- Over-confidence: individuals often overestimate their own abilities, including the ability to make optimal decisions, e.g. over-confidence that a stock they buy will certainly be profitable.
- herd behaviour: individuals follow the behaviour of the crowd to simplify the decision-making process, using the same financial services as their neighbours, friends, family members, without considering which would better suit their personal needs.
- Loss-avoidance behaviour: emotion-based loss avoidance, the opposite behaviour to rational loss avoidance (essentially fear of any negative outcome). A classic example of loss-avoidance behaviour is risk-aversion, with the majority of consumers often preferring lower-risk but also lower-payoff investment options (Altman, 2013).
- Status quo bias: if a choice enhances or secures the esteem or status of an individual by others, he or she will prefer that choice even at a loss. That is, for example, maintaining a certain standard of living may drive oneself and one's family into loans that one can no longer cover. This is clearly not a rational choice, but it is one that he or she will make for the sake of appearances, to maintain the status quo.
- Framing effect, reflection effect: decisions are heavily influenced by the way they are "presented", highlighting the advantages or disadvantages of the same bank contract, and consumers may evaluate two otherwise identical offers differently, preferring the former.
- Reference point effect: consumers focus only on gains and losses relative to a reference point that may not be objectively relevant to their choice, such as the cost of using banking services (Altman, 2013).
- Procrastination: procrastination can be manifested in financial decisions in that while they are willing to make profits in the present even at higher future costs (e.g. withdrawing money from an investment account earlier), they are willing to delay costs in the present indefinitely (e.g. not settling credit card payments on time).

- Mental accounting: individuals tend to manage their income and expenditure independently of each other, which can lead to seemingly irrational decisions such as investing at low interest rates and borrowing at high interest rates (De Meza-Irlenbusch-Reyniers, 2008).

The two approaches above - the bounded rationality and prospect theory approaches - may seem similar in elements, but they differ in one important respect. All those elements that may appear to be biases in the perspective theory-based approach (framing effect, loss aversion, status quo effect, etc.) play the role of determinants of the individual's decision options in the former approach, in the constrained environment in which the individual has to make a decision, so that his decision can ultimately be considered rational, taking into account the constraints of decision making, even if it only results in a suboptimal decision (Altman, 2013, Lefevre-Chapman, 2017).

Apart from irrational or boundedly rational behaviour, most of the literature blames financial illiteracy (Lusardi-Mitchell, 2011b, 2014) and the lack of financial knowledge for poor financial decisions, but there may be other factors behind the behaviours described above, either internal (cognitive and psychological) or external (social and economic). The external and internal influences on suboptimal decision-making may appear independently of each other but may also interact.

Possible external influences include the income level of the individual, since those with low income have no money to invest, they are less likely to be well-informed about investing, but also less likely to have savings or to start saving for retirement. Low income is also closely linked to poverty, with poorer consumers having less exposure to financial services and lower exposure to complex financial products. People's innate cognitive functions can also influence their behaviour, which, combined with their income situation, can also make the processing of information in the market asymmetric: for example, some people may not be able to interpret an overly long insurance contract with a good understanding. People with similar intelligence levels, able but higher income may be able to afford to seek advice from an insurance contract specialist, thus gaining an immediate advantage over those who, because of their income situation, cannot take advantage of advice, and their decisions will be irrational or suboptimal in most cases (Capuano-Ramsay, 2011, Potrich-Vieira-Kirch, 2015).

Apart from income status, individuals with different levels of intelligence will also make financial decisions with different degrees of efficiency. As the example above shows, an individual who is not able to read with comprehension may be overwhelmed by a complex financial decision, whereas an individual with faster thinking and better receptivity can easily process what they read. The above circumstances can lead to biases such as the status quo effect or herd effect. Thus, an individual may not only fail to interpret financial information because of a lack of financial literacy, but because of the lack of basic proficiency of reading and information processing or having a lower intelligence level (Capuano-Ramsay, 2011). And as such, the above biases and jeopardizing factors can greatly influence financial decision-making both at the individuals' and companies' level, as MSME decision-makers can bring their own innate biases and

2.5. Financial literacy as a core competence of the company

The key contributors to companies' competitiveness are the core competences, through the development of which long-term success and leading position of the company on the market can be secured. The aim of this chapter[3] is to provide a brief overview of the theory of core competences in the company and at the same time, to answer the question, whether financial literacy can be regarded as one of the core competences of the company. It is important to acknowledge financial literacy as a competence area and not just an abstract concept that does not fit anywhere within competence theory, as that supports the construction of the research model of this study, where financial literacy, digital and entrepreneurial competences play an equally important role in explaining financial outcomes of the companies. The overview of competence models provides an answer to this question by highlighting the similarities between financial literacy and other competences.

The main task of management and company decision-makers is to establish a business that offers customers products endowed with irresistible properties, or furthermore, products that customers did not even know they needed, thus creating new markets. Management needs to recognize that success lies in developing competences. In the short run, companies' competitiveness is determined by the price competition or other performance characteristics of their current products, but in the long run competitiveness

[3] Certain parts of this chapter have previously been published in Kuruczleki (2016, 2017, 2018).

stems from their ability to expand their core competences faster and, where possible, less costly than their competitors, giving them competitive advantage on the market.

Before the notion of core competences is discussed, it is important to clarify what are competences themselves. The European Commission accepted a Reference Framework on key competences for lifelong learning in May 2018[4]. This framework defines competences as the combination of knowledge, skills and attitudes, and key competences are such competences, which are "*essential to citizens for personal fulfilment, a healthy and sustainable lifestyle, employability, active citizenship and social inclusion*" (EC, 2019, p. 4.). These competences are defined for individuals in general, however, all of them can be interpreted for entrepreneurs in a business-setting as well. Competences are grouped under eight key competences in the Recommendation, which are:

- literacy competence, the ability to communicate in one's native language;
- multilingual competence, the ability to communicate in one or more foreign languages;
- mathematical competence and competence in science, technology and engineering.
- digital competence, the ability to use digital technologies at all field of life (e.g. work, school, participation in society), corresponding to the later introduced DigComp competence framework;
- personal, social and learning to learn competence, the ability to manage one's personal issues to the fullest extent.
- citizenship competence, the ability to participate in society in a responsible way.
- entrepreneurship competence, which corresponds to the EntreComp framework introduced in later chapters; and
- cultural awareness and expression competence (EC, 2019).

These eight competences are not separate from, but rather complement and support each other. Thus, for example, the development of mathematical competence can

[4] European Union (2018). Council Recommendation of 22 May 2018 on key competences for lifelong learning. The Official Journal of the European Union 2018/C 189/01. Online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AC%3A2018%3A189%3ATOC, downloaded: 24 April 2022.

be aided if the individual has the competence to acquire learning, and mathematical competence can also support the development of digital competence. For companies, not all of the competences listed above can be interpreted, but they provide a good starting point for determining what a company needs to be competent for.

In his studies, Berényi (2012, 2013) summarised the most important characteristics of competences used in the workplace. He and other authors define competences as the capacity of individuals to perform an activity, which in most cases leads to outstanding performance. In terms of the levels of competences, a distinction can be made between individual and organisational competences, the link between which is established by the fact that organisational competences are based on the individual competences of each worker. This means that the key to the development of organisational competences, from the point of view of managing a business, is to develop the knowledge and skills of individuals.

Competence is not a clearly distinguishable characteristic of individuals, such as financial knowledge. Competences are made up of several elements at once; an individual's particular competence is determined by his or her knowledge, skills, values, attitudes and even personality. Berényi (2012) distinguishes between three main types of competences, general, functional and key competences, depending on the role of the competences in achieving a given performance. This is in line with the approach to competence management developed by the European Union, which it also details, which breaks down competences into four levels, distinguishing between core, key, generic and specific or functional competences. The latter two refer to competences that are necessary for work, such as decision-making ability or problem-solving skills, or, as in the case of the latter, they are the key to outstanding performance (Berényi, 2013). Key competences are therefore mentioned by several sources as the key to business competitiveness, and I will present them in detail in the next section.

Szabó (2008) classifies competencies into four categories, which are already more applicable in the study of enterprises: base competences, core competences (also called as key competences), generic and functional competencies. The base competences provide the foundation for the development of core, generic and functional competences, the core competences are defined along the eight key competences defined above in the European Reference Framework, while the generic competences are general, independent

and flexible, transversal abilities, the acquisition of which cannot be linked to any specific subject. Generic competences are ubiquitous and are present in every occupation in an organization regardless of the field of that specific job or position. Examples include time management, problem solving, decision-making, or those working in all departments may need communication skills, which cannot really be limited to an area of operation, as the former. The narrowest range of competencies, functional competencies include the behavioral repertoire required for the successful performance of each job, the professional knowledge for outstanding performance, and these are therefore special competencies that apply only to a specific area of activity (Szabó, 2008). Thus, for example, while an accountant in a company should be familiar with tax laws, knowledge of the steps of marketing research is not a competence essential to their job, but it is for the marketing specialist of the firm and vice versa.

But why it is important to identify and develop core competences and not every competence in the company? For competitiveness and success of course. To see an example for this, let's consider the findings of Prahalad and Hamel (1990). They depict the elements of a diversified enterprise, such as end products, businesses, key products, and core competences, as a large tree. The trunks and main branches of the tree are the key products (such as the semiconductors manufactured by the multinational company NEC, which serve as a key component of many of their end products), from which the main business lines of the tree grow, and from which the tree leaves or produce grow that are placed directly on the market. The root system that provides the nutrient supply to the "tree" is nothing more than the core competences themselves. They provide the raw materials needed to run a company successfully, maintain and stabilize the company's processes (Prahalad-Hamel, 1990). Key products are the physical manifestations of core competences. Key products are the parts or components of the end product or service that contribute most to their value, such as microchips used in the manufacture of mobile phones or car engines in the manufacture of cars. It is important to distinguish between core competences, key products and end products, as the global competitiveness of a company is affected differently by three different factors, different "rules of the game" apply to competences or even end products (Prahalad-Hamel, 1990).

For a business to remain successful in the long run, it needs to remain a winner in all three areas. In the case of core competences, a business must become a world leader in the design and development of certain products or product functionality, possessing

specialized knowledge that no other competitor has. In addition, they can strengthen their leadership in a given key competency by playing a leading role in their physical manifestation, i.e. in the production of key products, so that they make every effort to maximize their market share in the production of that key product. By becoming a market leader in the production of a key product, not only can companies benefit from the size of the market, such as greater profits or investor focus, but they can also take precedence in shaping market processes and the evolution of target markets. In addition, the role of core competences is not only to harmonize the technological knowledge of the company, but also to create a link between the company's processes, which is a factor that clearly influences the company's strategy in the case of companies operating in both industry and service. The boundaries between the units that make up a company can be bridged through the commitment to communicate and collaborate between the units, in which core competences play a role at numerous levels. The company's collective knowledge is not only influenced by the knowledge of individuals in a given field, but also by knowledge sharing, including the skills that make up key competences, come from different areas and interact with each other. If employees in different positions and areas focus only strictly on their own area and do not work with other corporate units, there will be no positive synergies that could positively impact the operation of the company's processes and consequently, the success of the company (Prahalad-Hamel, 1990).

The recognition and development of core competences also contribute greatly to innovation, as it can open gates to new markets and influence the evolution of key products in the industry, as well as giving space and support to new ideas within the company. In contrast to physical tools, as with knowledge, core competences are not depreciating with use, but can be enriched through their further application. Maintaining a continuous development is essential for core competences as well, as similarly to knowledge, they tend "wear out" too when not used. Core competences are not only the glue that holds businesses together, but also the starting point for business development, and a guide that can help in positioning the business on the market and determining which audience to target (Prahalad-Hamel, 1990).

Conclusively, core competences are important elements of a company's resources, and in many cases, authors do not even distinguish them from resources or knowledge elements, using the terms alternately. The competitiveness- and competency-based approach to corporate strategy is not new, and Grant's 1991 study laid the foundations

for a company's resource-based strategy-making, which includes the company's competences. As the study explains, there have, of course, been attempts to combine a resource-based approach with strategy-making in the past, but they have regularly encountered two problems: firstly, no one has yet integrated a resource-based approach and strategy-making into a single framework; and secondly, no attempt was made to attribute practical applicability to resource-based strategy-making. In the 1991 study, Grant suggests a solution for the abovementioned problems. It should be noted here that although the resource-based approach is not the same as the competency-based approach, many consider the latter to be the antecedent of the resource-based approach, and there are many parallels between the two approaches as both focus on the company's internal processes and knowledge.

Grant (1991) defines five steps of strategy making: the first is the identification of the firm's resources. Similar to a SWOT analysis, this step involves taking stock of a company's strengths and weaknesses, which can also shed light on opportunities that will help to use previously misused resources more efficiently and cost-effectively. Grant (1991) distinguishes between six types of resources: financial, physical, human and technology resources, reputation, and organizational resources. The second step is the identification of firm capabilities. Like in the first step, management in the second step has to make an inventory of such skills and knowledge elements in which the company can be considered better than its competitors. These capabilities should also be associated with the previously listed resources and the components of a given capability should be defined. In many cases, it is not easy to clearly distinguish between resources and capabilities or competencies, but they can be both tangible and intangible, while capabilities and competences always take some intangible form, be it the ability to perform a process or some element of theoretical knowledge. This step is followed by the appraisal of the "*rent-generating potential*" (Grant, 1991, p. 115) of the listed resources and capabilities, i.e. evaluating the economic viability from both the aspect of its ability to maintain sustainable competitive advantage and as well from the point of view of economic returns. This step is in line with what is already known about competences, essentially it in this step it is examined how a capability takes physical form, which products it contributes to, and how profitable the particular activity it supports is. It is necessary to assess whether the given capability-resource combinations contribute to maintaining competitiveness, and if so, the impact, how each resource can be used

economically, and how certain resources could be used even more intensively. As the fourth step, a strategy should be created that can the best exploit the company's resources and capabilities and the synergies of them. At the last step, if any gaps remain in the strategy in terms of missing resources or activities that need further support, these resource gaps should be clearly identified, and investments must be made to sustain continuous development of the company (Grant, 1991). It can be concluded on the above, therefore, that long-term strategic planning should better be based on the firm's internal capabilities, and the path the firm follows should be aligned with the competences available and the competences which can be developed in the company.

That is common between the theories of Prahalad-Hamel (1990) and Grant (1991) is that companies should take stock of their competences and abilities and should be able to identify the most important areas which can shape the future of the company. Prahalad and Hamel (1990) highlight that the role of core competences is emphasized by their three important characteristics among corporate knowledge elements and competences. First, core competences provide potential access to a wide range of markets: for manufacturing companies, for example, core competences enable the production of key products that allow the production of end products sold in several markets (e.g. the production of calculators and digital watch displays is based on similar knowledge base while they are sold on different markets). Second, core competences contribute to the most important added value of a product; referring to the previous example, the display is the most important added value of a digital watch. What makes the competence in connection to its production a core competence is that without it we could not distinguish a digital watch from traditional watches. Third, core competences are difficult for competitors to copy, and are particularly difficult if, as mentioned earlier, core competences are created through the harmonization of different technological and other knowledge elements between business units, tailoring it to the special characteristics of the business.

Competences and core competences must be distinguished from each other. According to Prahalad and Hamel (1990), only such companies can operate successfully globally that can identify a mere 5 to 6 core competences, while those considering themselves to have outstanding knowledge in 20 to 30 areas probably failed to identify their strengths and missed the focus from their core competences. Getting to know and listing these strengths can go a long way in helping corporate decision-makers understand corporate processes and identify core competences by observing the relationships

between each area. Taking stock of the capabilities and competencies of the company can therefore make a major contribution to the definition of core competences. To this end, Grant (1991) proposes a method of analysing a firm's activities by function, which can be used to determine precisely what skills are required to perform each activity. Here, Grant refers back to Prahalad and Hamel's (1990) definition of core competences and clarifies that the word capabilities in the strategy-making model detailed previously refers to the competences of the firm, and therefore the identified key capabilities in the strategy are none other than the core competences of the company on which the strategy is based (Grant, 1991).

The question still remains whether financial literacy of companies can be considered among the core competences of businesses. Although the concept of financial literacy of companies is not uniform, in my previous researches I have tried to find a common denominator between different definitions and conceptual approaches. Based on the definition of individual financial literacy and the specifics of enterprises I defined financial literacy as making effective, well-informed business-related financial decisions, striving for financial security and having the necessary skills, abilities and attitudes to do so (Kuruczleki 2016, 2017). Thus, financial literacy includes the ability of companies to make sound financial decisions that are successful for the operation of the business, and the ability to obtain, understand, and valuate the information needed to make those decisions. Many authors have defined what a competent entrepreneur or enterprise is in recent years and decades, the results of which are summarised in the study of Mihalkovné Szakács (2014) with the help of which I would like to affirm why financial literacy must be included among the core competences of companies.

The author defines competences of the company as forms of knowledge, behaviour, skill, practice, and demeanour which promote outstanding individual performance and contribute to managing and making a firm grow. This definition bears many similarities to the definition of financial literacy: according to the conceptual approaches of financial literacy, it includes elements of knowledge, skills, behavior and attitudes, decision-making ability, and the ability to recognize and process relevant information (Remund, 2010). In addition, the studies processed by the author (Mihalkovné Szakács, 2014) all defined competent businesses differently, but they had several points in common: the competent entrepreneur makes decisions quickly and efficiently, is always forward-looking, is able to identify and exploit opportunities and

take risks (let us now ignore the fact that Hungarian companies are generally not characterized by a risk-taking attitude, as shown by Kuruczleki, 2016 and Ország-Kosztopulosz-Kovács, 2015). These qualities are also in line with the elements of financial literacy, so an entrepreneur or business that has these qualities and a level of financial literacy that is appropriate to make successful financial decisions can be considered competent. Based on the above, financial literacy can be classified as a core competence of a company.

This is further confirmed by other competence definitions. According to Hunter and co-authors (2006), global competence includes the openness of individuals towards other cultures, their willingness to act, and their ability to communicate and work effectively in a foreign environment. Global competences are made up of four distinct elements: knowledge, skills, attitudes, and experience in their definition. Those who excel in all of these areas are considered globally competent, and thus thrive in any intercultural environment. Financial literacy is also defined by these four elements, with the difference that these elements are limited to a specific topic, the range of financial decisions. In addition, financial culture can be classified as one of the functional competences of Szerb (2010), as it is limited to a certain function of the company, financial operations, and in order to perform it successfully, it is essential to be possessed by the company's actors and decision-makers.

In summary, financial literacy, while being a concept that is difficult to define and examine, includes characteristics that are essential to the success of businesses. Examining the elements of financial literacy, their composition and nature provide a good basis for examining financial literacy as a core competence of the company, equally as important as digital and entrepreneurial competence which is introduced in the next chapter.

3. Digital and entrepreneurial competences in the firm

As it has been mentioned above, even though financial literacy is the main interest of my dissertation, it cannot be observed independently of digital and entrepreneurial competences as financial literacy affects financial outcomes in close interaction with these competences. In this chapter entrepreneurial competences and digital competences are introduced following the approach of the EC Council Recommendations on the key competences for lifelong learning (Council Recommendation, 2018). I have decided to adopt this approach in my doctoral dissertation as this recommendation and the competence frameworks built on the foundations of this recommendation are defining competences similar to the OECD MSME financial literacy framework (2018a). This includes describing the main areas of competency, the proficiency levels (which are similar to the levels associated with the progression of the firm in the OECD framework) and as well knowledge, skills and attitudes associated with each areas of competency. Therefore, from the aspect of building my measurement model these competence frameworks proved to be the most suitable to be adapted.

The competences listed by the EC recommendation are required for citizens not only for personal fulfilment, health, social inclusion and responsible citizenship (as the recommendation says), but also for their employability. The frameworks are therefore linked to my research: such competences are do not only appear in personal and social context but are also important when it comes to the labour market and business settings. Entrepreneurial competences have been described by the EntreComp framework (Bacigalupo et al. 2016, McCallum et al. 2018) and digital competences by the DigComp framework (Ferrari, 2013, Vuorikari et al. 2016, Carretero-Vuorikari-Punie, 2017, Kluzer-Pujol Priego, 2018). These frameworks have been developed mainly for citizens' everyday lives, however, with very slight adaptations can be tailored to a business-related setting (e.g. as it will be seen later, protecting personal data as a DIGCOMP area of competency is not much different at a firm, however in the latter case company data needs to be protected).

3.1. Digital competences in the firm

The rapidly evolving information technology of the 21st century requires users to be able to adapt to new products as quickly as possible, whether it is the emergence of new tools or new software and services. The concept of 'digital natives' is not unknown

in the literature (Tóth-Mózer-Kárpáti, 2016); those born in the 1980s and 1990s can already be considered the first generations of digital natives, who have already faced such a wide range of ICT tools and services at birth that previous generations have never. These 'digital natives' are already approaching their thirties, many are in their late thirties, so their presence in the job market is becoming really significant these days, as many are already in decision-maker positions in companies, by either starting their own small businesses or taking over the family business. This chapter provides an overview of the different conceptualisations and definitions of digital competences, starting with the individuals' level (similarly to as how financial literacy literature has been introduced).

Digital competences –similarly to entrepreneurial competences- are listed among the key competences for lifelong learning by the Council Recommendation. The recommendation names digital competences as another competence that is required for citizens for "*the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society*" (Council Recommendation, 2018, p. C189/9) accurately stressing how digital competences are important at the workplace as well. The Council Recommendation details very briefly the essential knowledge, skills and attitudes citizens should have concerning the digital competences, which are much more detailed in the DigComp framework.

Regarding knowledge, the understanding of how digital technologies can support different areas of their lives, the understanding of the most important principle and mechanism of digital technology and the knowledge of the basic functions and use of digital tools are highlighted. Concerning skills, among many others the ability to use, access, filter information, creating and sharing digital content, managing and protecting information and engaging with technological tools are listed. As for the attitudes, a reflective, yet critical, open-minded, curious and long-term oriented attitude is required towards technological development for citizens to be able to engage with digital technology and digital content (EC, 2018).

The digital competence framework called DigComp has been first formulated in 2013 and went through many revisions during the years (DigComp 1.0. in 2013, DigComp 2.0 in 2016 and the current version, DigComp 2.1 was published in 2018). For the sake of brevity I am only going to introduce the current version, DigComp 2.1 and refer to DigComp 2.0 where it is necessary in this thesis work. In the original versions,

digital competences were not as detailed as in the current versions, which is a very detailed five-dimensional framework describing digital competences for citizens. The five main dimensions of DIGCOMP 2.1 are the following:

- "*Dimension 1: Competence areas identified to be part of digital competence*
- *Dimension 2: Competence descriptors and titles that are pertinent to each area*
- *Dimension 3: Proficiency levels for each competence*
- *Dimension 4: Knowledge, skills and attitudes applicable to each competence*
- *Dimension 5: Examples of use, on the applicability of the competence to different purposes*" (Carretero-Vuorikari-Punie, 2017, p. 10.)

Dimension 1 describes five main competence areas of the digital competence, which are then divided into a total of twenty-one competence descriptors which are very similar to the topics described by the financial literacy framework of OECD (2018a). The main areas of competence are information and data literacy (3 descriptors), communication and collaboration (6 descriptors), digital content creation (4 descriptors), safety (4 descriptors) and problem solving (4 descriptors), which include the following main elements:

- The 'information and data literacy' area covers competencies for obtaining, organizing, filtering, and storing information, from the simplest search in a computer browser to the use of more complex search engines.
- Elements in the 'communication and collaboration' competency area include online messaging, content sharing, online collaboration, social media presence, or netiquette. At a basic level, an individual should be able to communicate digitally with others through digital means (email, social network messaging services), while at a higher level, they should be able to use tools that are effective, ethical, and appropriate for the purpose of the communication.
- The 'digital content creation' competency area includes the creation and editing of a variety of digital content, from simpler images or texts to more complex programming tasks, all the way to keeping in mind the copyright aspects of content creation.
- Elements of the 'safety' competency area cover the wider environment in which digital devices are used, from the protection of our personal data and devices to the protection of our health and the environment.

- The ‘problem solving’ competency area covers competencies for solving emerging technical problems, from being able to identify any problems that a user encounters to solving them themselves using innovative technological solutions (Ferrari, 2013).

Table 4 contains these competence areas and descriptors a bit more in detail as described by DigComp 2.0 (which remained unchanged in DigComp 2.1).

Table 4. DigComp competence areas and competences

Competence area	Competences
1. Information and data literacy	**1.1 Browsing, searching and filtering data, information and digital content** To articulate information needs, to search for data, information and content in digital environments, to access them and to navigate between them. To create and update personal search strategies. **1.2 Evaluating data, information and digital content** To analyse, compare and critically evaluate the credibility and reliability of sources of data, information and digital content. To analyse, interpret and critically evaluate the data, information and digital content. **1.3 Managing data, information and digital content** To organise, store and retrieve data, information and content in digital environments. To organise and process them in a structured environment.
2. Communication and collaboration	**2.1 Interacting through digital technologies** To interact through a variety of digital technologies and to understand appropriate digital communication means for a given context. **2.2 Sharing through digital technologies** To share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices. **2.3 Engaging in citizenship through digital technologies** To participate in society through the use of public and private digital services. To seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies. **2.4 Collaborating through digital technologies** To use digital tools and technologies for collaborative processes, and for co-construction and co-creation of resources and knowledge. **2.5 Netiquette** To be aware of behavioural norms and know-how while using digital technologies and interacting in digital environments. To adapt communication strategies to the specific audience and to be aware of cultural and generational diversity in digital environments.

Table 4. continued

Competence area	Competences
2. Communication and collaboration	**2.6 Managing digital identity** To create and manage one or multiple digital identities, to be able to protect one's own reputation, to deal with the data that one produces through several digital tools, environments and services.
3. Digital content creation	**3.1 Developing digital content** To create and edit digital content in different formats, to express oneself through digital means. **3.2 Integrating and re-elaborating digital content** To modify, refine, improve and integrate information and content into an existing body of knowledge to create new, original and relevant content and knowledge. **3.3 Copyright and licences** To understand how copyright and licences apply to data, information and digital content. **3.4 Programming** To plan and develop a sequence of understandable instructions for a computing system to solve a given problem or perform a specific task.
4. Safety	**4.1 Protecting devices** To protect devices and digital content, and to understand risks and threats in digital environments. To know about safety and security measures and to have due regard to reliability and privacy. **4.2 Protecting personal data and privacy** To protect personal data and privacy in digital environments. To understand how to use and share personally identifiable information while being able to protect oneself and others from damages. To understand that digital services use a "Privacy policy" to inform how personal data is used. **4.3 Protecting health and well-being** To be able to avoid health-risks and threats to physical and psychological well-being while using digital technologies. To be able to protect oneself and others from possible dangers in digital environments (e.g. cyber bullying). To be aware of digital technologies for social well-being and social inclusion. **4.4 Protecting the environment** To be aware of the environmental impact of digital technologies and their use.
5. Problem solving	**5.1 Solving technical problems** To identify technical problems when operating devices and using digital environments, and to solve them (from trouble-shooting to solving more complex problems).

Table 4. continued

Competence area	Competences
5. Problem solving (continued)	**5.2 Identifying needs and technological responses** To assess needs and to identify, evaluate, select and use digital tools and possible technological responses to solve them. To adjust and customise digital environments to personal needs (e.g. accessibility). **5.3 Creatively using digital technologies** To use digital tools and technologies to create knowledge and to innovate processes and products. To engage individually and collectively in cognitive processing to understand and resolve conceptual problems and problem situations in digital environments. **5.4 Identifying digital competence gaps** To understand where one's own digital competence needs to be improved or updated. To be able to support others with their digital competence development. To seek opportunities for self-development and to keep up-to-date with the digital evolution.

Source: Vuorikari et al. (2016), p. 8-9.

Dimension 3 of DigComp contain the proficiency levels which have been expanded to eight proficiency levels (Foundation-levels 1 and 2, Intermediate-levels 3 and 4, Advanced-levels 5 and 6 and Highly specialised-levels 7 and 8) from the original three in the first version. The aim of this expansion was that this way educators and decision-makers can fine-tune and better tailor their assessments, training and learning materials to individuals' characteristics. These eight new proficiency levels are linked to the original three proficiency levels in such a way that the first six cover the three original proficiency levels and only levels 7 and 8 are new additions to the framework as such highly specialised professional levels were not originally included in the framework. One very particular characteristic of the DigComp 2.1 model is that it does not directly contain dimension 4, the dimension of knowledge, skills and attitudes, as it was originally detailed by versions 1.0 and 2.0 but provides examples for them through the learning outcomes in dimension 5 the framework, a total of 168 learning outcomes (8*21 for the 8 proficiency levels and 21 descriptors).

To support the implementation of the digital competence framework, the European Commission's Joint Research Centre has published a DigComp At Work Implementation Guide with guidelines on how to use the framework in business-related settings (Centeno, 2020). On top of that, a selection of case studies was published

highlighting the use of the framework by nine different European stakeholders, whose case studies contributed greatly to designing my research (Kluzer-Centeno - O´Keeffe, 2020).

In addition to the detailed presentation of the five competence areas, the DigComp framework also includes the relationship between digital competence and other key competence areas, as key competence areas tend to be connected or to overlap. Communication in the native language and in a foreign language appears in the areas of information, communication and content creation, and mathematical competencies play an important role in all areas. Being able to learn is essential for information acquisition and problem solving, while social and civic competencies play an important role in shaping responsible communication in the digital environment. Entrepreneurial competence, interpreted outside the context of business, can help with communication and group problem solving, while last but not least, cultural awareness and expressiveness can greatly improve both communication and content creation (Ferrari, 2013).

The above model covers all aspects of the use of ICT tools, and although it is a generally accepted framework in Europe, there are other models that go around the meaning of digital competence. These models and definitions already differ in their names (we can talk about digital competence, digital literacy, information literacy, computer use competence and more), and although there is quite a lot of overlap between the concepts, they slightly differ from each other. An internationally accepted model of ICT literacy is the European Computer Driving License (ECDL), which has existed in Hungary since 1988 and has been recognized since the 2006/2007 school year, and its main purpose is to develop the software skills of individuals. The model has been criticized by several for not developing skills that can be used in everyday life, but for focusing "purely" on developing certain technical skills (Calvani et al, 2008).

Calvani et al. (2008) compiled one of the most cited models of digital competence, in their study building their definition of digital competence based on to the definition of digital literacy. According to their interpretation, digital literacy means the ability to think critically rather than merely the use of ICT tools, as well as merging the technical aspects of using digital tools, intellectual competencies and the competences of responsible citizenship. Digital literacy and competence are not the result of simple factual knowledge or skills, but the complex integration of cognitive processes with the above-mentioned

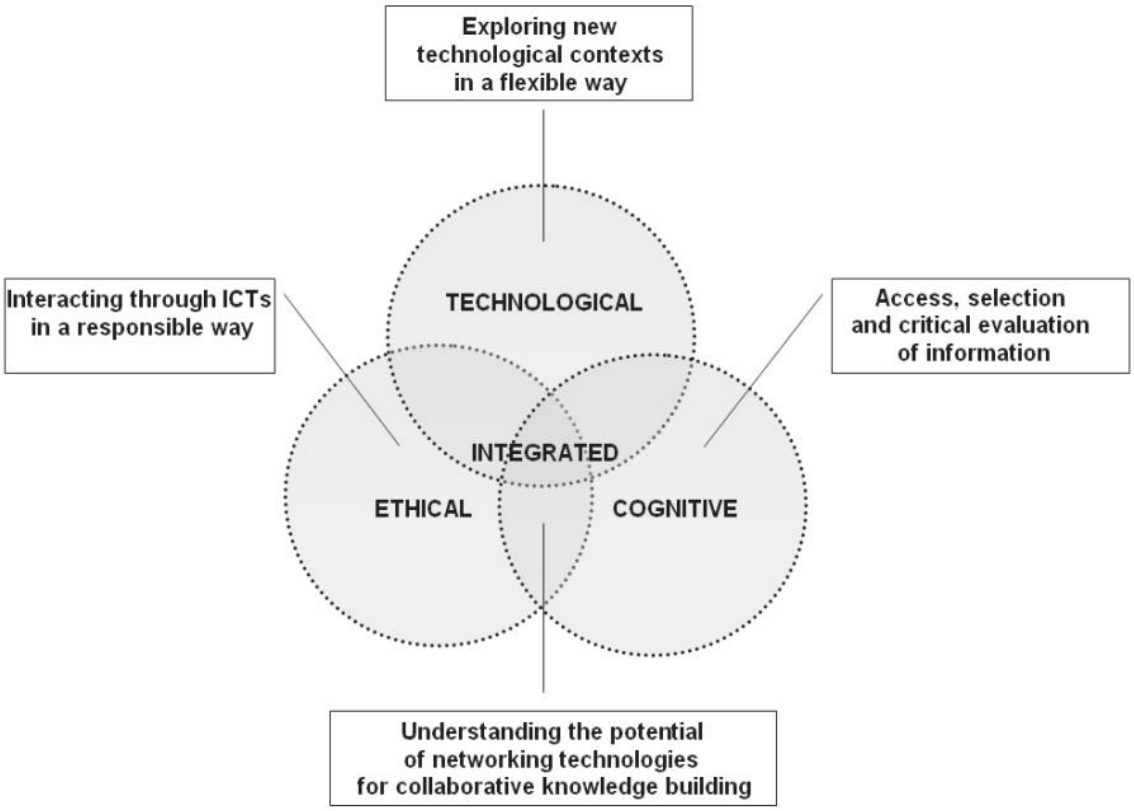
elements, methodological and ethical issues. This is because digital competence is a multi-dimensional, complex phenomenon based on the interactions of individual factors and sensitive to changes in the social and cultural environment (Calvani et al. 2008).

According to their definition, digital competence is manifested in the ability to discover and flexibly to deal with new technological situations, to select, analyze and critically evaluate data, to solve problems by exploiting the potential of technology, to collaborate, to build a common knowledge base with others, to personal responsibility and respect for and consideration of mutual rights (Calvani et al, 2008). Based on the definition, a conceptual model has been developed that defines three overlapping dimensions of digital competence:

1. The technological dimension: identification of and the ability to deal with new "technological challenges";
2. Cognitive dimension: reading, filtering, interpreting and critically evaluating data, taking into account the reliability and validity of the data;
3. Ethical dimension: constructive and responsible interactions with others using available technology (Calvani et al. 2008).

The integration between the three dimensions is the recognition of the potential of exploiting technology to build new knowledge. This allows individuals to share the information they have acquired with each other and thereby build new shared knowledge in a way that is accessible to all. The relationship between each dimension of the model is illustrated in the figure below (*Figure 16*). The model was brought to life by the difficulties of measuring digital competence, and the authors have developed a measurement model (Digital Competence Analysis, DCA) that allows all dimensions to be measured through increasingly complex tasks. Computational and other quantitative tasks can be used to examine parts of the three dimensions, while situational and complex tasks can help to examine them in more depth and assess the existence of integration.

Figure 16. Digital Competence Framework by Calvani et al. (2008)



Source: Calvani et al. (2008), p. 187.

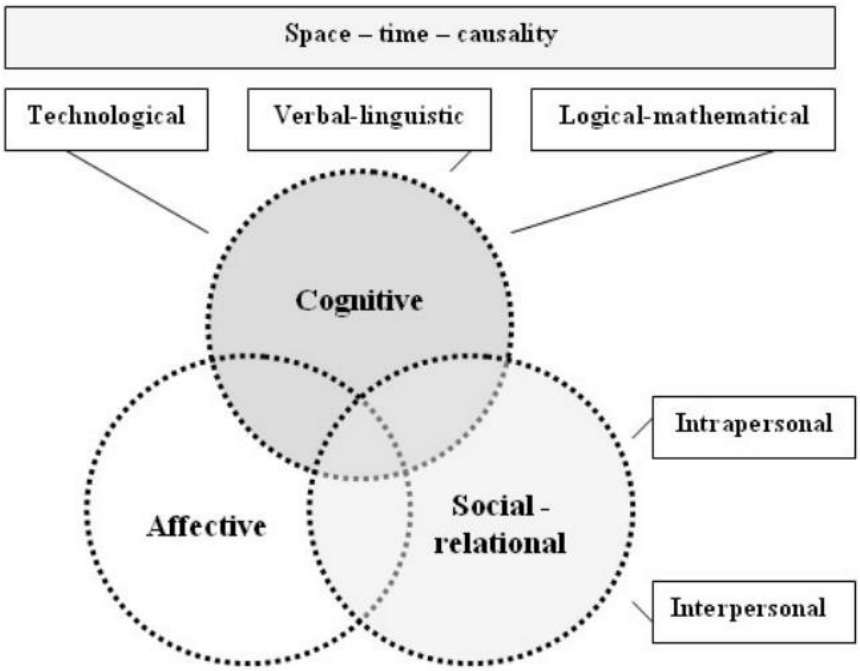
The competency elements of the three dimensions are also listed in the framework. Competences of the technical dimension include the recognition of problems, computer interfaces, selection of the most appropriate technology, execution of logical operations, mapping of processes, distinction between reality and the virtual world. Competences of the cognitive dimension include word processing, data sorting, interpretation of diagrams, interpretation of relevant information, evaluation of information reliability. Competences of the ethical dimension include protection of personal data, respectful internet behavior, understanding of technological and social inequalities.

A critique of the model of Calvani et al. (2008) has been formulated by Cartelli (2010) and can be summarized in three key points. The first critique is that the ethical dimension of the model is too normative, it is almost impossible to measure the competencies it contains. The second remark is that the technological and cognitive dimensions all contain cognitive issues. The final, third complaint is that the emotional and social dimensions are missing, and questions related to those appear in other dimensions where they do not belong (Cartelli, 2010). Learning from the critiques and

expanding the original model, he created a new model of digital competence that consists of cognitive, affective, and social dimensions:

1. The cognitive dimension was created by merging the technological and cognitive dimensions of the previous model, defining its elements following Benjamin S. Bloom's pedagogical taxonomies: knowledge, understanding, application, analysis, synthesis and evaluation (Cartelli, 2010), and expanded the dimension with verbal and linguistic elements and mathematical-logical competencies and the ability to understand the concepts of space, time and causation.
2. In the case of the emotional or affective dimension, the affective taxonomy of Krathwohl et al. (1973) was followed which distinguishes the following elements of the dimension: acceptance of phenomena, emotional response, evaluation of emotions, attitudes, organization and acquisition, internalization (Cartelli, 2010).
3. The third, social dimension involves the study of human and social interactions and relationships, although it is a problem for the author that there are no uniformly accepted definitions of their content for these concepts (Cartelli, 2010).

Figure 17. The new digital competence assessment framework: a revised digital competence framework by Cartelli (2010) as a response on the framework by Calvani et al. (2008)

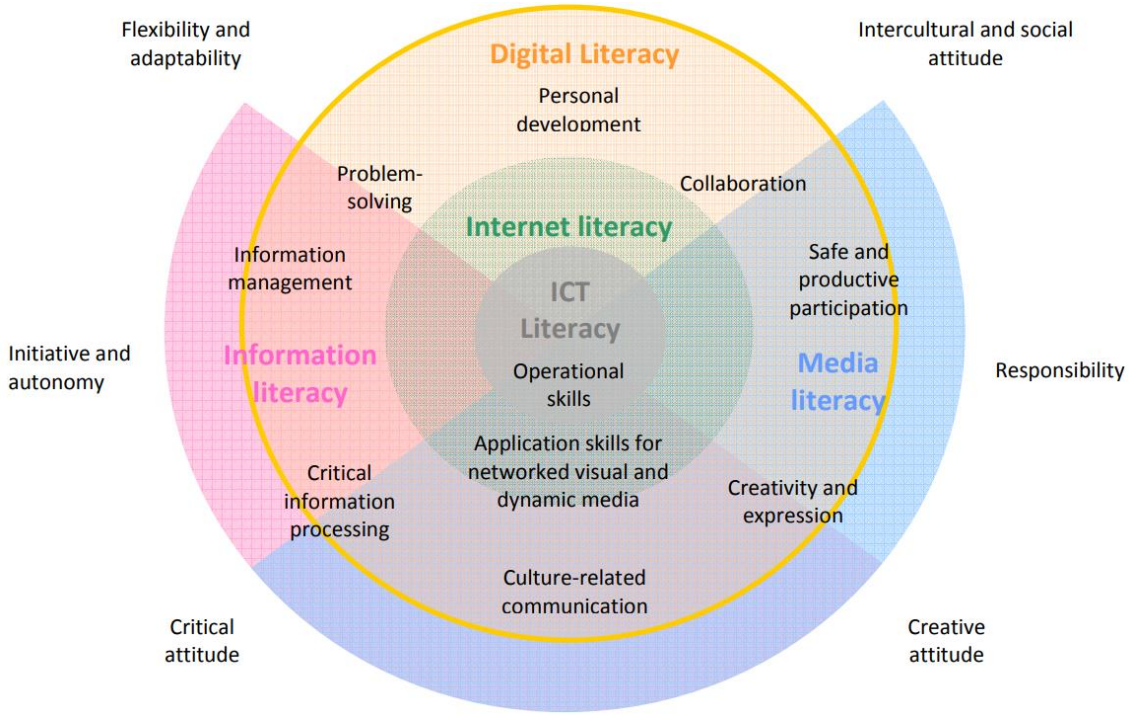


Source: Cartelli (2010), p. 566.

The main features of the model can be summarized in the figure above (*Figure 17*) and, as shown in the figure, the three dimensions again overlap, so they cannot be examined independently. The integration between the three dimensions, similarly to the previous model, means the exploitation of opportunities and a willingness to cooperate, the result of which can be the creation of new knowledge and further collaboration (Cartelli, 2010).

Ala-Mutka (2011) developed a conceptual model of digital competence with a similar approach. In her model, she created a model of digital competence adapted to the challenges of the 21st century, which simultaneously overlaps with many literacy areas, such as digital literacy, information literacy, internet literacy, ICT literacy or media literacy. In the model, digital literacy embodies ICT and internet literacy, factual knowledge of computer and internet use, and overlaps with information literacy and media literacy (see *Figure 18* below).

Figure 18. Digital competence framework reflecting on the 21st century by Ala-Mutka (2011)



Source: Ala-Mutka (2011), p. 44.

The model includes all the social and affective elements that the previous models have, but does not distinguish them so sharply, thus the willingness to cooperate or the ability to communicate appear relatively far apart in the model. It is similar in its elements

to the two models presented earlier, except that this model builds heavily on the relationship between different literacy fields and introduces new elements into the model, such as the internet, which have not yet received so much emphasis in previous digital competence models, thus also reflecting on the challenges of current times.

Conclusively, the introduced three frameworks treat digital competence as a complex phenomenon, influenced by many aspects of an individual's personality traits, knowledge and behaviour, or overlapping with other competences, as e.g. it would not be possible to use digital tools effectively without any language or mathematical skills.

With the outbreak of the Covid-19 pandemic, digitalization and digital competences became even more invaluable than before. SMEs were not prepared for the sudden lockdowns and suffered the consequences of having to quickly relocate their workflow to the online space, which in many cases led to coercive solutions:

> "*Almost every aspect and element of SMEs were affected by the crisis: the way they work, access information, communicate, make decisions, buy or to sell products, and re-skill employees, everything went digital. There was no time to reflect and assess the risks, there was only enough time left to come up with ad-hoc solutions to daily challenges*." (Nachmias-Hubschmid-Vierheilig, 2021, p. 128)

The crisis caused by the pandemic was different compared to the previous economic recession in a sense that it was a "human crisis" (Szeiner et al. 2023). Partical emphasis was put on human resource management, and with the spread of home offices, the focus has shifted from the development of physical assets to digitalization and human resource development. Flexibility, problem-solving skills and adaptability were among the top skills during the turbulent times of the pandemic, and digital competences could contribute greatly to the survival of SMEs. In Hungary, SMEs even though could benefit greatly from digitalization and improving digital skills in the business during the pandemic, the lack of finances and human resources made it challenging to adapt new digital technologies (Szeiner et al. 2023). In their survey, Tick and co-authors (2022) found that even though SME owners understood the importance of digitalization, they are neither pressurized, nor supported by regulatory bodies in improving their digital skillset. The authors assessed digitalization of SMEs based on the DESI (Digital Economy and Society Index, a program of the European Commission monitoring digitalization in member states) and their own survey, while Pintér (2023) evaluated the results of the

Digimeter survey over the years of the pandemic (from 2020 to 2022). While these surveys are independent from each other, the results were similar.

As a consequence of the pandemic, Hungarian SMEs even though sped up their digitalization processes, as a forced reaction to the pandemic, they still lag behind the European average in digitalization according to many surveys (Tick-Saáry-Kárpáti-Daróczi, 2022, Pintér, 2023). Studies draw special attention to micro-businesses, which might be left behind if they do not engage in further training. SMEs are the backbone of the economy, and the pandemic shed light on the importance of both developing the technological background and investing in the human factor (Klein-Todesco, 2021, Nachmias-Hubschmid-Vierheilig, 2021, Kő et al. 2022, Tick-Saáry-Kárpáti-Daróczi, 2022, Pintér, 2023).

At this point, it may be worth drawing a parallel between the concepts of financial literacy and digital competence. Financial literacy, as the combination of knowledge, skills and behaviour necessary to make sound financial decisions both at individual and company level, has been introduced very much in detail already. The similarity between the concepts of financial literacy and digital competences is that both cover a complex concept, defined by a set of individual characteristics, and the continuous development of which is the key to success in both personal and professional life. In terms of elements of financial literacy, it is similar to digital competence, both of which contain elements of knowledge, skills, behaviour, and attitudes that can be and needs to be developed collectively. The financial literacy and digital competences of those working together in a workplace can all contribute to individual and corporate success. The literature suggests, however, that there may be significant differences between the individual and the corporate level, so an individual's digital competence may be characterized by a quick problem-solving ability or a credit-rejecting attitude, and at the corporate level the opposite may be the case (Kuruczleki, 2018). The reason for the implementation of digital competences in my research alongside with financial literacy is thus the fact that with the technological advances of the 21st century, the boundaries between competences are becoming blurred, and with the digitalisation of today’s financial services and the emergence of FinTech services, the two concepts have become permanently and irreversibly connected.

The FinTech evolution has dominated the debate about the use of financial services both among individuals and in the business sphere and resulted in the abolishment of boundaries between what knowledge and skills one needs to be financially literate and digitally competent. Before the rapid spread of digital financial services most financial literacy frameworks did not consider IT-related financial solutions to be essential elements of individual and SME financial literacy. However, as Panos and Wilson (2020) also acknowledge, FinTech is revolutionizing the industry of financial services and can also potentially enhance financial capability and as well can contribute positively to financial well-being. The advancements in mobile payments, financial mobile applications, online banking solutions or robo-advising can be beneficial, but only to a certain extent and only with a given level of digital skills which enable an individual to use such digital tools effectively. The benefits of digitalization in finances are not black and white, FinTech also comes with certain threats apart from its advantages. Low levels of financial literacy and digital skills can cause risky financial decisions. one example could be that consumers should not engage in credits they cannot afford or cryptocurrencies with extremely volatile exchange rates without the proper IT and financial training to learn their risks and how to handle them. Financial literacy, especially regarding the use of FinTech products can be enhanced through the development of digital stills as well, stating a positive effect of digital competences on financial literacy (Panos-Wilson, 2020).

Approaching the relationship between digitalization and financial literacy from a different aspect, Nemoto and Koreen (2019) in their policy brief summarize that through access to FinTech services the economic growth of SMEs can be greatly improved. There is a credit and equity gap of SMEs that roots from the strict and inflexible conditions of traditional credit facilities, and as well from inadequate access to alternative financing tools, such as equity finance, corporate bonds issuance or mezzanine finance. This often poses a challenge to small businesses, especially smaller and newer ones, such as start-ups, making it highly problematic to fund a small business and to contribute to its growth on the long term (Nemoto-Koreen, 2019). The authors propose that policymakers should encourage the use of FinTech services by SMEs by designing a regulatory environment that promotes the digitalization of financial services and at the same time maintains safety and a fair competition on the market in compliance with data protection regulations. In their understanding, enhancing the digital capabilities of SMEs can not only improve their

financial literacy as a consequence but also emphasize how these two areas need to be developed to make SME owners more aware of the risks of financial services and to learn how to make efficient decisions (Nemoto-Koreen, 2019).

3.1.1. Measuring digital competences

Digital competences, as we have seen in the previous chapter, can be approached from many aspects, different frameworks identified various dimensions and topics present within digital competence, and therefore different measurement methods need to be applied to examine its dimensions. This chapter is dedicated to introducing empirical studies which aimed at somehow quantifying the digital competence among entrepreneurs. Digital competence measurement models exist for individuals as well and numerous studies have been carried out, e.g. among graduate students (Czeglédy-Juhász, 2020), adults in general (Juhász, 2020), high school students (Tóth-Mózer-Kárpáti, 2016), all of which painting a rather negative picture of the overall digital competence levels of the Hungarian population. However, since my study concerns SMEs, this chapter is going to focus on studies which were carried out specifically in the target group of my analysis.

Not many papers aim at measuring only the digital competences in SMEs, but rather tend to focus on digital maturity (e.g. Gubán-Sándor, 2021, Pham, 2010), or as Berényi (2013) did, contrasts it with other attributes of the companies. Berényi in his 2012 paper provided a comprehensive overview of the digital competences of Hungarian university students from the aspect of organisational competence development. This 2012 study was part of a later published work on the ergonomics and health consequences of the computer work environment and digital competences (Berényi, 2013). Both studies focused on individuals, yet it is important to mention these papers, as the results showed that the digital competence of the individuals (e.g. the employees or the manager of the company) ultimately affects the competitiveness of the organisations. These studies measured digital competences (basing its definition on the European Commission recommendations for the key competences for lifelong learning) with the help of six-point Likert scales and calculated average scores along each dimension. What is interesting in this work is that software use was recognized as a different competence (competence in software knowledge) and as part of this separate competence, the use of the following software is assessed: word processing, spreadsheets, presentation-maker, database management, editing software and business management software. Proficiency in these

software includes both knowledge and skill elements, measuring if the respondents know the given kind of software and at the same time can use it as well. The results showed that the respondents were not very familiar with editing software, management software and database management, which means that more emphasis should be put on developing these skills in schools (e.g. in university programmes). Companies should also assess what strengths or shortcomings their employees have and adjust their competence management to fully exploit the potential their employees have to boost company performance (Berényi, 2012, 2013).

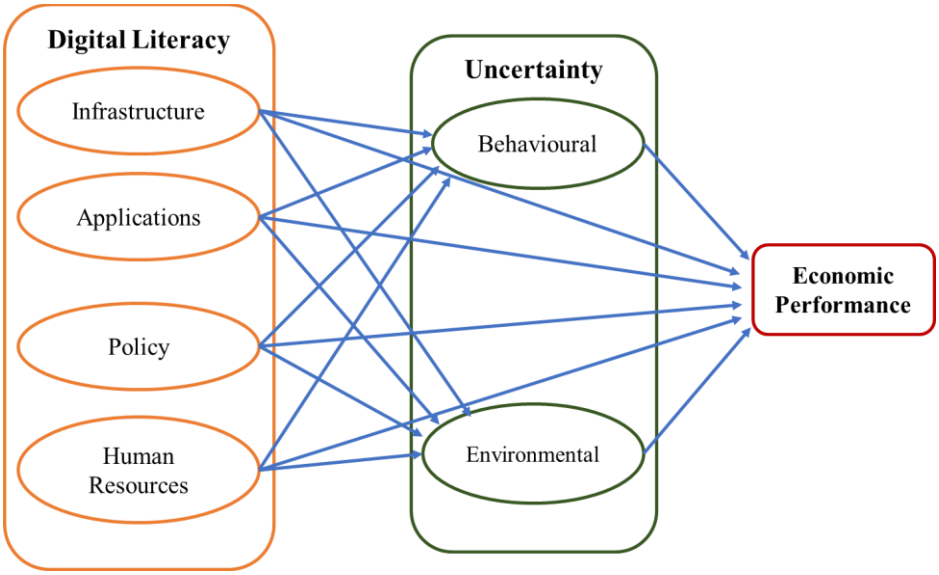
The study of Kulathunga et al. (2020) has already been mentioned earlier, as their paper assessed the joint effect of financial literacy and technological literacy on SME performance using a PLS-SEM path model. Technological literacy in this paper is somewhat similar to digital competences (but focusing slightly more on knowledge and behavioural elements than attitudinal elements) and includes the knowledge and abilities to successfully navigate in the rapidly evolving technological environment and turning technology to the advantage of the company. This study used seven-point Likert scales to measure technological literacy, and while in their definition they approach it in a general sense, defining it as the ability needed to navigate in the digital world, their statements referred more to the use of digital financial services, such as the use of accounting software or digital banking.

What is common between the papers of Kulathunga et al. (2020) and the other article already mentioned by Maziriri-Mapuranga-Madinga (2018) is the emphasis on digital finances and the role digitalization and FinTech plays in the operating of small businesses. The latter paper investigates the effect of technology-based self-service banking (TBSSB) and two sub-dimensions of financial literacy (budgeting and borrowing financial literacy) on SME business performance among agricultural SMEs in Zimbabwe. TBSSB even though does not include all digital competency areas, it includes the knowledge and ability to use ATMs, internet or mobile banking, and other FinTech services. Borrowing financial literacy includes such knowledge and behavioural elements that are related to credit-related decisions, risk management and debt management. Budgeting financial literacy is related to planning and making monetary decisions. Both are hypothesized to contribute positively to SME business performance, which is the ability of the business to set goals and successfully accomplish them, exceeding the expectations of partners (Maziriri-Mapuranga-Madinga, 2018).

The ability to use TBSSB and the related knowledge are even though just a segment of digital skills and the same can be said about the segments of financial literacy included in the research, however the joint analysis of digital and financial literacy-related areas contribute to the construction of the research model in this dissertation. TBSSB, budgeting and borrowing financial literacy are each defined as explanatory variables independent from each other in the PLS-SEM model applied by the authors. Another similarity between the two papers is that both apply a PLS-SEM methodology, where the responses for the independent variables are collected through Likert scale items. Scales in both research resulted to be reliable using the Cronbach's alpha measures of scale reliability and based on the research of Maziriri-Mapuranga-Madinga (2018) both TBSSB, budgeting and borrowing financial literacy have a strong, significant effect on business performance.

Ranatunga and co-authors (2020) examined the effect of digital literacy on economic performance among 110 Sri Lankan SMEs, including uncertainty as a moderating effect. The framework of the study differentiated between four main areas of digital literacy and claimed that each of these areas are positively associated with performance -i.e. better digital literacy of SME owners contribute positively to economic performance- while they negatively associated with uncertainty. The variables in their model (*Figure 19*) were seven-point Likert scale measuring agreement with statements along the four main areas of digital literacy, which were the digital infrastructure (11 items), application (14 items), policy (10 items), and human resources (12 items). Results of the study in fact confirmed that digital literacy strengthen SME performance and as well can help minimize the risk of uncertainty, which has a dominant moderating effect between digital literacy and economic performance. Another surprising takeaway of the study was that the use of mobile tools and services other than any other sophisticated digital infrastructure is an important element of SME practices, as using internet-based tools is a quick and cheap method for most SME owners to access information (Ranatunga-Priyanath-Megama, 2020).

Figure 19. Digital literacy framework 1 by Ranatunga-Priyanath-Megama (2020)



Source: own editing based on Ranatunga-Priyanath-Megama, 2020, p. 55.

This article shares some similarities with the previously introduced paper of Kulathunga et al. (2020), concerning not only their target group, but their measurement methods (Likert scales, PLS-SEM). However, that is not necessarily a problem, but highlights a methodological approach towards measuring digital competences. Both papers cited Pham (2010) as the source for formulating their statements or indicators on digital competences (or in their words, either digital or technological literacy). The paper of Pham (2010) examines ICT maturity of SMEs as a foundation for the implementation of proper knowledge management in any companies and as a consequence, the driver of SME success. The paper identifies the four main factors of ICT maturity (ICT infrastructure, ICT application, human resources, and ICT policy) and introduces a questionnaire for its measurement, supporting its viability with empirical results among 86 Vietnamese SMEs. Each of the respondents to their survey received an ICT maturity index (ICTMI) calculated from their responses, an index on a scale of 0 to 1 which can give us an overall measure of how mature SMEs are digitally, but through the four sub-dimensions can also help to identify weaknesses and possible future developments. The items of the questionnaire are mostly categorical variables, e.g. asking about whether a certain tool is used in the company (with answer options as yes or no), but these items could easily be transformed to Likert scale statements, just as how we could see in the previous examples.

3.2. Entrepreneurial competences in the firm

Entrepreneurship is a widely researched topic which has been researched by many academics over the past century. As Landström and co-authors (2012) summarized in a very extensive study, the topic of entrepreneurship is a phenomenon which has been in the interest of researchers even since the early twentieth century. Entrepreneurship studies are often regarded to originate from Schumpeter or Knight, whose works in the 1910s described entrepreneurs who can identify disequilibrium or imperfections on the market and benefit from acting upon possible opportunities created by these imperfections. But what makes a good entrepreneur, what are their characteristics? Numerous studies were conducted trying to examine the personal traits and abilities of entrepreneurs since the late 1950s, which led to various definitions and concepts on entrepreneurial competences. One of the earliest is Knight's definition from 1916 stating that "*entrepreneurial competence is the individuals's ability to deal with uncertainty*" (Landström-Harirchi-Åström, 2012, p. 1155) and which definition has been extended and complemented with many other traits over the decades. It is beyond the scope of this current thesis work to explore all of the possible definitions of entrepreneurial competences, yet the upcoming section provides a short overview of entrepreneurial competences and the main competency areas, which serve as the foundation for my empirical research.

Entrepreneurial competences are described by the Council Recommendation as "*the capacity to act upon opportunities and ideas, and to transform them into values for others*" (Council Recommendation, 2018, p. C189/11) and this definition is applied in the EntreComp framework as well (Bacigalupo et al. 2016), stressing that entrepreneurship is a transversal competence applicable across all spheres of life, both in personal and business-related settings. The Council Recommendation describes the essential knowledge, skills and attitudes related to entrepreneurship which are more detailed in the EntreComp framework. Essential knowledge in entrepreneurship includes the understanding of planning and management processes, economics, opportunities and challenges of employers and organizations, ethics, and sustainable development among many others. Entrepreneurship skills are highly based on creative thinking and include the ability to organize, problem-solving, working individually or in teams and decision-making. Attitudes are built around critical thinking, pro-activity, perseverance, and long-term orientation (Council Recommendation, 2018).

The Entrepreneurship competence Framework (EntreComp) has been developed over the course of 2015 and 2016 with the aim of bridging the worlds of education and work. Through the better understanding of entrepreneurship competences, facilitating learning and mobility of citizens the creators of the framework expressed their hope of the better employability of them all across Europe. The framework describes three main competence areas which are sought to express entrepreneurship as seen as the ability of turning ideas into actions and opportunities, with their five competences each, which competence areas are ideas and opportunities, resources and "into action" (*Table 5*).

Table 5. EntreComp competence areas and competences

Competence area	Competences
1. Ideas and opportunities	**1.1 Spotting opportunities** Use your imagination and abilities to identify opportunities for creating value **1.2 Creativity** Develop creative and purposeful ideas **1.3 Vision** Work towards your vision of the future **1.4 Valuing Ideas** Make the most of ideas and opportunities **1.5 Ethical and sustainable thinking** Assess the consequences and impact of ideas, opportunities and actions
2. Resources	**2.1 Self-awareness and self-efficacy** Believe in yourself and keep developing **2.2 Motivation and perseverance** Stay focused and don't give up **2.3 Mobilizing resources** Gather and manage the resources you need **2.4 Financial and economic literacy** Develop financial and economic know-how **2.5 Mobilizing others** Inspire, enthuse and get others on board
3. Into action	**3.1 Taking the initiative** Go for it **3.2 Planning and management** Prioritize, organize and follow-up **3.3 Coping with uncertainty, ambiguity and risk** Make decisions dealing with uncertainty, ambiguity and risk **3.4 Working with others** Team up, collaborate and network **3.5 Learning through experience** Learn by doing

Source: own editing based on Bacigalupo et al. (2016), p. 12-13.

The framework defines four proficiency levels of entrepreneurship divided into eight sub-levels (Foundation-Discover and Explore, Intermediate-Experiment and Dare, Advanced-Improve and Reinforce and Expert-Expand and Transform). These eight

proficiency levels determine how deep knowledge, how profound skills and attitudes are required from citizens concerning their entrepreneurship and for each levels and competences and their descriptors the framework describes a total of 442 learning outcomes which reflect the complexity of entrepreneurship as a whole.

To help both individuals and different organizations in applying the EntreComp framework for assessing and developing entrepreneurship competences, the European Commission's Joint Research Centre has published an EntreComp At Work Implementation Guide with guidelines on how to use the framework in a business-related setting (McCallum et al. 2018). They also shared a selection of case studies displaying the use of the framework by 10 different European organizations (McCallum et al. 2020).

Over the past decades, several authors have defined what a competent entrepreneur or enterprise is and what determines entrepreneurial competences. Mihalkovné Szakács (2014) summarised the results of these papers in her study. The author defines the concept of entrepreneurial competence by stating that if we define competence as a set of knowledge, behaviours, skills, abilities or attitudes that contribute to the outstanding performance of an individual in the area of running, managing and helping businesses to grow as a specific task, then we arrive at the concept of entrepreneurial competence. This definition shares many similarities with the definition of financial literacy. According to conceptual approaches to financial literacy, it includes elements of knowledge, skills, behaviours and attitudes, the ability to make decisions, and the ability to recognise and process relevant information. The paper of Mihalkovné Szakács (2014) provides us with an extensive review of what a competent entrepreneur is like (i.e. what are the main elements of entrepreneurial competences) which can be seen in the below *Table 6*.

Table 6. Qualities and skills identified as elements of competences of entrepreneurs (papers in alphabetical order)

Study	**Elements of entrepreneurial competence**
Balaton et al. (2010)	- resourceful, autonomous, lower than average need for acceptance, confirmation and support, nonconforming, unwilling or unable to defer to authority, highly self-confident, innovative, bold personality - ability to make quick decisions - ability to pursue own interests or will - problem-solving ability
Baráth (2008)	Knowledge: - awareness of opportunities - identifying opportunities for personal/business integration Skills, behaviour: - elements of the "leadership wheel" (e.g. vision-making and strategic thinking, communication, emotional intelligence etc.) - project management - cooperation - self-awareness (strengths and weaknesses) - proactivity - risk assessment and risk-taking Attitudes: - taking initiative - supporting change, innovator - striving to fulfil their potential (as a citizen and as an entrepreneur)
Bolton-Thompson (2000)	motivated, persistent, competitive, risk-taking, responsible, creative, fair, independent, innovative, capable able to identify and exploit opportunities, able to find and obtain the necessary resources, networking, service-oriented (in addition, four environmental factors were identified that support entrepreneurship: family background, education, work experience, age)
Hemingway-Bálint (2004)	- early identification of business opportunities - future orientation - success orientation - market orientation and customer focus - a commitment to valuing and motivating employees - realistic thinking - perseverance - ability to deal with challenges - determined decision-making
Hisrich (1992)	"*Technical Skills* • *Writing* • *Oral Communication* • *Monitoring Environment* • *Technical Business Management* • *Technology* • *Interpersonal* • *Listening* • *Ability to Organize* • *Network Building* • *Management Style* • *Coaching* • *Being a Team Player*

Table 6. continued

Study	**Elements of entrepreneurial competence**
Hisrich (1992) (continued)	*Business Management Skills* • *Planning and Goal Setting* • *Decision Making* • *Human Relations* • *Marketing* • *Finance* • *Accounting* • *Management* • *Control* • *Negotiation* • *Venture Launch* • *Managing Growth* *Personal Entrepreneurial Skills* • *Inner Control/Disciplined* • *RiskTaking* • *Innovative* • *Change Oriented* • *Persistent* *Visionary Leader"* (Hirsich, 1992, p. 30.)
Kaplan (1994)	- leadership skills - communication skills - decision-making skills - ability to work in a team - the ability to observe a problem in context both closely and at a distance in a focused and simultaneous manner
Lengyel (1989)	- diligence - ambition - loyalty - company routine - practical skills (market knowledge, negotiating skills, organisational skills)
Niuwenhuizen (2008)	proactive, performance-oriented, committed, creative, innovative, assertive, networking
Schumpeter (1980)	innovation skills in a given economic and social context
Singh (1988)	- education and qualifications - performance orientation, aspiration to grow - hardworking - emotional stability - confidence - accuracy - ability to change and improve - competitiveness

Table 6. continued

Study	Elements of entrepreneurial competence
Szűcs (2001)	Three groups of attributes and skills: - key attributes and skills: initiative, ability to see and seize opportunities, perseverance and persistence, commitment, self-confidence, ability to build and maintain business relationships - important attributes and skills: planning, problem-solving, mature personality, ability to manage and control, ability to influence others - "good to have" qualities and skills: the ability to search for information, the commitment to respect contracts, the drive for efficiency, professional experience, knowledge of one's own limitations, the ability to persuade, credibility, reliability, honesty, sensitivity to the welfare of employees, the need to train employees, the willingness to attract capital, the conscious building of the brand of the service or product.
Vecsenyi (1999)	dream builder, decision-maker, executive, obsessive, determined, loving, has attention to detail, independent, regards money as a reward, companionable

Source: own editing based on Mihalkovné Szakács (2014), p. 50-51.

Even though in my current research the entrepreneurial competence framework of EntreComp is adapted, we must take a look at how complex the notion of entrepreneurship competence is and how differently other authors define this phenomenon and skillset. To begin with, Lilleväli and Täks (2017) define entrepreneurial competence as the "*set of knowledge, attitudes and skills for opportunity recognition and exploitation, value creation and action orientation*" (Lilleväli-Täks, 2017, p.1), a definition highly similar to the EntreComp definition of entrepreneurial competences. The underlying notion of their study is that it is essential to provide individuals with entrepreneurship education as early in their studies as possible since individuals with strong entrepreneurial competences and spirit can contribute to both societal development and economic well-being. The aim of their article is to compare five different entrepreneurial education models and even though it is not the main goal of their study, but consequently also present in detail how these models define entrepreneurial competence, in what ways the definitions overlap and where they differ. When selecting the competence models for comparison, they aimed at choosing such models which included (preferably gradual) competence development opportunities at different levels, are designed to fit a selected nation or region and which contribute to the existing literature of entrepreneurship education. The five assessed models satisfying the above criteria were the "UK model", the "USA model" (also known as the National Standard for Entrepreneurship Education), the "Danish model", the "Nordic or Norden model" and the EntreComp model. The authors were able to identify a total of 70 competence elements, 19 of which were common along all five competence models: these items

mainly focused on exploiting opportunities and value creation, which the authors find to be essential aspects of entrepreneurial activities (Lilleväli-Täks, 2017). There were however many aspects which were different among the assessed models, especially when comparing the USA model to the remaining four models.

The UK model of entrepreneurial competence is a model blending holistic elements with a functional approach, where competence elements are defined rather broadly, not being elaborated as much in detail as in other models. Entrepreneurial competence development focuses on opportunity pursuit to a lesser extent than on innovation and effectiveness in this model. The USA model is a more functional competence model with 15 well-defined outcomes at three stages of competence development. The areas focus on traits and skills necessary for business success and as well on such broader notions as honesty, integrity or valuing diversity (Lilleväli-Täks, 2017). The Danish model could be regarded as different from the previous two in such sense that it is a holistic model which by definition would not describe competence development as a linear process. Instead, it defines it as as a set of different methods, content and activities which together contribute to entrepreneurial competence development, however, the learning outcomes defined by the model imply a gradual improvement among the levels (Lilleväli-Täks, 2017). Last, but not least, the Nordic model of entrepreneurial competence can be regarded somewhat as a mix of the Danish and the EU (i.e. EntreComp) model. Its definition of entrepreneurial competences is highly similar to that of the EntreComp model (highlighting the importance of the value creation process and pursuing opportunities) and is structured similarly to the Danish, but only differ in the naming of the main competence areas (Lilleväli-Täks, 2017).

To further elaborate on the different entrepreneurial competency frameworks, we need to look at Mitchelmore and Rowley's (2010) work in which they provided a literature overview of different competence models, integrating them to develop an entrepreneurial competency framework. In their review, they found that entrepreneurial competencies are such characteristics of individuals, which at a lower level can contribute to the launch of a new business and if improved further (as they acknowledge, entrepreneurial competences are learned and can be upgraded), can support the growth and success of a business. It is important to mention here that various literature reviewed by Mitchelmore and Rowley (2010) use the same three dimensions of knowledge, attitudes and skills as what we have already seen in the case of digital competences and

financial literacy as well. The authors recognize that business owners and managers have different roles in their organizations (entrepreneurial, managerial or technical roles), therefore in order to achieve success acting in any of these roles they must possess the necessary competencies along different competence areas. The below *Table 7* provides with a breakdown of the different competency areas.

Table 7. Entrepreneurial competency framework by Mitchelmore and Rowley (2010)

Key competency areas	**Competencies**
Entrepreneurial competencies	Identification and definition of a viable market niche Development of products of services appropriate to the firms chosen market niche/product innovation Idea generation Environmental scanning Recognising and envisioning taking advantage of opportunities Formulating strategies for taking advantage of opportunities
Business and Management competencies	Development of the management system necessary for the long term functioning of the organisation Acquisition and development of resources required to operate the firm Business operational skills Previous involvement with start-ups Managerial experience Familiarity with industry Financial and budgeting skills Previous experience Management style Marketing skills Technical skills Industry skills The ability to implement strategy (develop programmes, budgets, procedures, evaluate performance) Familiarity with the market Business plan preparation Goal setting skills Management skills
Human relations competencies	Development of the organisational culture management feel is necessary to guide the firm Delegation skills The ability to motivate others individual and in groups Hiring skills Human relations skills Leadership skills

Table 7. continued

Key competency areas	**Competencies**
Conceptual and relationship competencies	Conceptual competencies Organisational skills Interpersonal skills The ability to manage customers Mental ability to coordinate activities Written communication skills Oral communication skills Decision making skills Analytical skills Logical thinking skills Deal-making skills Commitment competencies

Source: own editing based on Mitchelmore-Rowley (2010), p. 100.

The entrepreneurial competence framework of Mitchelmore and Rowley (2010) distinguishes between four main competences, such as entrepreneurial, business and management, human relations and conceptual and relationship competencies. When looking at the competence elements of each competency area, we can recognize such elements that appear in the EntreComp framework as well, like the ability to generate ideas and pursue opportunities, yet provides an even more detailed breakdown along the four dimensions. It is also important to recognize, how some finances-related skills appear in their competence framework, such as decision making, resource management and financial and budgeting skills which again shows that entrepreneurial competencies are not fully independent from financial literacy but are somewhat overlapping with it.

Staying with the idea that the success of SMEs is determined by the manager and his or her entrepreneurial skills, Kyndt and Baert (2015) provided us with another detailed literature review on what competencies entrepreneurs need to possess to successfully manage their companies. According to the authors, "*competencies have been defined as combined and integrated components of knowledge, skills, and attitudes. As such competencies are changeable, learnable and attainable through experience, training or coaching*" (Kyndt-Baert, 2015. p. 14). Providing us with a synthesis of the literature from the previous nearly three decades, they were able to identify the most important and most often recurring competency areas of entrepreneurial competence. If an entrepreneur wants to be successful, they have to exhibit the followings:

- perseverance: most often entrepreneurs are associated with a risk-taking behaviour. Perseverance takes risk-taking a step further by complementing it with the ability to deal with difficulties and unexpected events despite of them being risky, persevering even when facing any obstacles and fallbacks.
- ability to plan ahead: it is important for entrepreneurs to plan ahead and have a long-term oriented plan, a vision they work towards. They need to be able to create long-term plans, set clear goals in the future rather than acting on impulse without considering the long-term consequences of their actions.
- insight into the market: apart from assessing risks concerning the operation of their own companies, entrepreneurs should also continuously monitor the market and stay up to date with the latest trends, technologies and competitors to maintain their position on the market. Entrepreneurial competence in this aspect is then broader than having knowledge about our own business, but we should also be aware of our surroundings.
- orientation towards learning: a successful entrepreneur is a continuous learner, constantly evolving and improving knowledge and skills in the relevant fields. Not only does their business have to compete with other businesses, but he also has to compete constantly with often younger or better qualified managers.
- ability to identify and seize opportunities, aware of potential returns, decisiveness: these three competency areas exist (or should exist) parallel to each other. As the authors claim, "*taking risks also provides opportunities for success*" (Kynd-Baert, 2015, p. 14), however if an entrepreneur is not able to identify such opportunities, does not know what they can gain from them or does not act to take advantage of this opportunity, failure is inevitable. Together with their insight into the market, entrepreneurs should be able to recognize potential opportunities for success, consider the possible outcomes, advantages and disadvantages (i.e. possible gains or losses) and make straightforward decisions.
- independence, self-knowledge and justified self-confidence: entrepreneurs should be able to make decisions by themselves, not depending on others, and to do so and as well to take responsibility for one's actions, they need to be aware of their own skills. This is especially true when it comes to any shortcomings, asking for professional advice when needed is not a sign of dependence but rather shows that

an entrepreneur has a clear view of their actual knowledge and skills and is not afraid to admit them.

- building networks: businesses do not operate isolated from each other; therefore it is important for an entrepreneur to be able to build a network of peers and stakeholders and to maintain these relationships.
- ability to persuade: successful entrepreneurs are "people persons" in terms of them being particularly good at interacting with others, both inside and outside the company. This includes leadership skills, management of employees and as well being a good negotiator with stakeholders.
- social and environmentally conscious: in the operation of the business, entrepreneurs should be able to consider not only the economic, but the social and environmental consequences of their actions and should not manage the operation of the business in a way that it does no harm neither to the rest of their closer community, nor to their wider surroundings (Kyndt-Baert, 2015).

An interesting take on entrepreneurial competencies that needs to be mentioned here is by Neneh (2012). The author explores what an "entrepreneurial mindset" is, which does not directly translate into entrepreneurial competencies, but focuses on the attitudinal dimension of entrepreneurship. Relevant skills are important determinants of business success, but the author argues that it needs to be complemented by an entrepreneurial mindset as well, which is "*a way of thinking about business and its opportunities that capture the benefits of uncertainty*" (Neneh, 2012, p. 3364). Entrepreneurial mindset includes such elements as creativity, motivation, risk-taking, growth mindset, awareness about SME support services and the desire to develop skills, most of which are not skills by themselves, but rather attitude an entrepreneur who seeks business success must possess.

The study of Abdul (2018) aimed at investigating how entrepreneurial skills of Nigerian SME owners contribute to business success. The study was based on a conceptual framework, which identified the five main areas of entrepreneurial skills which overlap with those of the Entrecomp framework: communication, problem-solving, leadership skills, creative thinking and teamwork. Communication does not merely include the ability to talk with peers, but also listening and thinking before speaking. Furthermore, a good entrepreneur is able to transfer his or her ideas through both written and spoken language and nonverbal communication (e.g. gestures, body

language) as well. Creative thinking and problem-solving are considered the two most important drivers are business success. Creative thinking does not only include the ability to generate new ideas but includes intellectual skills needed to assess the viability and feasibility of the ideas. This skill complements problem solving, the ability to quickly develop solutions to previously unknown problems, which can be an extraordinary skill and can promote the growth of the business. Leadership and teamwork complement each other and are further supported by the communication skills of the entrepreneurs. Business success is a result of team effort therefore entrepreneurs must be able to leverage teamwork and, in the process, "*stirring their team by ensuring adequate communication, appreciating the views of other and encouraging contributions*" (Abdul, 2018, p. 34.). Communication is key in leadership and a good entrepreneur is able to manage a team effectively, maintaining firm, yet honest communication with their team and manage them is a way that it contributes to the growth and success of the company (Abdul, 2018).

Al Mamun and co-authors (2019) examined the effect of entrepreneurial competences on business performance among Malaysian micro-entreprises. In their study they say that "*entrepreneurial competencies are related to a manager's knowledge, skills and capabilities as intangible and valuable resources that can contribute to a firm's sustainable competitive advantage*" (Al Mamun-Fazal-Muniady, 2019, p. 31). They identify four factors of entrepreneurial competency: entrepreneurial skills, market orientation, sales orientation and networking. Entrepreneurial skills are not to be confused with competency, skills in the frame of their definition refer to the ability to learn and improve their knowledge, to be able to interact with their environment, shortly summarizing it as being the ability to sense, seize and transform information. Market orientation and sales orientation overlap in such a sense that both competence areas are connected to pursuing the business successfully, having a clear view of one's own position on the market and trying their best effort to drive high sales and profitability. The former also overlaps with what Kyndt and Baert (2015) defined as insight into the market. Last, but not least, networking skills can help entrepreneurs navigate in a dynamically developing environment and can help drive growth through expertise and support (Al Mamun-Fazal-Muniady, 2019), similarly as Kynd and Baert (2015) emphasized that a good entrepreneur is not afraid to seek professional advice.

Enterpreneurial competences, even entrepreneurship itself is a very complex notion. From the above summary we could clearly see that despite the various concepts

and definitions, even since the beginning of entrepreneurship studies, researchers agree on what being an entrepreneur is like. Being an entrepreneur is being able to recognise and take advantage of one-of-a-kind opportunities to move our business forward. To do so, one must have a very high level of entrepreneurial competence, consisting of various elements, including knowledge, skills and attitudes, in line with how financial literacy and digital competences are also built from these dimensions.

3.2.1. Measuring entrepreneurial competences

The previous chapter has shown well how much the definition and content of entrepreneurship has changed over the decades, scholars adjusting it and adding elements to accommodate for the continuous social and technological changes. Consequently, there is no universally accepted definition and there cannot be, as even if there was a definition recognized globally, that would need to be adjusted as well over time. There is a consensus though on the importance of entrepreneurship, how promoting and developing entrepreneurial competences from the youngest of age can contribute on the long run to the economy and society as a whole, therefore various studies have been carried out to map individuals' entrepreneurship competences and to develop entrepreneurship education programs based on the results. This chapter is going to review empirical studies conducted in the topic, focusing mainly on such papers that aimed at examining entrepreneurial competences of SME owners and managers.

Kassai (2020) recognized that successful entrepreneurs have a wide range of competences that support their business success simultaneously, not relying on the one-sided use of a single competence or competence dimension. The research had a mixed methodology, with quantitative and qualitative elements. The quantitative research aimed to create a narrowed set of competencies specific to successful entrepreneurs from a general list of managerial competencies. The main question of this phase of the research was whether there were any patterns between the typical competences and whether there are different patterns that can be observed in successful entrepreneurs. Then, using a qualitative approach, the author investigated, through a case study and literature review, whether and how the results of the quantitative research are valid and, if so, how they manifest themselves in the lives of entrepreneurs. The quantitative survey was aimed specifically at five expert groups as relevant respondents for the research: entrepreneurs, early-stage investors, incubator and accelerator managers, first and second line managers

of enterprises and consultants working with entrepreneurs, reaching a total of 90 respondents from 16 countries (Kassai, 2020).

In the quantitative phase the respondents had to select from a list of previously collected 120 managerial competence those 10 to 15 items that they thought to be the most important competence area and as well those 3 the existence of which is a barrier to successful entrepreneurship. The respondent then had to evaluate on Likert scales the importance of the selected competence areas. This phase was then followed by a social media analysis, where with the help of quantitative content analysis the author identified which of the 120 competence areas were the most frequently mentioned together with success-related expression based on 670 thousand mentions in 8 languages. As a result of these two analyses, the author was able to identify the most important entrepreneurial competence areas that contribute to business success. Even though there were some differences between the results of the two assessments, as an overlap of the two examinations, the following were defined as the most important competence areas of entrepreneurial competences that promote success: being inspirational, agile, motivational, approachable, performance-oriented, ethical, creative thinking, decision-making, motivated, having a sense of purpose, fairness, flexibility (Kassai, 2020).

Apart from the identification of the key competence areas, the author also contrasted the importance of them between the two assessments using Spearman rank correlation analysis, finding a moderate, positive relationship between the rankings of the two assessment. The author also run a hierarchical cluster analysis on the key competences, as a result of which three dimensions of leadership emerge: social, planning and implementation dimensions. The social dimension of leadership contains the attributes associated with emotional intelligence and social interactions, while the other two are associated with practical knowledge and skills needed to make decisions objectively. Based on a case study also present in the paper, these three are accompanied with a fourth dimension called the individual characteristics dimension, which explains who becomes an entrepreneur as opposed to employed professionals or company managers. With the help of the identified four dimensions, the author then run a final cluster analysis on the original respondents to identify their main leadership styles, which were then called “team builders”, “explorers” and “lone wolfs”. This study contains a plethora of quantitative and qualitative methods and gives us an abundant example of how such methods and measures can be used in entrepreneurship competence research:

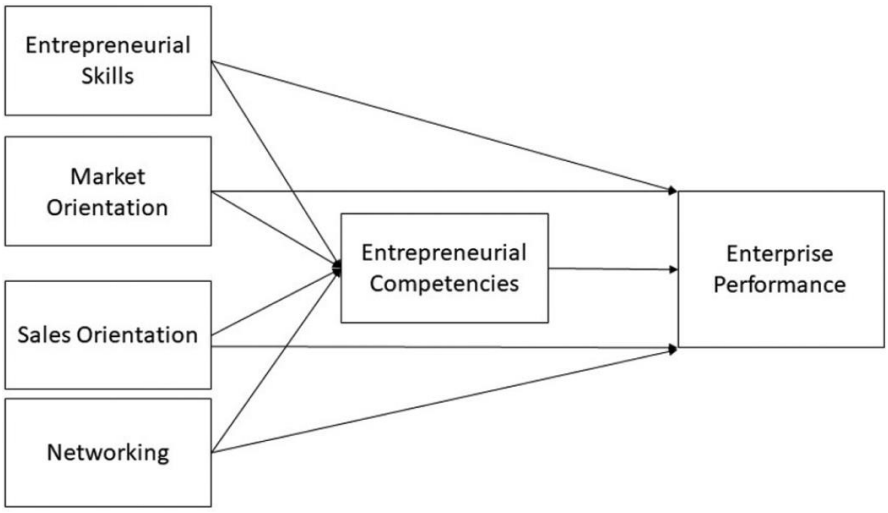
Likert scales, rankings and rank correlation, clustering, content analysis and case studies (Kassai, 2020).

Before turning towards the empirical studies employing quantitative methods, we need to take a look at some qualitative papers. To begin with, the previously mentioned study by Abdul (2018) used a questionnaire, however, the author emphasized that the questionnaire was qualitative in nature as the questions were semi-structured and open-ended. Surveys were sent out digitally because of practical reasons: the sample consisted on both UK-based and Nigerian entrepreneurs, hence it was easier to reach out to them online, asking them about their opinion on which skills can contribute to SME growth. Another qualitative research is conducted in the work of Tamyez-Ishak-Ali (2016) where they aimed at examining how entrepreneurial competences and networking affect the success of Malaysian construction SMEs. Their qualitative study, composed of 8 interviews contribute to the literature by exploring which are the main areas of entrepreneurial competences among such entreprises and as well their contribution to success. They found that the main competence areas contributing to success are personal competencies (e.g. managing relationships, honesty, ethical considerations, trust etc.), learning (e.g. constant development in technical -related to the businesses' activities- and non-technical -such as marketing, PR, management or financial- skills), seizing opportunities (e.g. risk management, planning) and strategic management skills. In their study they concluded that small-size construction firms, who are competing in a very hostile environment must constantly develop these competency areas in order to maintain success, therefore these findings underline a positive relationship between entrepreneurial competences and business success.

Turning towards quantitative methods, the previously reviewed paper by Al Mamun and co-authors (2019) examined the effect of entrepreneurial competences of 403 Malaysian micro-entrepreneurs on performance. In their research they have constructed a research framework (*Figure 20*) that also served as the foundation of their PLS-SEM path analysis. This framework identified four elements affecting entrepreneurial competences: entrepreneurial skills, market orientation, sales orientation and networking. The survey instrument contained five-point Likert scale items (4 to 6 items for each constructs) and measured the respondents' competences using self-evaluation. Apart from the self-assessment of their entrepreneurship competences, the survey also collected data

on the perceived performance of the businesses, asking the entrepreneurs to assess how is their firm compared to major competitors, evaluated on a Likert scale as well.

Figure 20. Research framework by Al Mamun-Fazal-Muniady (2019)



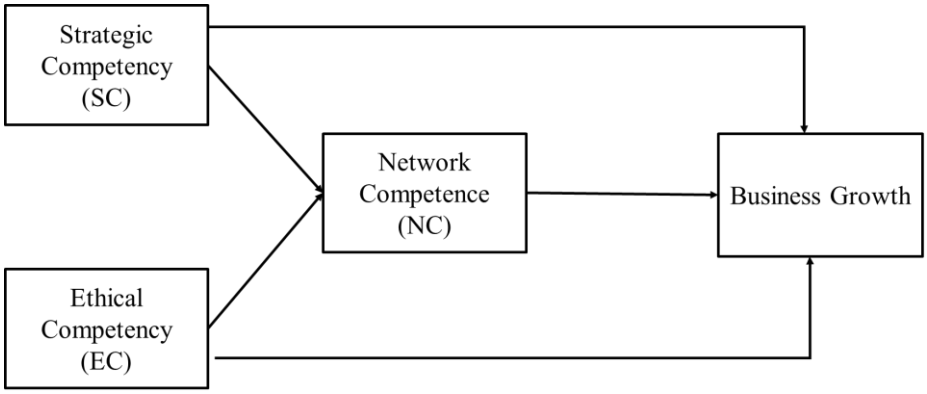
Source: Al Mamun-Fazal-Muniady (2019), p. 36

The obtained Likert scale variables proved to be reliable and valid, and each had a significant effect on the construct they were associated with. The path model built by the authors showed that entrepreneurial skills, market orientation and networking each have a weak, yet significant, positive effect on entrepreneurial competences and as well the first two have a significant, weak, positive effect on performance. Only sales orientation proved to have an insignificant effect on both entrepreneurial competences and firm performance. An interesting result is that entrepreneurial competence has a positive, stronger than moderate, significant effect on firm performance, and mediates the relationship between its determinants and firm performance (except for sales orientation). This means that in the case of micro entreprises, good entrepreneurial skills and market orientation can boost firm performance and networking can also be a unique resource that can help in improving performance (Al Mamun-Fazal-Muniady, 2019).

The above paper was based on the resource-based view (RBV) theory and so is the study of Tehseen et al. (2019). The authors in this study examine two dimensions of entrepreneurial competence, strategic and ethical competency and their effect on the growth of 80 Malaysian SMEs. Strategic competency in their definition is "*the ability of entrepreneurs set, assess and execute strategies for attaining the success of firms*" (Tehseen at el. 2019, p. 6), while the ethical competency is "*the ability of individuals to show transparency and honesty in all business dealings by telling truth and by admitting*

mistakes" (Tehseen et al. 2019, p. 7). The authors chose these two competencies specifically because through better resource allocation (which is promoted by strategic competency) and ethical business practice (e.g. respecting partners, being transparent and retaining good and honest relationships) businesses can achieve growth. As a second objective, the study also examined the mediating role of network competence (*Figure 21*), the ability to build and maintain wide-ranging business relationships. The reason for the inclusion of this competence in the model is that business growth does not only depend on how well one can manage their own business and how ethical they are in doing so, but successful firms also engage in building a network to achieve growth. Building networks is especially important for SMEs who might lack certain internal resources to promote further growth as opposed to larger firms, so that also advocate for the inclusion of network competence as a mediator between entrepreneurial competences and business growth.

Figure 21. Research framework of Tehseen at al. (2019)



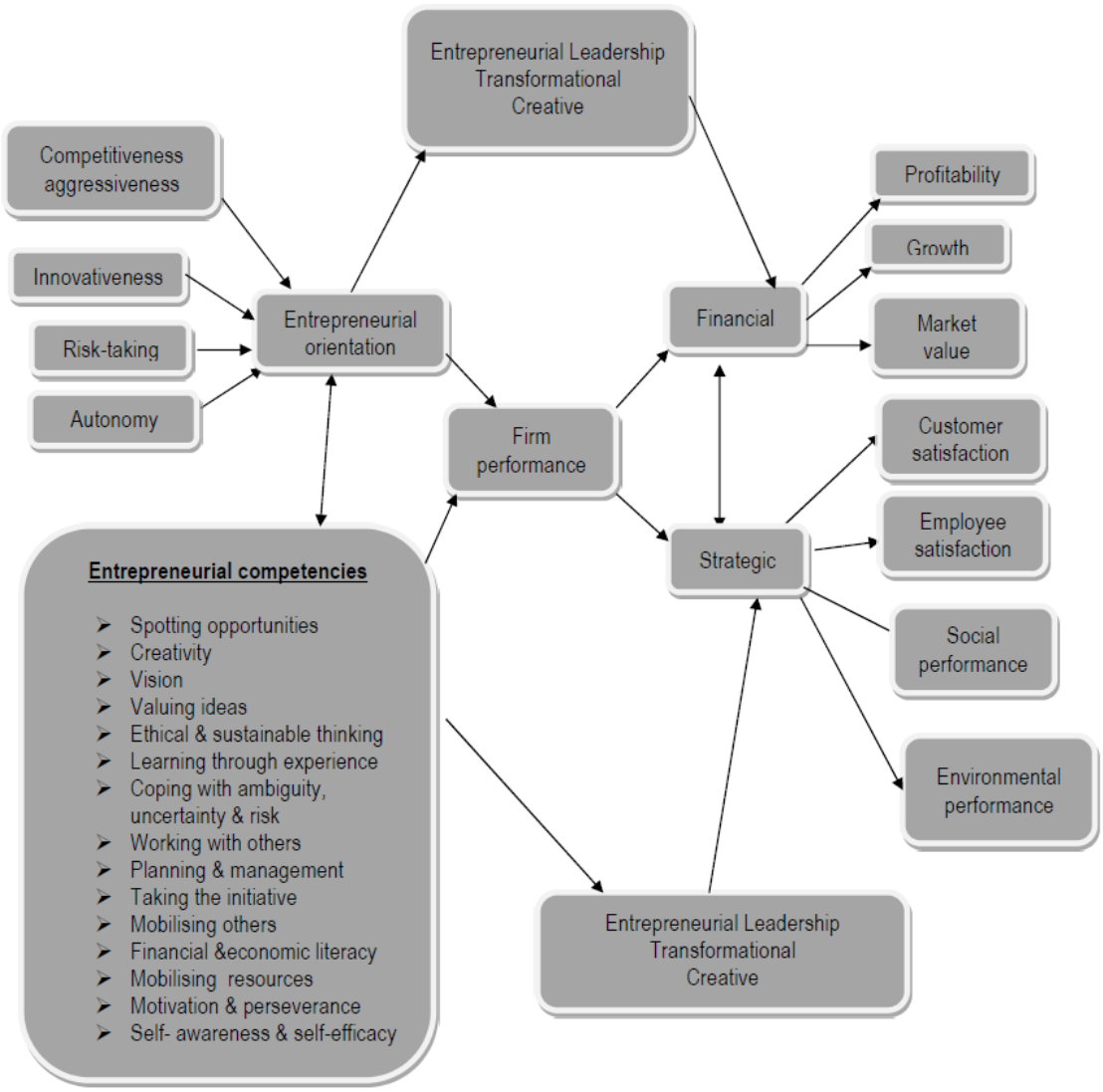
Source: own editing based on Tehseen et al. (2019), p. 9.

The study measures each concept with the help five-point of Likert scales, including business growth as well where the respondents had to indicate how much they agree with statements concerning their sales, market share, cash flow and number of employees. These scales did not contain actual accounting-based measures (e.g. the growth rate of their net income, market share, etc.), but evaluated the perceived growth of the SMEs. The conceptual model and hypothesized effects and mediation was analysed with the help of a PLS-SEM path model. The results even though turned out insignificant and negative for the effect of strategic competency and ethical competency on business growth, but both resulted to have a positive, significant impact on network competence and the mediating role of network competence also resulted to be significant and positive.

The study proved that entrepreneurial competence is undeniably an important driver of SME success and growth, yet the results emphasized that network competence is an essential resource driving SME growth (Tehseen et al. 2019).

Even though it does not contain actual empirical results, Nwachukwu and co-authors (2017) conducted an extensive literature review and constructed a conceptual framework and proposed measurement methods to help uncover the dynamics on how entrepreneurial competences (EC), entrepreneurial orientation (EO) and entrepreneurial leadership (EL) contribute to firm performance, which they divide into two aspect: strategic and financial performance. To define entrepreneurial competencies in the model, they based their definition on the Entrecomp model and as it can be seen in the below *Figure 22*, entrepreneurial competence contains the same 15 dimensions as the Entrecomp model, thus assuming that financial and economic literacy is a component of entrepreneurial competences. The paper formulated seven propositions for further research, two of which proposes that entrepreneurial competences have a direct, positive effect on both financial and strategic performance. The paper also proposes -based on prior literature- that EC, EO, EL and performance should be measured through five-point Likert scales and the causal relationships in the conceptual model should be assessed with the help of Pearson correlation and multiple regression models.

Figure 22. Conceptualisation of EO-EC-EL Performance Link Model by Nwachukwu-Chládková-Žufan (2017)



Source: Nwachukwu-Chládková-Žufan (2017), p. 10.

Gender differences appear rather often when it comes to leadership skills or business performance under the leadership of different sexes. Mitchelmore and Rowley (2013) examined entrepreneurial competences of female entrepreneurs in the UK with a survey of 210 respondents. The survey instrument was based on the above introduced entrepreneurial competency framework by Mitchelmore and Rowley (2010). Five-point Likert scales were used, where the female entrepreneurs had to self-assess their competences along 37 items. Using principal component analysis, the authors succeeded to identify the four main factors of entrepreneurial competences specific to female entrepreneurs. Even though the obtained components have the same name as the proposed framework from their 2010 work (conceptual and relationship competences, business and

management competences, entrepreneurial competences, human relationship competences), their content is slightly different from that, as it can be seen in the below *Table 8.*

Table 8. Female entrepreneurial competencies framework by Mitchelmore and Rowley (2013)

Factor	**Item**
Conceptual and relationship competencies	• Interpersonal skills • Oral communication skills • Relationship building • Networking • Integrity • Self-confidence • Motivating self • Political competence • Being active • Desire to succeed • Perseverance
Business and management competencies	• Budgeting skills • Business operational skills • Developing management systems • Formulating and implementing strategies for exploiting • opportunities • Business plan preparation and writing • Development of operational systems • Planning business activities • Managing finance
Entrepreneurial competencies	• Idea generation • Innovation skills • Visioning • Envisioning opportunities • Product innovation • Creativity • Willingness to take risks • Scan environments for opportunities • Risk taking
Human relations competencies	• Employee development • Managing employee performance • Human relation management skills • Employee relations • Hiring skills • Leadership skills • Motivate others • Management style • Management skills

Source: Mitchelmore-Rowley (2013), p. 136.

The next example for entrepreneurship competence measurement is an odd one out, as it has not been carried out among entrepreneurs, but it is important to be reviewed, not only due to the enormous sample size of more than 25 thousand respondents, but also because it contributes to the construction of my conceptual research as well. Staying on the ground of gender differences, Oggero and co-authors (2019) examined how financial literacy and digital skills of Italian individuals contribute to them becoming entrepreneurs. The study was based on two samples of the Italian Survey of Household Income and Wealth (SHIW), with 19907 respondents in 2008 and 19836 respondents in 2010. After having limited the sample to couples (i.e. to household where two respondents were present, the head of the household and their partner), the final sample became 26032 individuals from 15921 households. The sample was representative of the Italian population and about 2-8% of the sample consisted of entrepreneurs (depending on the definition). The study used a very simplified approach to measure financial literacy and digital competences, and the same can be said about entrepreneurship as well. Two financial literacy questions have been adapted from Lusardi and Mitchell (2008) and a dummy variable was created, which took the value of 1 for respondents who could answer correctly both questions and 0 otherwise. Digital skills were measured using another dummy, which was equal to 1 if household members contacted financial providers through the computer in the year of the survey. Entrepreneurship was also calculated through two dummy variables, based on a narrow and broad definition of what an entrepreneur is: according to the narrow definition, only those running their own businesses are entrepreneurs, but the broad definition adds self-employed, craftsmen, business partners and other professionals to the pool of entrepreneurs.

The probability to become entrepreneur using both definitions has been examined with the help of multivariate logistic regression models, including not only financial literacy and digital skills, but their interaction and as well other demographic factors of the respondents (e.g. marital status, residence, having children, age, educational attainment, household net disposable income etc.). The results of the logistic regression models showed that men are generally more likely become entrepreneurs and the reason behind that is that women do not only have a lower level of financial literacy compared to men, on top of that a digital divide is also present between men and women. An important takeaway of the study from the aspect of my research is that financial literacy and digital skills have a positive, direct effect on entrepreneurship.

This chapter provided us with an overview of different methods of examining entrepreneurial competences both qualitative and quantitative methods. As for quantitative methods in entrepreneurial competence assessment, the most often occurring methodological elements are the use of Likert scales, causal analyses (e.g. logistic regression), principal component analysis (using the Likert scale items) and building path models. Likert scales are often used for evaluating the importance of competence areas or to do self-assessment and can be used as input variables in causal models.

4. Financial outcomes of the firm

The literature review suggest that financial literacy, entrepreneurship and digital competences have a joint influence on the different financial and non-financial outcomes of the firm, let it be their financial performance, growth, competitiveness or even innovation. In this chapter the financial outcomes of the firms are introduced which are divided into three main groups following the OECD financial literacy framework: financial well-being, financial resilience and financial performance. Focusing on firm performance as a whole would be beyond the scope of my dissertation, therefore my analysis is limited to the financial outcomes of the company as listed above.

In this chapter I am providing an overview of the definition and elements of these concepts and explain the difference between financial resilience and well-being as resilience and well-being in general are usually regarded as either conflicting or the same concept, the difference between them being such subtle as further explanation is needed on differentiating between them. When defining these concepts, I rely again on the definitions applied by OECD. In the case of financial resilience and well-being the definitions are created to fit individuals in the personal finances' setting, therefore a slight modification is needed to adapt them to business-related setting. This is a similar modification as in the case of digital competences (see the earlier example on personal vs. company data protection), most of the elements can be similarly interpreted in a firm environment as in the case of individuals, only the topics are somewhat different.

4.1. Defining financial resilience and well-being and their differences

Financial resilience in the definition of OECD (2020a) is a characteristic, a skillset, every citizen should possess to ensure that they can cope with unexpected and unpredictable financial difficulties and financial choices in their life. The definition distinguishes between six main elements which together constitute how well a person can deal with the unexpected and unpredictable (e.g. the 2008 financial crisis and its results or even the current pandemic and its economic implications):

1. Keeping control over money: this is the ability of constantly monitoring and keeping track of finances in order to avoid debt and financial stress (i.e. stress caused by worrying about an unstable financial situation);

2. Taking care with expenditure: closely related to keeping control over money, individuals who take care of expenditures exert prudent financial practices and consider whether they can afford a purchase or expenditure or not;
3. Availability of financial cushion: this element refers to the ability of individuals of saving up money for supporting themselves when income is scarce or when an unexpected event occurs and as a result, they experience loss of income.
4. Coping with a financial shortfall: is the ability of handling a financial shortfall and the degree of how much they are worrying about it;
5. Planning individual finances: includes a long-term oriented approach in setting goals and pursuing these goals;
6. Fraud awareness: is the ability of being aware of the dangers of scams and frauds and the ability to act against being victimized (OECD, 2020a).

As it can be seen from the above description, financial resilience is such a skillset that can be quite easily adapted at a business-setting. Concerning the first element, decision-makers of companies must be able to keep control over the money of the company as well and should act so that the company does not experience any debt and financial uncertainty. The second element can also be directly adapted at firm-level as considering affordability of purchases and expenses is just as important for a firm as in the case of personal finances. As for the third element, the ability to save money and act fast to soothe the effects of unexpected events, is even though a similar concept, however in the case of a company, decision-makers should not be afraid of losing their personal income, but main source of income of a company (e.g. tourism firms losing most of their clients during the pandemic). They should be able to mobilize such resources which can ensure further operability of the firm and as a result being able to cope with financial shortfall effectively, experiencing the least worry about the future of the company. Long-term planning is just as important, if not more, at a company setting than for individuals. Therefore an ability to set and pursue long-term goals is also an important characteristic of the entrepreneur of financial decision-maker of a company, similarly to the ability of monitoring risks and acting in such a manner that the company does not become victim to a fraud.

While financial resilience describes a skillset individuals (and with very slight modifications entrepreneurs) should possess, financial well-being is a state which describes the stability of the financial situation of an individual (as described by OECD

2020a) or with some modifications, a firm. The OECD financial literacy framework adopted the definition of financial well-being from CFPB (2015) and is defining financial well-being as a state within which a person can feel secure about their finances and are not restricted in any ways financially, measuring well-being using 5-point Likert scales (and in some cases, reverse scale items). What causes a slight confusion between financial resilience and financial well-being is the description of the elements of the latter:

- "*Having control over one's finances in terms of being able to pay bills on time, not having unmanageable debt and being able to make ends meet.*
- *Having a financial "cushion" against unexpected expenses and emergencies. Having savings, health insurance and good credit, and being able to rely on friends and family for financial assistance were factors that increase consumers' capacity to absorb a financial shock.*
- *Having financial goals—such as paying off one's student loans within a certain number of years or saving a particular amount towards one's retirement—and being on track to meet those financial goals also made people feel like they were in good shape financially.*
- *Being able to make choices that allow one to enjoy life—such as taking a vacation, enjoying a meal out now and then, going back to school to pursue an advanced degree, or working less to spend more time with family—was also deemed an essential ingredient in financial well-being*" (OECD, 2020a, p. 51-52).

The elements listed above seem very similar to the elements of financial resilience already listed. What differentiates between these two concepts is that while in the case of resilience, all of the elements are referring to skills needed to act towards certain states or goals, in the case of well-being we regard the above elements as the result of actions and the financial state reached as a result. Therefore it needs to be highlighted in the first element that it refers to a status where one does not have debt and has a stable financial status as opposed to the ability for acting towards this as an element of financial resilience. Similarly, the second element of having a financial cushion refers to the existence of savings and having financial goals is also a static where these goals exist and individuals are at a given state for reaching these goals, but not the ability to act towards reaching them. The last element is closely related to the first element, if someone is in a stable financial state than they have a certain degree of freedom to enjoy and are not restricted or limited in any ways when it comes to making decisions.

When adapted in a firm setting financial well-being means essentially the same, the firm being in a stable, debt-free financial position, having savings available to use in case of financial shocks and as well having clearly defined financial goals. The last element is somewhat different when it comes to a business-related setting, as it might not refer to the company being able to enjoy life, but not being limited in such decisions that make the employees enjoy life. e.g. providing them with certain benefits, such as a pension plan or premiums.

4.2. Defining financial performance

Drucker (1954) defines economic performance as the first and most important function of a company. Operating a business can undoubtedly lead to other non-economic results as well, such as employee satisfaction or contribution to the welfare of society, but a company and its management has failed if it does not generate economic results (Drucker, 1954). These nearly 7 decades old statements even though might sound somewhat extreme, however, the performance of a company is a very broad notion which can include various different aspects and economic and financial indicators still remain important measures of business success and survival. It has been and still is important to measure business performance as the indicators make it possible to assess how the business is doing, make comparison with other businesses possible and can also serve as important benchmark for future growth projections.

Measuring performance has kept scholars busy in the past decades and even though newer and newer models emerged throughout the years, the challenges of performance measurement have remained mostly unchanged: when developing a performance measure model or indicator, researchers faced ambiguous questions. They were eager to quantify as many aspects of the business operation as possible, however, quantifying could lead to unexpected consequences (Neely, 2005). This conflict has been resolved by Drucker's suggestion to develop performance measurement systems that are balanced, and cover eight areas of the operation of the business:

> "*There are eight areas in which objectives of performance and results have to be set:*
>
> *Market standing; innovation; productivity; physical and financial resources; profitability; manager performance and development; worker performance and attitude; public responsibility*" (Drucker, 1954, p. 63).

Various performance measurement models have been developed over the past decades. The most notable and well-known of which, among the many others, are the Balanced Scorecard by Kaplan and Norton (1992, 1993), the Key Performance Indicators, the performance measurement matrix by Keegan et al. (1989), the results-determinant framework by Fitzgerald et al. (1991) and the performance pyramid by Lynch-Cross (1991), all of which are heavily influenced by the areas established by Drucker (Neely-Gregory-Platts, 1995, Neely, 2005). What is common in all performance measurement models is that they describe numerous areas of performance, including financial and non-financial performance measures, such as personal growth and satisfaction of employees, skill improvements, customer retention and satisfaction, loyalty, market size, competitive advantage or even business survival (Škrinjar-Stemberger-Hernaus, 2007, Bosilj-Vuksic et al. 2008, Ranatunga-Priyanath-Megama, 2020, Tehseen-Ramayah, 2015, 2020, Tuffour-Amoako-Amartey, 2020). It is out of the scope of this current research to examine all areas of business performance; the main focus now is to discover and clarify what financial performance means based on the literature.

Financial performance is and has always been an important element of performance measurement models, as financial performance measures are easily quantifiable and can be easily obtained from business operation measures. Financial performance indicators are usually measured repetitively in the company and provide a snapshot about the current state of the company on their way of achieving the objectives of the company. Such indicators can be measured either objectively and subjectively; the most commonly used objective indicators of financial performance are sales, profitability measures such as return on equity (ROE), return on assets (ROA), return on investment (ROI), return on sales, gross or net profit margin, sales growth, earnings per share (if applicable), or even cash flow or the number of employees (Adomako-Danso, 2014; Agyapong-Attram, 2019; Anwar, 2018; Bosilj-Vukšić et al. 2008; Dandibi-Ben Pam-Umaru, 2019; Herijanto-Rahadi, 2020; Hilal-Rahim-Iranmanesh, 2020; Ishtiaq et al. 2020; Kaban-Safitry, 2020; Liu et al. 2020; Mitchelmore-Rowley, 2013; Ranatunga-Priyanath-Megama, 2020; Resmi-Pahlevi-Sayekti, 2019a, 2019b; Škrinjar - Bosilj-Vukšić - Indihar-Štemberger, 2008; Škrinjar - Stemberger-Hernaus, 2007; Tehseen et al. 2019; Tuffour-Amoako-Amartey, 2020; Usama-Yusoff, 2019; Venkatraman-Ramanujam, 1986; Watson, 2007; Yang-Ishtiaq-Anwar, 2018). Interestingly though, many state that such objective measures are hard to be obtained when working with

smaller companies, as in many cases financial data is not collected on a regular basis especially when it comes to startups or micro enterprises. In such cases many authors recommend using self-perceived measures of financial performance and as well of financial success.

As introduced earlier, Kaban and Safitry (2020) examined how financial literacy influences business performance and sustainability of culinary MSMEs in the Greater Jakarta area. This study is a great example of the constraints one might face when trying to measure financial performance of small companies objectively. As they summarized, measuring financial performance of MSMEs is problematic due to three causes: first, companies might have limited resources to collect such data; second, performance indicators generally look at the company and business processes as a whole and do not really provide a great snapshot of the actual processes of the company; and third, and most importantly, the most widely used performance indicators are mostly suitable to be used in large companies. Consequently, in their study a new approach to measure performance has been developed based on the EFQM Excellence Model for performance measurement based on the perception of the respondents along 12 Likert scale items. Even though not being actual quantitative measures of the business such as sales or profitability, these perceived measures could also serve as good indicators of financial performance (Kaban-Safitry, 2020).

Similarly to the previous research, the use of self-perceived measures of financial performance are recommended by Ishtiaq et al. (2020), Yang-Ishtiaq-Anwar (2018) and Anwar (2018), some of them as an addition to objective measures. Anwar (2018) and Yang-Ishtiaq-Anwar (2018) argue that measuring financial performance in SMEs is especially challenging for researchers as financial data does not necessarily exist in an organized way for SMEs. To obtain some measures nonetheless, they recommend using self-reported measures in the form of Likert scale items. Yang-Ishtiaq-Anwar (2018) measures SME performance along 4 financial (such as ROE, ROA or ROI) and 4 non-financial indicators (e.g. customer satisfaction, employee satisfaction, loyalty of employees etc.). Managers and firm owners in their research could evaluate from on a scale of 1 (extremely declined) to 5 (extremely improved) how SME performance has improved in their company. A measurement tool based on the same methodology is used in the research of Anwar (2018) where firm performance is measured along 6 self-perceived dimensions: ROE, return on sales, ROI, ROA, sales growth and net profitability

since last three years compared to major competitors. This self-reported approach is used based on the argument that objective measures of profitability can sometimes be misleading in grasping financial success and as well such measures are sometimes difficult to be measured for smaller companies (Anwar, 2018). Therefore, even though the use of proxy measures such as ROI or ROE might give us objective and comparable measures of company profitability and performance, self-evaluation can complement these objective measures and help us better understanding the company.

In the understanding of Venkatraman and Ramanujam (1986), performance of a company is built up from way more layers than just their financial performance measures. They described a three-layered structure of performance measures, the lowest level or the core of which is financial performance of the company, such accounting-based measures as sales growth, profitability (e.g. ROI, ROE or even return on sales) or earnings per share. These measures are easy to collect and easy to assess, making company comparison possible. However, financial performance is merely the narrowest subset of performance measurement levels and as the authors acknowledge as well, even though financial performance has been the dominant field in performance research, more market-oriented measures, such as market share, product quality or even marketing efficiency can reflect better how a business performs. These measures constitute together the operational performance of the company, which, in addition to financial performance, accounts for a "higher" or more complex level of financial performance measures, namely business performance. Business performance is therefore not only the collection of quantitative accounting-based measures but reflect on the actual operation and success of the company both in financial and nonfinancial terms. The outmost layer (or the broadest concept) of performance according to the authors is organizational effectiveness, reflected mainly in organizational theory and strategic management literature and conceptual models, and which embodies both the notions of financial and business performance (Venkatraman-Ramanujam, 1986). The used term in this dissertation, financial outcomes, reflects the most what the authors defined as business performance in their study, since including measures of financial resilience and well-being are not only accounting-based "hard" measurements, but reflect the daily operation of the companies.

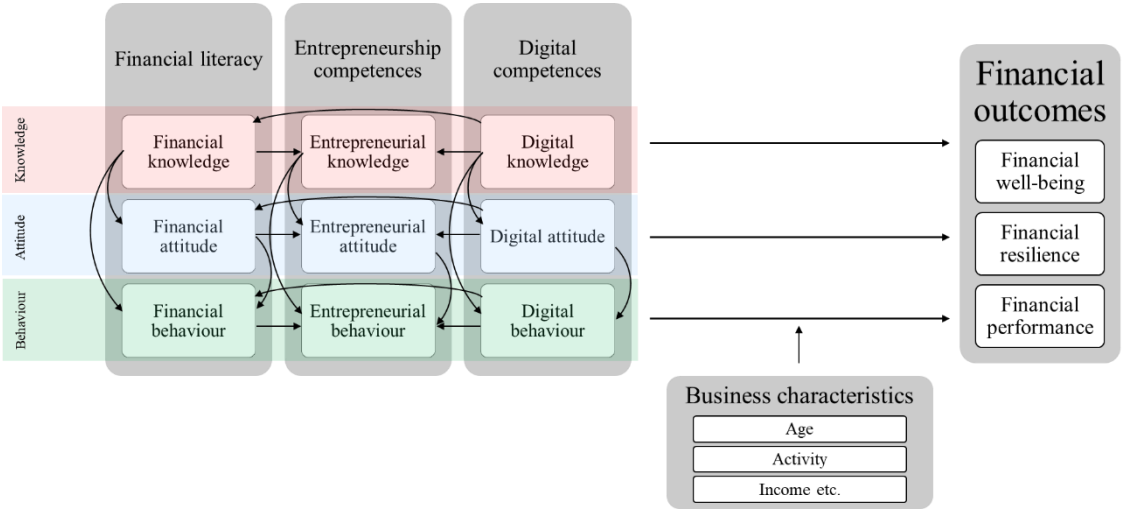
5. Empirical research methodology

The main research question of my dissertation is how financial literacy, together with entrepreneurship and digital competences affect the financial outcomes of the company. Based on an extensive literature review I was able to formulate a measurement model which reflects the main findings of the literature and merges their findings in a model where not only the individual effects of financial literacy, entrepreneurship or digital competences are assessed, but takes into account their interactions and joint influence on the financial outcomes of the company.

5.1. Conceptual framework

This chapter presents the conceptual framework and the path models tested in the empirical research. The models presented in this chapter are the results of a work based on the synthesis of the reviewed literature. As we can see it from the literature review, an extensive number of papers examined how financial literacy affected the financial performance of companies (chapter 2.3.3), how digital competences influenced financial literacy or even entrepreneurial competences (chapter 3). Yet the true novelty of this current research is that it combines all three competence areas to one research model and examines their joint influence on the financial outcomes of the MSMEs. The below *Figure 23* contains the conceptual model of the empirical research and all the possible interactions of the competences and their dimensions, all of which have been derived from the literature, as explained below.

Figure 23. The proposed conceptual model for empirical research



Source: own editing

Financial literacy, digital an entrepreneurial competences are constructed from three dimensions: knowledge, attitudes and behaviour. These dimensions are in interaction not only within the same competence, but between the same dimensions of the competence areas as well (which is based on the relationships of the competences themselves), which could provide us with different approaches of building the PLS models, which will be introduced shortly.

The independent or target variable of the analysis is a three-dimensional construct, the financial outcomes of MSMEs, which is composed of the measures introduced in chapter 4: financial resilience, well-being and financial performance. Many studies examined independently how financial literacy (Adomako-Danso, 2014, Agyapong-Attram, 2019, Dandibi-Bem Pam-Umaru, 2019, Delić-Peterka-Kurtović, 2016, Herijanto-Rahadi, 2020, Hilal-Rahim-Iranmanesh, 2020, Ishtiaq et al. 2020, Kaban-Safitry, 2020, Kulathunga et al. 2020, Liu et al. 2020, Maziriri-Mapuranga-Madinga, 2018, Pandey-Gupta, 2018, Panos-Wilson, 2020, Sindani, 2019, Suparlinah et al. 2019, Tóth-Kása-Lentner, 2022, Tuffour-Amoako-Amartey, 2020, Usama-Yusoff, 2019, Wise, 2013, Zaitul-Ilona, 2022), digital competences (Kulathunga et al. 2020, Maziriri-Mapuranga-Madinga, 2018, Nemoto-Koreen, 2019, Oggero-Rossi-Ughetto, 2019, Omiunu, 2019, Panos-Wilson, 2020, Ranatunga-Priyanath-Megama, 2020), and as well entrepreneurial competences (Al Mamun-Fazal-Muniady, 2019, Hilal-Rahim-Iranmanesh, 2020, Neneh, 2012, Nwachukwu-Chládková-Zufan, 2017, Sambo-Gichira-Yusuf, 2015, Suparlinah et al. 2019, Tamyez-Ishak-Ali, 2016, Tehseen et al. 2019, Tehseen-Ramayah, 2015, Utami, 2020), influence different aspects of firm performance (e.g. growth, innovation, sustainability, competitiveness or even survival), and in the majority of the cases, a positive effect can be observed. Based on the above therefore, each of the competences act as determinants or influencers of the financial outcomes of the MSMEs. When formulating the research hypotheses, it is important to clarify in advance that the survey instrument contains self-assessment type variables, meaning that e.g. financial performance of the companies is not measured through objective indicators, such as ROA, ROI or net income (or even if they are, they result to be insignificant in the models), but rather asks the respondents how they perceive their business, if it is successful and as well to evaluate how different measures have changed over time using Likert scales. This means that the competences of SME owners and managers are not

hypothesized to directly influence the financial outcomes, but the perceived financial outcomes of the SMEs.

The aim of the research is even though analysing the influence of financial literacy together with entrepreneurship and digital competences on firm financial outcomes, in concordance with the earlier described concepts the subject to my analysis is an individual, an entrepreneur or financial decision-maker of an MSME. A questionnaire has been developed to assess these individuals, which can be found in *Appendix 1*, based on the OECD/INFE Survey Instruments to measure individual and MSME financial literacy, the DigComp and EntreComp frameworks and DigComp At Work and EntreComp At Work Implementation Guides (OECD 2020a, 2020b, McCallum et al. 2018, 2020, Bacigalupo et al. 2016, Ferrari, 2013, Vuorikari et al. 2016, Carretero-Vuorikari-Punie, 2017, Kluzer-Pujol Priego, 2018, Centeno, 2020, Kluzer-Centeno - O´Keeffe, 2020) with such modifications that make it possible to adapt the frameworks at firm-level.

The survey consists of a total of 43 questions and is divided into 8 main parts:

1. Business characteristics-demographics of the business: 9 questions, single choice, and short response questions
2. Business characteristics-financial management: 7 questions, single choice, and Likert scale questions
3. Business characteristics-demographics of respondent: 9 questions, single choice, multiple choice, and short response questions
4. Financial literacy: 3 questions, true or false knowledge test and Likert scale questions for measuring attitudes
5. Entrepreneurship competences: 2 questions, true or false knowledge test and Likert scale questions for measuring attitudes and behaviour
6. Digital competences: 2 questions, true or false knowledge test and Likert scale questions for measuring attitudes and behaviour
7. Financial resilience: 3 questions, Likert scale and single choice questions
8. Financial well-being: 4 questions, Likert scale and single choice questions
9. Financial performance: 4 questions, Likert scale and single choice questions

The responses in the questionnaire are used to calculate the knowledge, attitude, and behaviour scores of the respondents in the three competence areas, financial literacy, entrepreneurial competences, and digital competences. Calculating the knowledge scores

happens by adding up the number of correct responses for the knowledge question elements, this way resulting in a score of 0 to 5 for each of the three areas. Financial knowledge, entrepreneurial knowledge and digital knowledge scores are therefore calculated as the sum of the correct responses for the statements in questions no. 28, 30 and 32, respectively. *Appendix 2* is describing the evaluation of the knowledge test questions.

Attitudes are measured along Likert scale elements, where respondents had to indicate on a scale of 1 to 5 how much they agree with certain statements (where 1 means they highly disagree and 5 means highly agreeing with a statement). These statements can be used as individual variables in the model, or an overall attitude score can be calculated, which measures attitudes towards finances, entrepreneurial and digital competences with one value for each. Financial, entrepreneurial and digital attitude scores can therefore be calculated using the Likert scale statements in questions no. 29, 31 and 33 respectively. In the case of the latter two questions, statements used for calculating entrepreneurial behaviour and digital behaviour scores are mixed together with the attitude statements. The calculation of attitude scores is described in *Appendix 3*.

Financial behaviour is measured by adapting questions from the OECD/INFE MSME financial literacy questionnaire (OECD, 2020b). These questions (no. 13, 14, 15, 16, 17 and 26) are measuring financial behaviour on a scale of 0 to 9, showing how "*financially savvy*" (OECD, 2020b, p. 36) the behaviour of the respondent is (the higher the score, the more conscious their behaviour is). Question 15 contains Likert scale elements, and the rest of the questions are single-choice questions. As for calculating the entrepreneurial and digital behaviour scores, Likert scale items were used. The calculation of behaviour scores is described in *Appendix 4*. Similarly to the attitude items, these Likert scale variables can also be used as individual variables in the model.

Concerning the output variables of the measurement model, financial resilience and financial well-being questions have been adapted from the OECD/INFE (2015, 2020a) individual financial literacy questionnaire and have been modified so that the statements are understandable in a business-related context. Financial resilience is measured through questions no. 34 to 36, which both contain single choice and Likert scale elements. Financial resilience of the companies can be described on a scale of 1 to 12 (the calculation of which is described in *Appendix 5*), where higher scores means the

company is more financially resilient, therefore is able to face and handle unexpected financial crises and shortfalls easier. Lower scores mean that the company is less financially resilient and could face substantial difficulties handling unexpected financial situations, accordingly, being less vulnerable towards financial shocks. Financial well-being is measured through questions no. 37 to 40, the latter two questions measuring financial well-being with the help of Likert scale items, which contain reverse scale items as well (indicated in *Appendix 6*). Financial well-being questions have been adapted from the CFPB (2015) financial well-being questionnaire and been slightly modified to fit the business context of the analysis. In the case of the Likert scale questions, some statements contain reverse-scale items agreeing with which indicate a lower level of financial well-being. Scores for this indicator range from 0 to 42, where higher scores indicate a better state of financial well-being, while lower scores indicate the opposite. Financial performance questions have been adapted from the OECD/INFE MSME financial literacy survey (2020b) with minimal to no modifications. These questions no. 41 to 44 aim at quantifying business success, profitability and turnovers in Likert scale and single choice questions. The survey instrument (OECD, 2020b) does not specify how to calculate financial performance scores of companies, however due to the nature of the financial performance questions, some of them can be translated to numeric scales and can be used in the measurement model as indicators, as described in *Appendix 7*.

5.2. Research hypotheses

To formulate the research hypotheses, it needs to be reviewed briefly what the literature says about the relationships of the competences and as well their dimensions. The first set of relationships in this research to be examined are between the dimensions of the competences. Knowledge, attitudes and behaviour are the most commonly appearing dimensions of financial literacy, and various studies examined the causal relationship between these elements. Knowledge is often associated with an overall positive effect on behaviour (Capuano-Ramsay, 2011, Yong-Yew-Wee, 2018) and attitudes (Yong-Yew-Wee, 2018). Many papers also supported that attitudes can positively affect the behaviour of individuals (Luksander et al. 2016, Nagy-Tóth, 2012, Zsótér-Németh-Béres, 2016), which in many cases is derived from the theory of planned behaviour (Ajzen, 1991, Koropp et al. 2014, Sariwulan et al. 2020, Sivaramakrishnan-Srivastava-Rastogi, 2017, Yong-Yew-Wee, 2018). Examining the relationship of the knowledge, attitude and behaviour dimensions is not subject to this research (as many

papers have already proved the existence of a significant causal relationship between them). However, since financial literacy, digital and entrepreneurial competences are measured through these three dimensions, it is possible to examine their effect on the perceived financial outcomes of the company.

H1: The knowledge dimension of each competences has a positive, significant effect on perceived financial outcomes.

H2: The attitude dimension of each competences has a positive, significant effect on perceived financial outcomes.

H3: The behaviour dimension of each competences has a positive, significant effect on perceived financial outcomes.

Having examined the relationship of the different dimensions of the competence areas, now we can take a look at the "horizontal" relationships of the model, i.e. the relationships between the competences themselves. The first relationship to be examined is between financial literacy and entrepreneurial competences. Financial literacy is often regarded as a determinant of entrepreneurial competences, claiming that higher financial literacy levels contribute to better entrepreneurial competences, thus being a driver of success (Rahmandoust et al. 2011). The conceptual framework of entrepreneurship by Nwachukwu and co-authors (2017) includes "financial and economic literacy" as a dimension of entrepreneurial competencies, thus implying that financial literacy in fact is not a determinant, but an integral part of entrepreneurial competencies (in line with dimension 2.4 of the EntreComp model).

The second relationship that needs to be addressed is the effect of digital competences on financial literacy. With the rise of FinTech and the rapid development of digital technology, digitalization became an increasingly important element of every competence model. Mentioning digital finances are unavoidable when assessing financial literacy and entrepreneurial competences also require a certain level of digital proficiency. According to Panos and Wilson (2020), FinTech is revolutionizing financial services and is very likely to have an overall impact on personal financial management, well-being and welfare both at individual and societal level. The development of financial technology has just begun to accelerate in the past few years, putting emphasis on the practical application of digital solutions in finances; therefore, when it comes to assessing the financial literacy of individuals, we also need to include the analysis of their digital

skills. Digitalization is not only beneficial for individuals, but for SMEs as well, however both Panos-Wilson (2020) and Nemoto-Koreen (2019) agree that the digital transformation of finances could also present dangers besides its potential gains, but overall, digital transformation and at individuals' level, digital competences are expected to influence financial literacy.

Third, digital competences also affect entrepreneurial competences, in many cases together with financial literacy, as Oggero, Rossi and Ughetto (2019) found that financial literacy and digital skills can positively contribute to entrepreneurship. Based on the above, in my conceptual framework digital competence is regarded as the determinant of both financial literacy and entrepreneurial competences.

H4: Competence areas are positively related to each other.

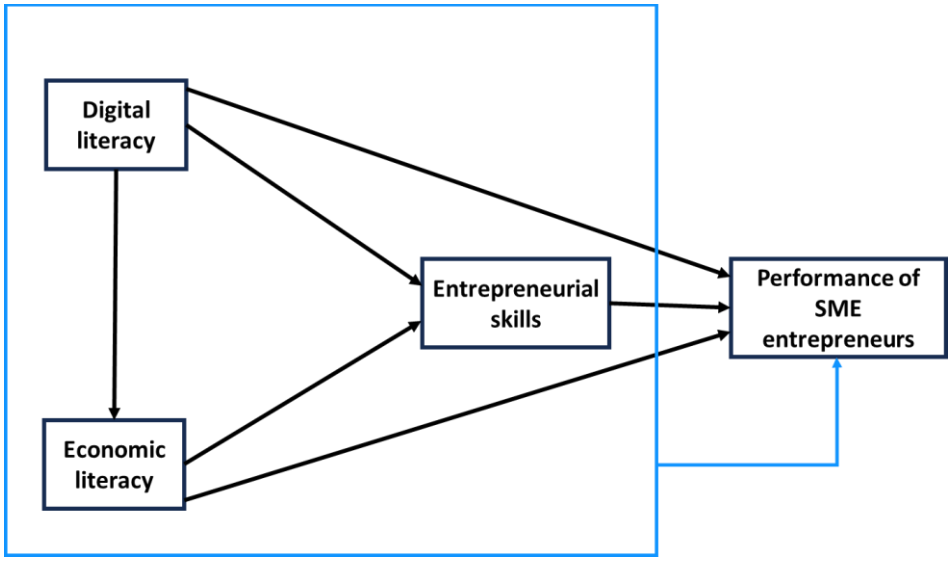
H4a: Financial literacy has a positive effect on entrepreneurial competences.

H4b: Digital competences have a positive effect on financial literacy.

H4c: Digital competences have a positive effect on entrepreneurial competences.

A paper by Sariwulan et al. (2020) proposed a model highly similar to the conceptual model of this work. In their research, a path model is drawn which is composed of four main elements: digital literacy, economic literacy, entrepreneurial skills and SME performance. The structure of the path model (*Figure 24*) and the relationships proposed between the different constructs strongly resembles what I have constructed as my research model as well. The main difference between their model and mine is the content of the different constructs. Their measurement is based on the self-perceived knowledge and skills of 90 Indonesian entrepreneurs measured with Likert scale items and does not contain knowledge test questions to directly quantify their actual knowledge. The construction of their model is in line with the previously introduced literature, digital literacy is hypothesized to have an effect on both economic literacy, entrepreneurial skills and performance of SME entrepreneurs, economic literacy is expected to affect entrepreneurial skills and performance and there is a causal relationship directed from entrepreneurial skills towards SME performance. The results showed that each of the competence areas have a significant and positive effect on SME performance, with digital skills having the strongest influence concerning both the direct and indirect effects.

Figure 24. Empirical causal relationship path diagram by Sariwulan et al. (2020)



Source: own editing based on Sariwulan et al. (2020), p. 276.

The paper found that digital literacy had the strongest positive total effect (accounting for both direct and indirect effect through economic literacy and entrepreneurial skills) on SME performance, while the other two competences even though had a significant positive effect, both were weak. In my research, I am examining the relationships of the competences, therefore I will assess the strength of the effect they exhibit (if any) on perceived financial outcomes. I am hypothesizing therefore, that each of the observed competences will result to have a significant impact on the perceived financial outcomes of the company. The strength of their effect is not subject to the below hypothesis; however, it will be interesting which competence will turn out to be the most influential in the PLS-SEM models applied in this research.

H5: Every competence has a positive effect on perceived financial outcomes.

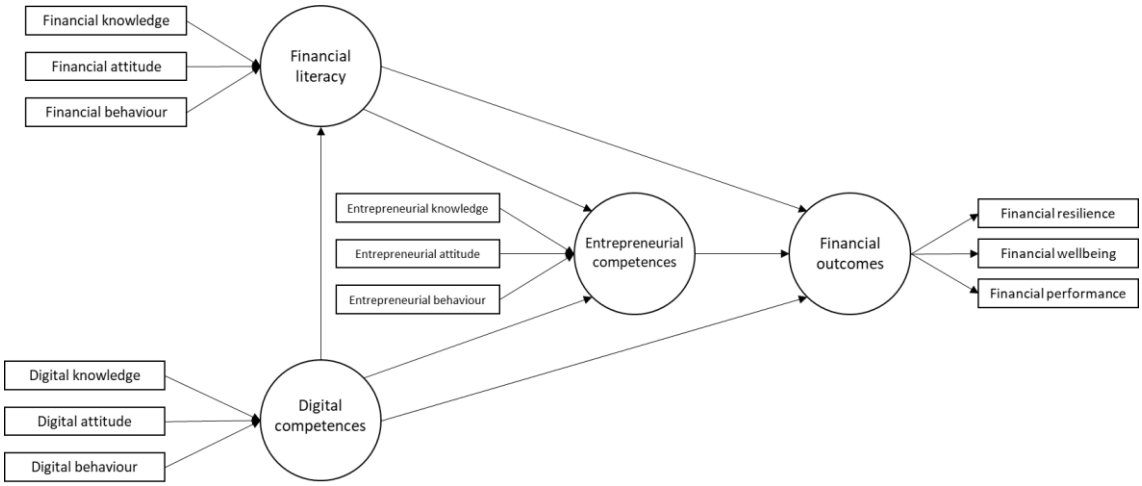
5.3. PLS models applied in the empirical research

From the previously introduced literature review it is known that many papers have demonstrated how such constructs as financial literacy, entrepreneurial and digital competences affected different firm performance indicators. Many examined the two-sided relationships between the constructs forming the conceptual model as well, however, this research attempts to get a more complex overview of the possible influence of the above-mentioned three constructs on the financial outcomes of the company. The novelty of my research is that these three elements have not yet been examined together

before in a complex path model. The paper by Sariwulan et al. 2020 presents a similar research model, however, their latent variables, economic literacy, digital literacy and entrepreneurial skills focus less on the three-dimensional breakdown of knowledge, attitude and behavioural elements compared to my research. Their model is similar to that of my own, and I would like to acknowledge their contribution to formulating my research model. Yet, since neither the definition of the notions included in their model and nor their measurements are the same as the model I have constructed in this research, it can be said that no such conceptual model has been formulated prior, contributing to the novelty of this thesis.

As it will be seen later, due to the limitations of the chosen analysis method (PLS-SEM) and the sample size, creating a path model that includes every possible relationship from the conceptual framework would be overly complicated and might dissatisfy the application conditions of the PLS-SEM method. Therefore, in the first PLS-SEM model I have created a slightly simplified model. Financial literacy, entrepreneurial and digital competences are composed of knowledge, attitude and behavioural elements, which constitute the constructs together. In the previously introduced conceptual model, these three elements were inter-related to each other within and in between the competence areas as well. As it will be discussed later, more in detail, the chosen methodological framework did not make it possible to assess all the presumable relationships between these elements, as such might have required a higher sample size and as well a different survey design.

Figure 25. The first, simplified conceptual model for empirical research



Source: own editing

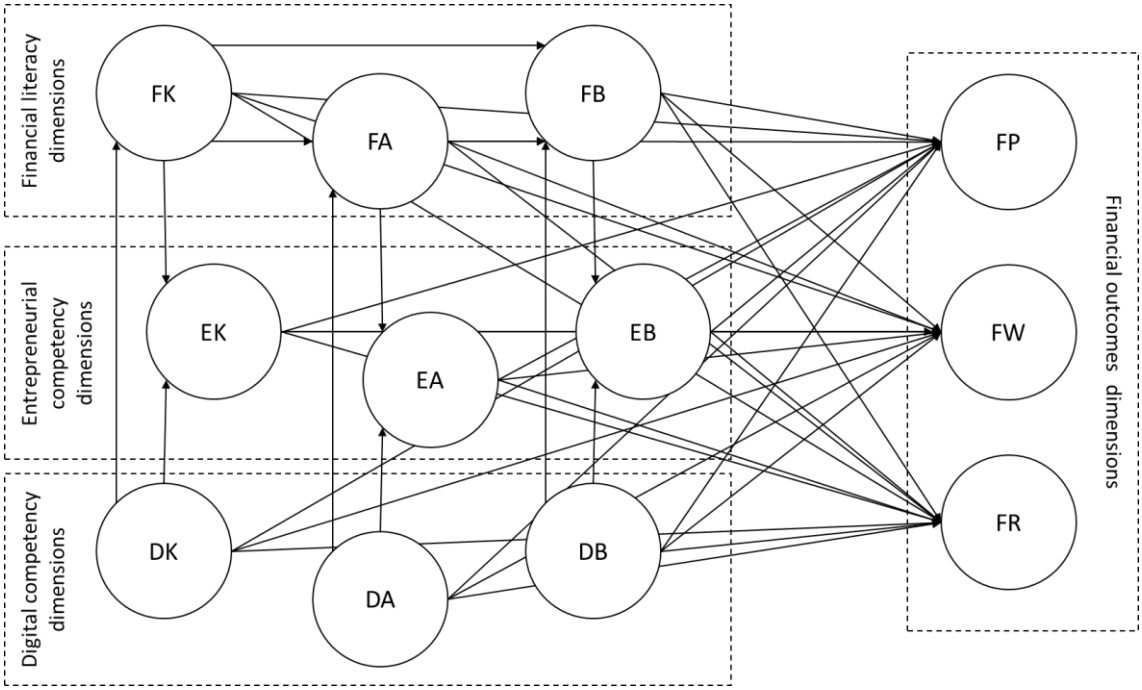
The above *Figure 25* presents the first, simplified model, which only includes the "horizontal" relationships of the conceptual framework, i.e. the first research model presented below does not consider the relationships between the dimensions, only between the actual competences. In the above research model every competence area is constituted from three indicators (indicators will be shown in rectangles, while circles will represent constructs or latent variables on every path model) of knowledge, behaviour, and attitude, which contain the scores along these 9 dimensions. These scores are pointing towards the constructs as the indicators can also be regarded as the values forming an index of financial literacy, digital and entrepreneurial competences. The relationships between the competence areas have been drawn following the relationships indicated by the processed literature and each competence area is assumed to have an impact on, thus pointing toward the construct of financial outcomes. The indicators of financial outcomes are also scores, and the arrows are pointing from the latent variable towards the indicators, which is not coincidental, as each of the three dimensions of financial outcomes are the embodiments or manifestations of this construct.

The second approach to the model is based on the later described hierarchical component model (HCM) method to PLS-SEM analyses. A said "discrepancy" of the previously described model to be tested -and as we could also see it from the literature- is that financial literacy, digital and entrepreneurial competences are more complex notions than they could be grabbed through one construct with three indicators each. The indicators forming the knowledge, attitude and behaviour scores of each construct have been calculated using the responses of a total of 47 variables (see variables description and scores later and in the *Appendix*) and at the same time the target construct of the model, financial outcomes are also measured using 22 different variables along three constructs. The fact, that the competence areas and financial outcomes are built from three dimensions each and are simplified to one indicator per each dimension causes that potentially a substantial amount of data is lost in the model.

This problem can be solved two ways. One possible solution could be building the model similarly as how the conceptual model (*Figure 23*) is constructed, allowing the input side of the model to have 9 constructs, all interrelated with each other, and having all of them being connected to the target side of the model, financial outcomes. Financial outcomes could also possibly be divided to three constructs each, one for financial performance measures, one for financial resilience and as well one for financial well-

being, however running such a huge path model is not only problematic from the application side, but as well from the side of the interpretability of the results. It is very difficult to understand a complex model with 9 explanatory and 3 target constructs, as even understanding such a model without any mathematical data and analysis results is difficult enough, as *Figure 26* demonstrates it well.

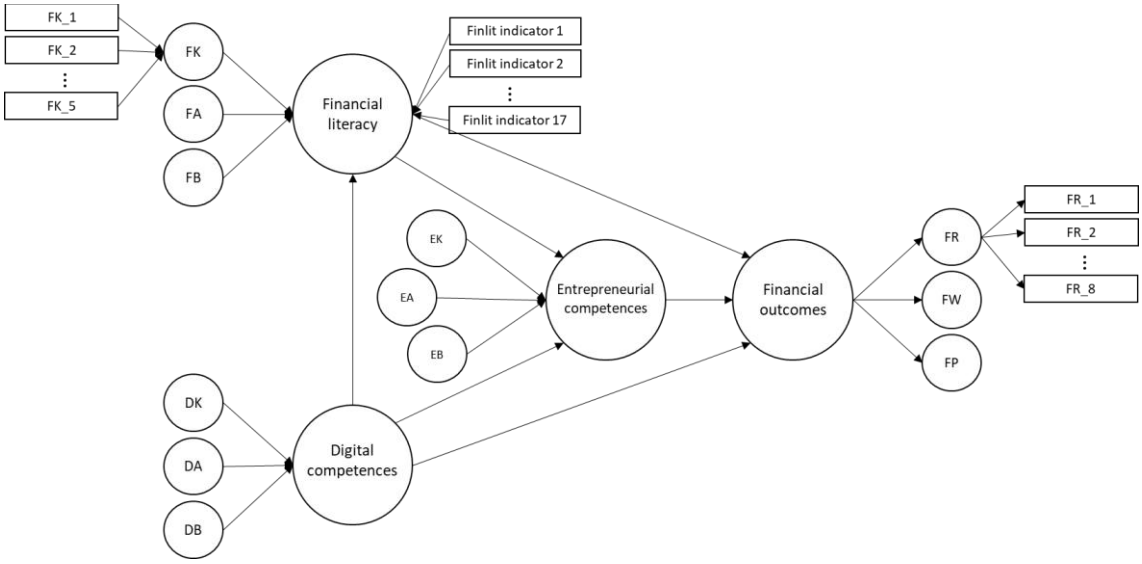
Figure 26. A possible path model including every relationship from the conceptual model



Source: own editing

Based on the above figure one might suppose that even though it seems to be problematic to understand, yet it is still possible to run the analysis using this model. It is true in fact that the model is useable from a mathematical point of view but does not make it possible to examine fully the relationships between the competency areas and their complete effect on financial outcomes. So the question arises: how to reconstruct this model so that each skill area remains their own construct with their own indicators in the model, without having to simplify their values to artificially created indicators, while at the same time forming a "bigger" construct themselves? *Figure 27* below gives and answer for that.

Figure 27. Hierarchical component model based on the conceptual framework



Source: own editing

In simple PLS-SEM path analysis, the model does not allow for the existence of constructs without indicators. However, if we regard financial literacy as an individual construct, which is composed of three underlying dimensions of financial knowledge, financial attitude, and financial behaviour, which three have their own indicators, financial literacy might have no direct indicator to itself. The PLS-SEM methodology applied in this dissertation does not allow for constructs to stand alone without indicators, however, a method called the hierarchical components model (HCM) allows for multidimensional latent variables to exist within the same path model (Hair et al. 2017).

In this path model the dimensions of the competence appear as latent variables or constructs themselves, explaining the competences. Each of the variables introduced in the previous chapter are used as indicators without any transformation in the hierarchical component model (HCM). This means that e.g. while the scores for the five statements of questions no. 28 (*Appendix 2)* are transformed (summarized) into one indicator to be used in the first path model, as the HCM model requires the actual variables themselves, the latent variable of financial knowledge will contain five indicators. As the above figure shows, the relationships between the dimensions are not considered, as adding additional paths between constructs can considerably increase the sample size requirements of the analysis, but it would be possible to include the possible effect of knowledge on behaviour and attitude and the effect of attitude on behaviour in the model as well. The results of

these two models are presented in this thesis work and the answers to the research hypotheses are based on them.

5.4. Data analysis methods

The technique used in the quantitative analysis of the empirical research is the Partial Least Squares Structural Equation Modeling (PLS-SEM) method. This method is based on the structural theory assuming that latent variables or constructs are related to each other and can be connected with paths. The main elements of path models are latent variables which are also often referred to as constructs, indicators related to the latent variables and the paths connecting the latent variables. In the family of Structural Equation Modeling techniques, the two most commonly used methods are the Partial Least Squares method (PLS-SEM) and the Covariance Based path model (CB-SEM). An important differentiating factor between the two methods is that CB-SEM is a covariance-based method treating latent variables as common factors explaining the covariance between their indicators, while PLS-SEM is a composite-based nonparametric method where latent variable scores are calculated as a composite value, thus a linear combination of the items that constitute a given latent variable. Furthermore, a benefit of PLS-SEM over the CB-SEM method is that while normal distribution of the variables is desirable in the case of the latter method, PLS-SEM does not necessarily require the data to be normally distributed; in fact, PLS-SEM does not have any assumptions about the data itself (Cassel-Hackl-Westlund, 1999; Hair et al. 2017).

The choice of which method should be applied, depends on the characteristics and objectives of the research: PLS-SEM is more commonly used in exploratory research where the theoretical background of the models is less developed or in cases where the main goal of the analysis is to predict or explain the value of target constructs. CB-SEM is more of a confirmatory nature, and can be used when the aim is validating or comparing theories (Hair et al. 2017). In this current research the paths in the model are even though supported by the literature as described earlier, the model itself has not been tested before. The goal is to develop theory in an exploratory context and to examine the effect of financial literacy, digital and entrepreneurial competences on financial outcomes of the company, thus, to explain the target construct in the path model, therefore PLS-SEM is a better fit for the purpose of this research.

5.4.1. Specifying the measurement and path models

SEM models are composed of two elements, the structural (or inner) model and the measurement (or outer) model. Structural models are composed of the latent variables, often referred to as constructs. Paths connecting them explain the causal relationships and regression equations between the latent variables using standardized variables. In the PLS models the paths are the direct effects, which can be used to describe the cause and effect relationships using regression equations, and to calculate the strength of the indirect and direct effects. PLS-SEM is similar to a regression model in such a sense that the aim of PLS-SEM methods is to maximize the explained variance of an endogenous (predicted) construct in the model. However, PLS-SEM is a multivariate analysis technique which allows for simultaneously examining the causal relationships between the latent variables (through the inner model) and as well between the latent variables and the indicators (through the outer model).

The measurement model (or outer model) is a model specifying how the latent variables are measured and is composed of the latent variables and indicators in connection to them. Depending on how the latent variables are measured, we can differentiate between formative and reflective models. In formative measurement models directional arrows are pointing from the indicators towards the latent variables, and these causal indicators are forming the construct together. Formative models can be applied where indicators represent the causes of a phenomenon; then indicators are not interchangeable in the construct and omitting an indicator from the model can alter the nature of the examined latent variable. In reflective measurement models, on the other hand, directional arrows are pointing from the latent variables towards the indicators, which are also often referred to as manifests of a given construct. Since in the case of reflective measurement models the latent variable serves as the cause of the indicator variables, in most of the cases the indicators are highly correlated and due to such removing an indicator from the measurement does not cause the meaning of the construct to change (Hair et al. 2017). When deciding on the type of measurement model, one should carefully consider whether the indicators from the source data are the causes or the manifestations of the underlying construct. In this research in the case of the constructs of financial literacy, digital and entrepreneurial competences, they can also be regarded as indices, whose values are determined by the knowledge, attitude and behaviour scores associated with each competence. Therefore, these three latent variables each form

formative measurement models, while in the case of the last latent variable, the indicators representing the financial outcomes of the company are the manifestations of the construct, hence in the case of this latter latent variable, a reflective measurement model has been applied.

5.4.2. Preparation for the analysis

PLS-SEM analysis follows a systematic procedure. The first step is specifying the structural model and the measurement models, as it has been done in the previous chapter. Next, the data needs to be examined. A huge advantage of the PLS-SEM method is that it poses little to no restrictions on sample size and is able to run with a relatively small sample. As a general rule of thumb it is recommended that the sample should be at least 10 times larger than the highest number of formative indicators used to measure a given latent variable or 10 times more than the highest number of paths directed at a given construct in the structural model (Hair et al. 2017, Barclay-Higgins-Thompson, 1995).

It is also important to decide on how to handle missing data, because a substantial amount of missing and unhandled data can distort the result of the analysis greatly. Hair et al. (2017) suggests that generally, if an observation is missing 15% of the questionnaire data, such observations (and the same stands for variables as well) should be excluded from the analysis. The software used for analysing PLS-SEM models in this current research, SmartPLS, provides three methods for handling missing data, the choice of which method to be used depending on the characteristics of the missing data and the aims of the analysis: mean replacement, casewise deletion and pairwise deletion. Mean replacement is recommended to be used in such cases when less than 5% of the values are missing per indicator. This method replaces every missing value in a variable with the average of the valid observations and this way reduces variability within the observations, which is why the authors do not suggest this method for datasets, where the share of missing data exceeds 5% per variable.

Another method for handling missing data is casewise (or listwise) deletion, which handles missing data by excluding entire observations from the dataset which have missing values in any of the variables. The advantage of casewise deletion is that it produces an input dataset without any missing values, however, Hair et al. (2017) raises two concerns for choosing this method: first, casewise deletion can considerably scale down on the number of observations in the analysis (as it deletes entire rows of

observations even if it misses a value only for one indicator). The decrease in the number of observations risks meeting the sample size requirements detailed above. Second, it poses the risk of biasing the analysis by excluding entire sub-groups of respondents who might be following a certain response pattern. Pairwise deletion is a similar method where only the missing values are excluded in the analyses, but all valid values of an observation are remained and used for calculating the model parameters, hence the advantage of pairwise deletion over casewise is that it results in more information being kept in the model (Hair et al. 2017). Since it was compulsory for the respondents to answer almost all questions in this current study, as a result the amount of missing data was very low (0,446%), therefore I have decided to use mean replacement to account for missing data in the path models.

Before running the analysis, response patterns, outliers and data distribution should also be assessed. If there are suspicious responses in the sample, such as always choosing the same responses for every question or disregarding screening questions (i.e. researchers can ask in the middle of the questionnaire to give a specific response for one of the questions –in this current research, no such question has been included in the questionnaire), such observations with the suspicious patterns should be removed from the sample. In my research, one respondent has been removed because of suspicious response patterns (and as well because of providing false information).

Outliers can also greatly affect the outcome of the analyses. Outliers can be defined many different ways, perhaps the most cited definition of outliers is by Hawkins (1980), who defined an outlier as "*an observation which deviates so much from other observations as to arouse suspicions that it was generated by a different mechanism*" (Hawkins, 1980, p. 1). Another definition by Singh and Upadhyaya (2012) define outliers as "*patterns in data that do not conform to a well defined notion of normal behavior"* (Singh-Upadhyaya, 2012, p. 307). Outliers can arise from several sources, one of them being an extreme event or extreme circumstances of the respondent, or sometimes outliers can even represent a certain subgroup of the population. They be problematic from that point of view that they can decrease the explanatory power of any causal models, therefore they need to be handled some way. Outliers are often screened using both univariate and multivariate methods, most of the statistical analysis software provide methods for handling outliers, and the decision whether outliers are removed from the analysis or sustained depends highly on the target group and the aim of the analyses. In

this present research, due to the nature of the questions applied in the survey (e.g. Likert scale items), screening for outliers was not relevant.

The distribution of the variables should also be considered. One great advantage of the PLS-SEM method is that it is a nonparametric method and other than the CB-SEM method briefly introduced earlier, does not require the data to be normally distributed. This does not necessarily mean that any distribution is acceptable in the analysis, as extremely nonnormal distributions can be problematic when assessing the significance of the model parameters, especially in bootstrap analyses. We can speak about skewness if the data distribution lacks symmetry. This means that while in the case of a symmetric distribution the mean and the median take the same value and all of the observations are spread evenly around them, in the case of skewed distributions the values of the mean and the median are not equal. Therefore the shape of the distribution is not symmetric, but is skewed either to the left or the right (Lind-Marchal-Wathen, 2017). Kurtosis is the "peakedness" of the data and shows how the data are concentrated at the end of the distribution (referred to as tails). If the distribution has skewness and/or kurtosis measures below -1 or above +1 we regard the distribution of the variable to be non-normal. As indicated above, even though PLS-SEM is a method that does not necessarily require the data to be normally distributed, skewness and kurtosis of the variables should be examined carefully, as extremely non-normal data tend to distort the results of the analyses.

5.4.3. Evaluating the goodness of the measurement models

The PLS-SEM models are constructed from latent variables (often called as constructs) and indicators connected to the latent variables. The connections between the latent variables are called paths and the constructs and the paths together constitute the inner or path model of the PLS-SEM model. The outer models are, however, the models constituted from the relationships of the constructs and their indicators. When evaluating the goodness of the PLS-SEM analysis, we should first evaluate the outer models and depending on whether we have formative or reflective models, different measures should be considered. Since the goal of the PLS-SEM analysis is to maximize the explained variance (the coefficient of determination) of the endogenous constructs in the path model, when evaluating the outer models, such measures are considered which reflect the predictive potentials of the model. Such metrics are internal consistency, convergent

validity and discriminant validity measures for reflective models and internal consistency reliability and validity measures for formative models (Hair et al. 2017).

It is indifferent which type of outer measurement model is evaluated first, however, since reflective models are the more commonly used outer models and its evaluation involves more steps compared to formative models, reflective model evaluation is introduced first. The first step involves internal consistency reliability measures, which are Cronbach's alpha and composite reliability. Cronbach's alpha is the most widely known and used measure of reliability since Cronbach having it published nearly seven decades ago (Cronbach, 1951) and is an estimate of scales' reliability based on the variances of the individual variables and the variance of the construct they are forming. Cronbach's alpha is criticized for assuming that the relative importance of the variables is equal, and as well for it being sensitive to the number of items in the scale, so it is recommended to not use Cronbach's alpha either unconditionally or as a sole measure of internal consistency. To complement Cronbach's alpha, composite reliability is examined at the same time. Composite reliability is a measure based on the standardized outer loadings and the variance of the measurement error. While Cronbach's alpha can take the value of -1 to +1 (but is typically having values between 0 and 1), composite reliability measures vary between 0 and 1. Hair et al. (2017) recommends using both Cronbach's alpha and composite reliability together, however, Cronbach's alpha needs to be treated carefully, since as a more conservative measure of reliability, generally underestimates internal consistency. For both measures, values above 0,6 can be regarded as acceptable, and values between 0,7 and 0,9 as satisfactory, indicating that the scales are reliable (Hair et al. 2017).

The second step of evaluating reflective models is the investigation of convergent validity. Convergent validity includes two measures, the average variance extracted (AVE) and indicator reliability. Indicator reliability implies that the standardized outer loadings of each construct should be higher than 0,7. This threshold is based on the assumption or rule of thumb that a latent variable should explain at least half of the variance of each indicator (which can be calculated as the square of the standardized outer loadings). This also means that the variance shared between the indicator and the construct is higher than the measurement error in the variance (the unexplained variance). If we are about to follow this rule of thumb, then the standardized outer loadings should have a value of at least 0,708 (as 0,708 squared is equal to 0,5, 50% of the explained

variance), but in social sciences this minimum threshold is rounded to standardized outer loading scores of at least 0,7 (Hair et al. 2017). Indicator reliability measures examine convergent validity at the levels of the indicators forming the constructs, while AVE measures validity at the constructs' level. AVE shows what percentage of the variance of its indicators a construct explains. If the AVE measure exceeds 0,5 that indicates that more than 50% of the variance of the indicators are explained by the construct, and less than half of the variance is explained by the error term.

The third step of reflective measurement model evaluation is the analysis of discriminant validity. Discriminant validity means that a construct is unique, and the phenomenon explained by the given construct is not explained by other constructs in the model. Discriminant validity analysis could potentially include many indicators to be checked, such as the cross-loadings of indicators (indicators correlation with other constructs other than theirs), the Fornell-Larcker criterion and the heterotrait-monotrait ratio (or in short, HTMT) (Hair et al. 2017). The most commonly used measure of discriminant validity is the Fornell-Larcker criterion, which means that the square root of the AVE of any construct should be larger than the highest correlation with any other construct. If this criterion is satisfied, that indicates that a construct or latent variable shares higher variance with its own indicators than with any of the other constructs, thereby indicating the uniqueness of the construct itself (Hair et al. 2017).

When evaluating formative measurement models we do not consider any of the above indicators, as many are based on the assumption that the reflective construct explains the variance of the indicators, while in the case of formative models, the indicators are the independent variables in the model, explaining the variance of the construct itself. The steps, however, include similar aspects compared to reflective models: the first step is convergent validity assessment, followed by the assessment of collinearity issues and the significance of outer weights (and as such, indicators). The first step, the assessment of convergent validity involves a redundancy analysis which measures if a formative construct correlates strongly with a reflective measure of the same construct (Hair et al. 2017). If it does, that means that the formative construct is valid and can capture the phenomenon effectively. Since this current study does not include both formative and reflective indicators for the constructs of financial literacy, digital and entrepreneurial knowledge, redundancy analysis was not carried out to test convergent validity of the constructs.

The second step of formative model assessment is collinearity diagnostics. While in reflective models, to ensure that indicators are reflecting the same phenomenon, indicators are expected to be highly relates, thus highly correlating with each other, in formative models the exact opposite is typical. Formative indicators are not required to be strongly correlated, in fact, high correlations between indicators can even prove problematic from the point of view of methodology and interpretation (Hair et al. 2017). When two or more predictor -or in this case, formative- variables are highly correlated, multicollinearity arises. In regression models multicollinearity can cause the regression parameters to be untrustworthy and can limit the size of R^2, and furthermore, can make it difficult to predict the importance of individual indicators in the model (Field, 2018). Translating multicollinearity issues to the context of PLS-SEM analysis, multicollinearity can distort the estimation of indicator weights and can make their interpretation problematic. We can suspect multicollinearity if there are large (larger than 0,9) correlation coefficient between formative indicators, but the most commonly used measure of multicollinearity is the variance inflation factor (VIF), which can range from 1 to positive infinity, where higher VIF values indicate stronger collinearity in the model. As a general rule, indicators with VIF values of at least 5 are recommended to be dismissed from the model.

The third step is the evaluation of the significance of outer weights. Outer weights are the results of such multiple regressions, where the formative indicators are the predictors, and latent variable scores are the dependent variable and here outer weights mark the relative contribution of each indicator to the construct. This step is important to find out if each formative indicator truly contributes to the construct. To test the significance of the outer weights, bootstrapping is carried out: a large number of subsamples of the same size as the original dataset (here only considering the number of valid observations) are drawn from the original sample using sampling with replacement. The number of bootstrap sample is recommended to be at least as much as the number of valid observations, but the recommended number of bootstrap samples is 5000 as a rule of thumb. Bootstrapping tests whether the outer weights are significant at a 0,05-level, which gives us information on the relative importance of the indicators. If the outer weight p value is above 0,05, that means that a given outer weight is not significant at a 5 percent significance level and one might consider removing that given indicator from the model (Hair et al. 2017).

In this analysis the measurement models are assessed first, doing ceteris paribus changes to the set of indicators included in the model and once the measurement models will all be proper, then the inner path model is evaluated. It is possible to evaluate both the inner and outer models at the same time, however ceteris paribus changes (i.e. removing one indicator at a time and then removing paths at a time if necessary) can show the best how the different elements of the competences contribute to the financial outcomes and contribute to the deeper understanding of the mechanisms between the constructs.

5.4.4. Evaluation of the inner (structural) model

Once the measurement models are assessed properly, the assessment of the structural path can follow which give us answers to the original research questions of whether financial literacy, digital and entrepreneurial competences have a significant effect on financial outcomes of the assessed MSMEs. Structural model evaluation follows a standard procedure as well, as described by Hair et al. (2017).

The first step of the evaluation of the inner model is the examination of path coefficients. The path coefficients describe the relationship between the constructs, and their values generally range between -1 and +1 (as Hair et al. 2017 explains, exceptions from this interval can happen, but most likely the path coefficients fall into the above interval). These path coefficient provide us with standardized beta coefficients of a multiple OLS regression using standardized variables (Hair et al. 2017). To determine whether these causal relationships are significant or not, we should do bootstrapping. Conducted similarly to the bootstrapping of outer weights, p values of the path coefficients' bootstrap analysis will tell us whether the relationship should be sustained in the model or not. If a given path's p value is above 0,05, that means that a given path is not significant at a 5 percent significance level (a standard level of significance in social sciences) and removing that given path from the model should be considered.

Apart from the path coefficients, we can evaluate the total effects between the constructs. Total effects are the sum of the direct and indirect effects of a given construct on another construct. Direct effects are given as the path coefficients and indirect effects can be measured as the product of path coefficients of a path between two constructs if there is a mediating construct between them. To provide an example for direct and indirect effect, in the simplified path model of this research, the construct financial literacy has a

direct effect on financial outcomes, as a path is aimed directly from financial literacy to financial outcomes. However it also exhibits an indirect effect through entrepreneurial competences and this indirect effect can be measured as the product of the path coefficients between financial literacy and entrepreneurial competences and then financial outcomes. The sum of these direct (financial literacy → financial outcomes) and indirect (financial literacy → entrepreneurial competences → financial outcomes) effects constitute the total effect of financial literacy on financial outcomes and show the complete extent on how the former construct can influence the latter construct.

The goal of any regression model is to maximize the explained variance of the constructs in the model; therefore, it is crucial to examine the predictive power of the model through the coefficients of determination. The R^2 values show what percentage of the variation for every endogenous constructs can be explained by their exogenous constructs. In this sense, it can happen that one construct s exogenous in one sense and endogenous in another, as e.g. in the first research model the construct of entrepreneurial competences is an exogenous construct explaining financial outcomes, while it is endogenous when being explained as a function of digital competences and financial literacy. Even though the aim is to maximise the explained variation, there is no rule of thumb for how much is an acceptable R^2 value, as while in some analyses R^2 values above 0,80 (or 80%) are preferred, in other cases, if R^2 exceeds 0,20 (or 20%), that can already be regarded as satisfactory, every time depending on the nature of the study (Hair et al. 2017). However, if we want to set thresholds, then Hair et al. (2017) suggests that R^2 values above 0,75, can be regarded as substantial, above 0,50 as moderate and above 0,25 as satisfactory. The adjusted R^2 values can be used to compensate for adding nonsignificant constructs to the model, as by increasing the number of explanatory variables in a multiple regression model the explained variance can also be increased biasing the comparison of differently constructed models. Thus, it is recommended to examine adjusted R^2 values to compare different path models.

The last step is the evaluation of f^2 effect sizes showing if a given exogenous construct has a substantial effect on the endogenous construct or not and can be calculated by considering how the R^2 value of the endogenous (explained) construct would change if we omitted a given exogenous (explanatory) construct from the model. Exogenous constructs have a substantial, large effect on and endogenous construct (and therefore should be kept in the model) if their f^2 effect sizes exceed 0,35, have a medium effect

between 0,15 and 0,35 and a small effect between 0,02 and 0,15, and below that, exogenous constructs have no effect on the endogenous construct (Hair et al. 2017). After having considered each of the above measures, we can make a decision on the fit of the model, how well the construct can explain the variances, how strong the relationships are between the constructs. Through bootstrapping decision can be made on which paths should remain in the model and which have no significant effect that should be excluded from the path model.

5.4.5. Hierarchical components model (HCM)

Sometimes the research models in PLS-SEM analyses are too complex or the causal relationships examined in the models exist at a deeper level or complexity, which traditional PLS path models cannot grasp efficiently, and when this happens, hierarchical component models can be applied. Hierarchical component models (or HCM in short), according to Hair et al. (2018) "*refer to a construct measured at more than one level of abstraction in a PLS path model*" (Hair et al. 2018, p. 37). This means that components in the path model are not constituted from indicators as in the previously described models, but are composed of other subcomponents, which are concrete traits or dimensions of the primarily examined concepts.

One advantage of the use of HCM models is that it can reduce the number of relationships in the structural models, making it more parsimonious (or more compact in this sense) and as well make the model easier to apprehend. In the introduced empirical research framework, the three competence areas (financial literacy, entrepreneurial and digital competences) are each constituted as a mix of three sub-dimensions, knowledge, behaviour, and attitude. Including all the 9 dimension elements in the PLS path model and the 3 competence areas as well is problematic from two aspects: first, constructs should all have indicators connected to them. If we create a model in which the three competence areas are only comprised of the dimensions, them having their own indicators, then we would have no variables forming the competences themselves. Second, including every path and structural relationship (i.e. connecting each of the 9 dimensions of the 3 competence areas to each of the 3 dimensions of financial outcomes) makes the model unnecessarily complicated, and the vast number of structural paths can also hinder the satisfaction of the previously introduced sample size requirements.

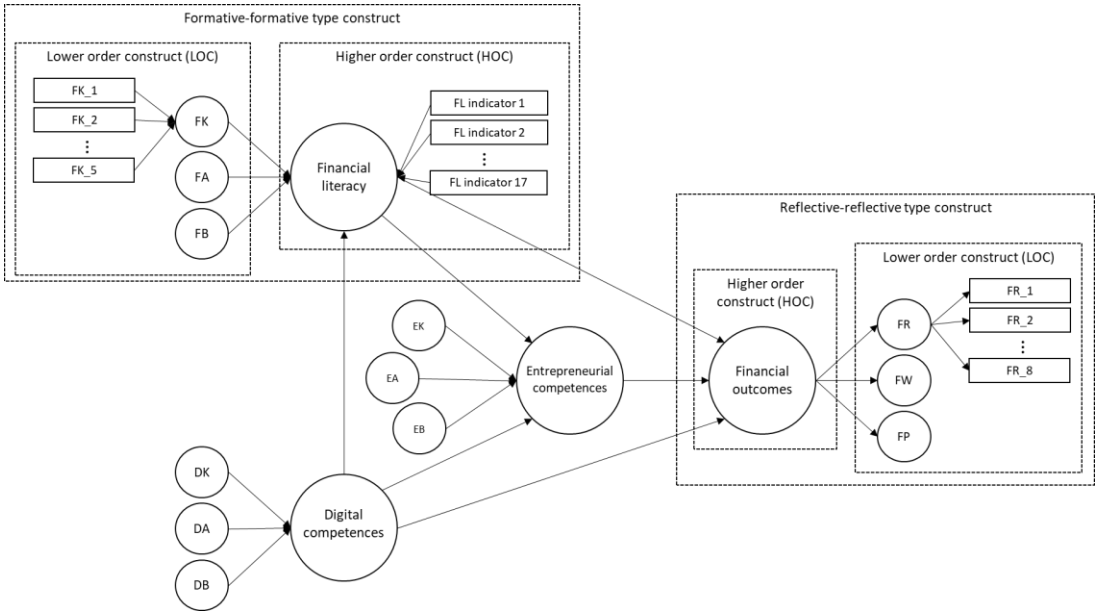
Hierarchical component models are therefore composed of two different kinds of constructs, the lower order (or first-order) constructs (referred to as LOCs) and the higher order (or second-order) constructs (referred to as HOCs). In a HCM model, LOCs act as the indicators of a HOC, therefore to every HOC in the model, several LOCs can be connected. Depending on the structural relationships in the HCM model, Hair et al. (2018) differentiates between 4 types of models: reflective-reflective, reflective formative, formative-reflective and formative-formative. These types are determined by both the relationships between the indicators and the LOCs and the relationship between the LOCs and the HOC. In my analysis, from the input side of the model (from the side of the competences) a formative-formative type model is used, where both relationships are of a formative nature (as described above), each indicator form together the value of each knowledge, behaviour and attitude dimension, while these formatively measured lower-order dimensions are also formatively connected to the more abstract higher-order competence areas. LOCs are therefore concrete aspects of a more general construct (Hair et al. 2018). As for the output side of the model, where the construct of financial outcomes (as a HOC) is composed of financial well-being, financial resilience and financial performance (acting as LOCs in this aspect), a reflective-reflective type HCM model is used, as variables in this case are the manifests of the LOCs and financial outcomes can be regarded as a common factor of the LOCs (Hair et al. 2018).

When running a HCM model, we can follow two main approaches when specifying the model: the repeated indicators and the two-stage approach. In the repeated indicators approach every indicators of the LOCs are also attached to the HOC the LOCs are connected to. Therefore indicators are used twice in the model, first to calculate the primary loadings or weights (the loadings or weights between the indicators and the LOCs) and second, to calculate the secondary loadings and weight (between the LOCs and the HOC). The use of this approach raises many technical considerations, among which the highest concern is that in the case of formative-formative types of HCM, as the majority of the HOCs variance can be explained by the LOCs, if there are any other paths or antecedent variables connected to the HOC, their relationships will be very small and most certainly insignificant, making it problematic to measure relationships between the HOC and other indicators outside of the LOCs. In this current analysis, the second, the two-stage approach is followed, which provides an alternative solution to many of the

concerns that can arise from the use of the repeated indicators approach in the case of formative-formative types of HCM.

This approach is called two-stage approach, because in the first stage, a repeated indicators approach is used to obtain LOC latent variables scores; and these latent variable scores are then extracted and added as variables to the model, connected to the HOC in the second stage and are used as indicators in further analyses (Hair et al. 2018). The path model for the first step of this approach can be seen below (*Figure 28*). In this step indicators are connected to both the LOCs and the HOCs, as if they were in a repeated indicators approach. The same diagnostics are carried out to determine which of the indicators have a significant partial effect in the model as seen before at the evaluation of the outer model. Then these indicators are used to create components. The created components are then extracted from the first stage and reloaded to the second stage of the model as the direct indicators of the HOCs, similarly as how in the first PLS-SEM model financial literacy only had 3 indicators.

Figure 28. First stage of the two-stage approach of the hierarchical component model



Source: own editing

Following this approach, the structural model is formulated in the first step as formative-formative types from the input side and reflective-reflective type from the side of financial outcomes, assigning every indicator both to the LOCs and the HOC, and then extracting a total of 12 variables for each of the LOCs and adding them as indicators in the second stage. Model evaluations are then carried out following the same standard

procedure as introduced before. One major difference between this and the previous model is that in the previous model, indicators were calculated as an aggregation of the indicator scores (e.g. in the case of knowledge dimensions) or as an arithmetic mean of Likert scale variables, however, in this case the components are created as a linear combination of the actual scores aiming at maximizing the explained variance.

5.5. Defining the target group, data collection

The research is aimed at the micro, small and medium enterprises of the Southern Great Plain of Hungary. Micro, small, and medium enterprises are defined by the Act XXXIV of 2004 as the following:

"(1) An enterprise is considered to be an SME

a) which employs fewer than 250 persons and

b) which has an annual turnover not exceeding the forint equivalent of EUR 50 million, and/or an annual balance sheet total not exceeding the forint equivalent of EUR 43 million.

(2) Within the SME category, a small enterprise is defined as an enterprise which

a) employs fewer than 50 persons and

b) whose annual turnover and/or annual balance sheet total does not exceed the forint equivalent of EUR 10 million.

(3) Within the SME category, a micro enterprise is defined as an enterprise which

a) employs fewer than 10 persons and

b) whose annual turnover and/or annual balance sheet total does not exceed the forint equivalent of EUR 2 million." (Act XXXIV of 2004, section 3)

According to the above description, the target group of my research are such enterprises who employ fewer than 250 persons and/or have an annual turnover equivalent to a maximum of 50 million EUR. As the survey was referring to the year 2020, the sample consisted of enterprises which were operating in that year. According to HCSO data, as of 31 December 2020, in the three counties of the Southern Great Plain a total of 97812 companies operated actively (out of which 97730 were MSMEs), as shown in *Table 9* below.

Table 9. Number of operating enterprises on the Southern Great Plain of Hungary, by employment size classes, as of 31 December 2020

Size category	**Number of employed, persons**	**Territorial unit**			
		Bács-Kiskun county	**Békés county**	**Csongrád-Csanád county**	**Southern Great Plain total**
Micro	Unknown or 0	1581	1003	1531	4115
	1-4	35214	19185	29937	84336
	5-9	2275	1146	1727	5148
Small	10-19	1029	535	793	2357
	20-49	546	294	433	1273
Medium	50-249	233	116	152	501
Large	250-	44	14	24	82
Total		**40922**	**22293**	**34597**	**97812**

Source: own editing based on HCSO data

The distribution of enterprises by size classes shows a rather similar pattern in each of the counties, if we distinguish between the MSME size categories (micro, small and medium), we find that by number in each of the countries micro enterprises dominate, accounting for approximately 95% of all of the enterprises in each county (95,69% for the entire region). Small enterprises account for roughly 3,71% of the enterprises, while the rest, medium and large (more than 250 persons employed) enterprises account for less, than 1% of all the enterprises in the region. Therefore, in my research I am trying to address companies which mean the absolute majority of the companies operating in the Southern Great Plain.

Members of the target group have been chosen randomly using publicly available company registries from the websites of the Chamber of Commerce and Industry of the respective counties and as well from the CrefoPort company information database[5] to which access has been granted through university services. Companies have not been directly sent the survey itself due to data protection concerns, but first an invitation letter calling for their participation in the survey has been sent out to a total of 3050 companies in the region. A total of 265 responses have been received for the invitation (including those that refused to participate in the survey) and the details and access link to the online survey has only been forwarded to those, who affirmed their intent to take part in the

[5] The CrefoPort company information database is available at the https://www.crefoport.hu/ address. In my research a query has been generated for the contacts (including company name, e-mail address, owner's, or manager's name) of SMEs (employing between 0 to 249 persons) for any companies registered in the Southern Great Plain of Hungary, regardless of activity code (TEÁOR).

survey. The online survey run between 22 April and 3 September 2021, yielding a total of 159 responses to the survey, which accounts for a response rate of 5,21%. It is important to explain the reason why the survey run for almost 5 months. According to *Section 153 of the Act C of 2000 on Accounting*, companies are required to deposit the annual accounts the latest by the last day of the fifth or sixth month (specified in detail in the text of the Act on Accounting) following the balance sheet date of the annual account. This date, if a company follows the standard practice of the business year ending on 31 December of the previous year, generally falls on 31 May or 30 June. Since the survey run around this deadline, companies were typically reluctant to respond to the first invitation. Early July a reminder has been sent out to the companies encouraging them to participate in the survey. Many of the contacted businesses asked for an extended deadline to fill out the questionnaire and most of them referring to summer holidays asked for extending the deadline to 31 August. The survey has been closed on 3 September 2021 when the last response has arrived.

The size of the obtained sample was 159 businesses from which 157 responses were valid (out of the two excluded companies, one of them exceeded the size requirements of MSMEs by employing more than 300 employees and the other respondent excluded failed to provide truthful and real responses). The composition of the sample was not representative for the sample by size, therefore the unweighted results cannot be generalized. However, to approximate a representative sample, a weighting method has been applied taking into account the size of the companies (as it will be seen later, micro-enterprises were underrepresented in the country, so the weights were needed to account for this problem). Due to the sample size I have decided to apply a one-dimensional weighting, however, some papers (e.g. Limpek-Kosztopulosz-Balogh, 2016) applied multidimensional weighting, accounting for e.g. the size, legal form or location of the businesses, which could have been a possibility in this study as well. The weights have been calculated for each valid observations by first calculating the share of the size groups within the population and dividing it by the share of the same group in the sample. The weights range from 0,05222 for the most over-represented group (medium enterprises) to 2,705656 for the most under-represented group (companies with 1 to 4 employees).

6. Results of the empirical research[6]

6.1. Descriptive statistics of the sample

6.1.1. Business demographics

As explained earlier, the composition of the sample was not representative concerning the size (i.e. number of employees), legal form and location (county) of the companies. While in the Southern Great Plain region of Hungary, micro-enterprises employing 1 to 4 persons constitute the majority (86,29% of all SMEs as of 31 December 2020) of the businesses, in the sample, this group has been highly underrepresented. Even though the majority of businesses in the sample were micro-enterprises (58,6% of the sample), small and medium enterprises were overrepresented in the sample (as it can be seen in *Table 10*).

Table 10. Population and sample by size category and number of employees

Size category	Number of employees, persons	Number of companies, population*	Distribution of companies, %		
			Population	Sample (unweighted)	Sample (weighted)
Micro	0 or unknown	4115	4,21	11,46	4,21
	1 to 4	84336	86,29	31,85	86,17
	5 to 9	5148	5,27	15,29	5,30
Small	10 to 19	2357	2,41	19,75	2,46
	20 to 49	1273	1,30	11,46	1,33
Medium	40 to 249	501	0,51	10,19	0,53
Total		**97730**	**100,00**	**100,00**	**100,00**

*as of 31 December 2020, based on HCSO data

Source: own editing based on HCSO and own data collection

Concerning the location of the headquarters of the businesses (*Table 11*), the composition of the sample was similar to the population in terms of the share of companies from Békés county, however businesses from Csongrád-Csanád county were over- and businesses from Bács-Kiskun county were under-represented (44,59% and 33,12% respectively).

As per legal form of the surveyed companies, even though both in the sample and in the population, limited liability companies (*Kft.*) and self-employed (*egyéni vállalkozók*) constitute the absolute majority of businesses operating in the Southern

[6] In the presentation of the empirical research results, a decimal comma will be used as a decimal separator.

Great Plain region (90% of the population), in the sample 87,88% of the respondents were representing limited liability companies, highly over representing that legal form over the others in the sample. The absolute majority of companies were autonomous, profit-oriented companies (93,63%), while 3,82% of the respondent companies were subsidiaries of other businesses, and 1,91% reported to be non-profit businesses. One of the respondents stated that they do not know if any of the above categories apply for their business.

Table 11. Distribution of companies by size, location and legal form, %

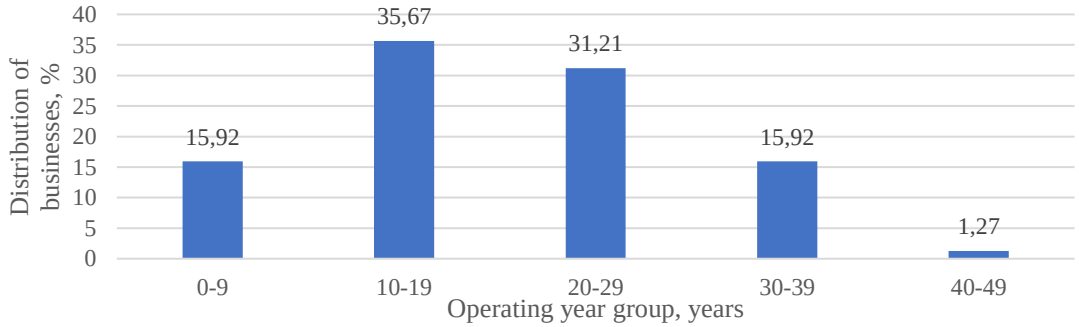
		Distribution of companies, %	
		Population*	**Sample**
Location of headquarters			
	Bács-Kiskun	41,84	33,12
	Békés	22,79	22,29
	Csongrád-Csanád	35,37	44,59
Legal form			
	Corporation/company limited by shares	0,33	3,79
	Limited liability company	25,15	87,88
	Limited Partnership	8,48	6,06
	Public limited company	0,19	1,52
	Self-employed	64,85	0,76
	Other	1,01	0,00
Total		**100,00**	**100,00**

*as of 31 December 2020, based on HCSO data

Source: own editing

The businesses surveyed were operating for on average 19,63 years, ranging between 1 to 49 years. Concerning the distribution of businesses by age, roughly one third (35,67%) of them were operating for between 10 to 19 years, a similar share (31,21%) for between 20 to 29 years. An equal amount of 0 to 9 and 30 to 39 years old companies can be found in the sample (both groups accounting for 15,92% of the sample each). The lowest share of companies accounts for the oldest group, only two companies (1,27%) were older than 40 years, as summarized on the below graph (*Figure 29*).

Figure 29. Distribution of companies by age, %



Source: own editing

Concerning the distribution of respondent companies by main activity, the highest share of companies is coming from industry and manufacturing and as well from other services (services excluding financial services, IT-services, education and legal services), both accounting for 36,94% of the sample each. As for other services, companies providing IT services constitute 12,74% of the sample, financial services 6,37%, educational services 5,10% of the sample while there is no company in the sample whose main activity is connected to legal services. Agriculture accounts for the remaining 1,91% of the companies in the sample. The distinction between the different areas of services is due to the assumption that differences might be found between the decision-makers operating in such fields (e.g. financial decision makers of financial companies might be more financially literate or decision makers of IT companies, who might have better digital literacy).

A total of 55 companies in the sample reported that they do (35,03%), while 100 of them reported they neither export products nor provide services abroad (63,69%), and two of the respondents (1,27%) stated that due to the characteristics of their business, it is not possible for them to operate abroad. This question has been included in the survey because I assumed that companies that might be more prone to operating outside of the borders of the company might be more knowledgeable about international finances and the financial and legal environment in general. A similar characteristic of companies is whether they are under foreign or domestic ownership. Since the majority of the respondent businesses is under domestic ownership (98,09%), it is not possible to deduct strong conclusions based on the ownership of the companies.

Concerning ownership and decision-making, three quarters of the respondents (75,47%) were the owners of the business, and the remaining 24,53% reported that they were not the owners of the company, however, among them a huge share (89,74% of non-owner respondents) were involved in making financial decisions in the company. The share of respondents who were not involved in making financial decisions in the company is 3,14%, these 5 respondents have therefore been excluded from the further analyses (the PLS-SEM analysis). The goal of my research is to analyse how the financial literacy, digital and entrepreneurial competences of the decision makers of the MSMEs influence their perceived financial outcomes, therefore those, who are not making financial decisions in the company, should not be included in my research model (*Table 12*).

Table 12. Number of respondents by ownership and decision-making in the business, persons

		Are you involved in taking financial decisions for this business?			
		Yes	**No**	**Don't know**	**Total**
Do you own this business (alone or with others)?	Yes	119	1*	0	120
	No	35	3*	1*	39
	Total	154	4	1	159

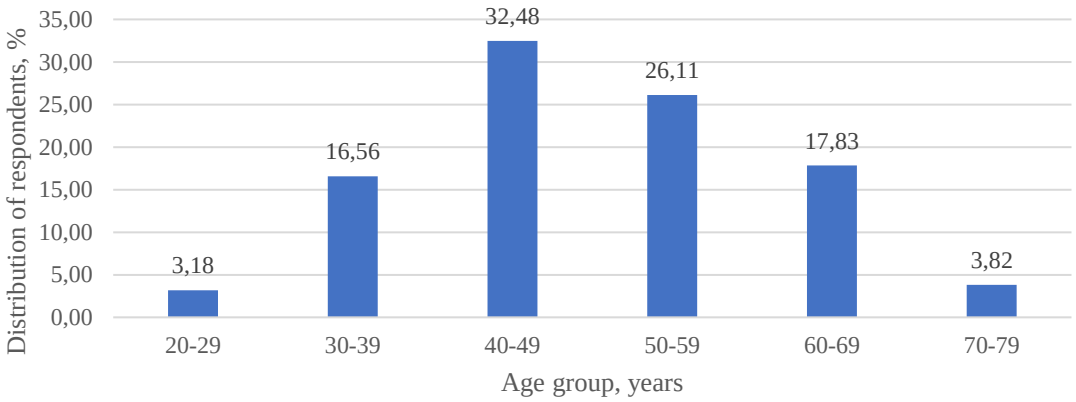
*these respondents have been excluded from the analysis, as they are not involved in financial decision-making.

Source: own editing

6.1.2. Demographics of the respondents

In this section the demographics of the respondents are introduced. 83,44% of the respondents are male, while only 16,56% are female. By age, the respondents are nearly normally distributed, the average age of the respondents is 49,73 years, with a standard deviation of 11,72 years (23,58%), ranging between 22 to 79 years (*Figure 30)*. The respondents are distributed somewhat symmetrically by age, the age shows a very slight right skew (α_3=0,026; P=0,186).

Figure 30. Distribution of respondents by age, %



Source: own editing

The respondents could also report on how long they had been business owners, including not only the current, but their other and previous businesses as well. Not all of the respondents answered this question (n=150), however the below *Table 13* shows the distribution of respondents by age and the time since they have been business owners together. The respondents have been business owners for on average 21,45 years, with a standard deviation of 10,23 years (47,68%), ranging from 0 year to 50 year. The most

frequent time for which they have been business owners is 30 years (11,92% of respondents), followed by 20 years (7,94%) and 25 years (6,62%). The time for which the respondents have been business owners is characterized by a weak left skew (α_3= -0,145; P= -0,454), most of the respondents are above the mean. There is a positive, strong relationship (r=0,776) between the age of the respondents and the time for which they have been business owners. Contrasting these variables with the age of the company, the results do not show strong relationships, between the age of the respondents and the age of the company, there is a weaker than moderate, negative relationship (r= -0,362) and as well between the time for which the respondents have been business owners and the age of the company (r= -0,421)[7].

Table 13. Distribution of respondents together by age and how long they have been business owners, %

Age (years)	**How long have you been a business owner? (years)**					
	0-9	**10-19**	**20-29**	**30-39**	**40-50**	Total
20-29	3,33					3,33
30-39	6,67	8,00	2,00			16,67
40-49	6,00	9,33	15,33	2,00		32,67
50-59		1,33	13,33	9,33	0,67	24,67
60-69		0,67	5,33	10,67	2,00	18,67
70-79			0,67	2,67	0,67	4,00
Total	16,00	19,33	36,67	24,67	3,33	100,00

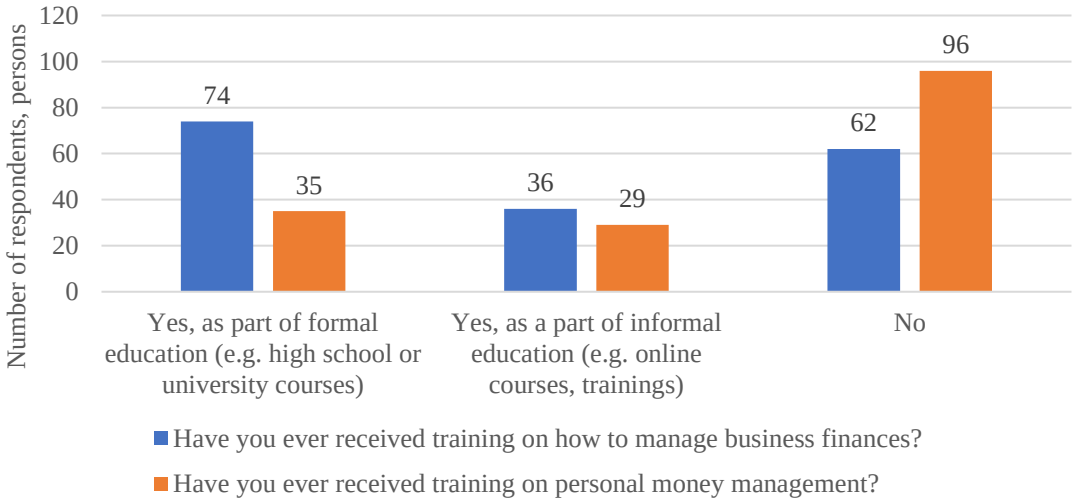
Source: own editing

Concerning their highest finished educational attainment level, the majority (77,07%) of the respondents hold at least a bachelor's degree (Ba or Bsc) if not higher. Not one of the respondents reported not having finished at least some sort of a high school, 17,20% finished a vocational secondary school providing a professional certificate, 5,73% finished grammar school with a maturity exam, 31,85% hold a bachelor's degree, 33,76% a master's degree (Ma or Msc) and the remaining 11,46% reported having finished a doctoral programme, thus holding a DLA, PhD or equivalent certificate.

[7] It is important to notice that from such results we cannot deduce any strong conclusions. This is because first, the relationships are not very strong between the above pairs of variables and second, because it is possible that the current businesses of the respondents are not their first businesses. It could be possible that a business has just been recentlylaunched, while the owner has been a business owner for many years before, which is a factor that has not been asked in the questionnaire, therefore making conclusions based on the above correlation coefficients could be highly questionable.

It is interesting to know if the respondents have ever received any sort of financial trainings. All three financial education-related questions were multiple-choice questions in which the respondents could choose all options which applied to them. Most frequently, 90 respondents stated that they have received such education as part of their higher educational studies, and the second most frequently chosen option (41 persons) was having received I as part of out-of-school training (e.g. trainings organized at workplace), followed by informal online education (28 persons), and secondary education (21 persons). 2 respondents have received finances-related training in each of the above four categories, 3 persons had received finances-related education during their formal studies and during out-of-school trainings, excluding online courses, and 2 more respondents reported that they have never received finances-related education during their formal studies, but only through online and out-of-school trainings. A total of 38 persons (24,2% of the valid responses) reported not having received education in subjects related to business, economics or finance.

Figure 31. Number of respondents reporting whether they have received training on business finances and personal money management, persons



Source: own editing

Concerning training received on business finances and personal financial management (*Figure 31*), it is interesting to notice that nearly twice as many respondents reported having received financial education in business-related matters as part of formal education (e.g. during their university studies) than in personal finances, while there was not such a big difference concerning out-of-school trainings. The number of those who have never received training in personal finances is rather high, yet this can be accounted

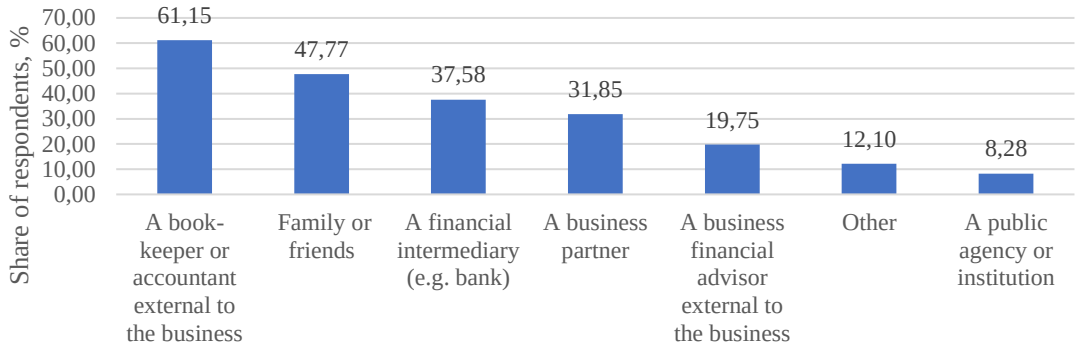
to financial literacy being included just recently in formal education in most countries (see e.g. Kovács-Pásztor, 2022). A total of 60 respondents answered that they have never received training in business finances and neither in personal finances, which account for 38,22% of the valid responses.

The last two questionnaire items about the demographics of the respondents included questions on the parents of the respondents (if any of them are or have been business owners themselves as well) and on their long-term plans about funding their own retirement years. Asking the respondents if any of their parents currently own a business, or owned a business in the past, 155 responses arrived, 40,65% reporting that yes, their parent are or have been business owners themselves and the remaining 59,35% reported that their parents have never been business owners. Asking about how they will fund their own retirement or maintain themselves when they will no longer work due to old age, the vast majority of the respondents (143 persons, 91,08%) reported that they have already thought about their retirement years. This is a great indicator of a long-term financial orientation and shows that they have already been thinking ahead (a characteristic of good financial behaviour).

6.2. Financial management

Partially to calculate the financial behaviour scores and as well to uncover financial practices within the businesses taking part in the survey, the respondents had to answer questions related to financial management within the company. Concerning whom helped taking financial decisions for the business in the past 24 months, the most frequently cited agent was a book-keeper or accountant external to the business (96 persons, 61,15%), followed by family or friends (47,77%, 75 persons) and financial intermediaries (e.g. a bank), with 37,58% (59 persons) of the responses (*Figure 32*). The results are in line with the findings of Ország-Kosztopulosz-Kovács (2015) who also found that back in 2015 in the Southern Great Plain region of Hungary SME owners had the most trust in their accountants, followed by their lawyers and then their family, the latter having been the third most trusted party back in 2015. This shows how much business owners gave and still give family members a say in making financial decisions, not solely based on their professional qualifications, but their personal relationships as well.

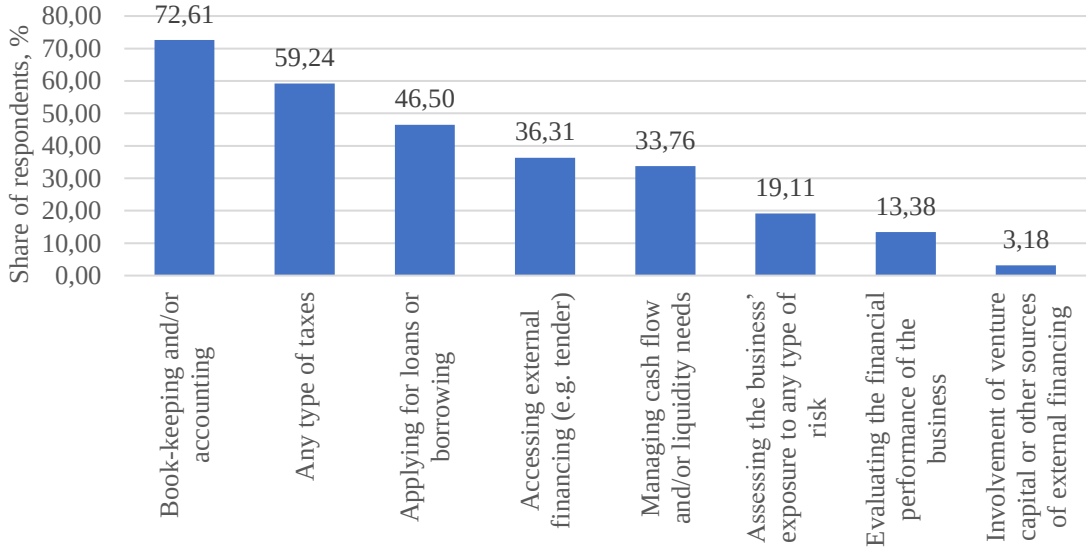
Figure 32. In the past 24 months, has any of these people helped you in taking financial decisions for the business? Share of respondents by agent category, percentage of valid responses, % (n=157)



Source: own editing

The respondents could also report on in which of the following matter they have asked for help or support in the past 24 months prior to filling in the survey (*Figure 33*). The most frequent response was book-keeping and accounting (114 persons, 72,61%), followed by taxation matters (59,24%, 93 persons) and the financing-related issues (46,50% or 73 persons concerning loans or borrowing, 36,31% or 57 persons for external financing issues, such as tender applications). These results are consistent with the findings of the previous questions, as the respondents asked for help or support the most frequently from their accountants; it is not surprising that they have been contacted the most frequently in accounting-related matters.

Figure 33. In the past 24 months, have you asked for help or support about any the following matters? Share of respondents by agent category, percentage of valid responses, % (n=157)



Source: own editing

Asking them about how they keep track of the financial records of the business, fortunately[8], the share of those who kept track of business finances was a vast majority of the respondents (95,5% of valid responses). 71,34% reported that they keep track in electronic format (e.g. in MS Excel or any dedicated software), for 17,20% of the respondents, someone else (e.g. an accountant) keeps records, while 7,01% keeps track in a paper form (such as noting them in a notebook or by keeping receipts and invoices). 3,82% keeps track in their head, not having any written notes, while only 1 person reported that they do not usually keep track of business finances.

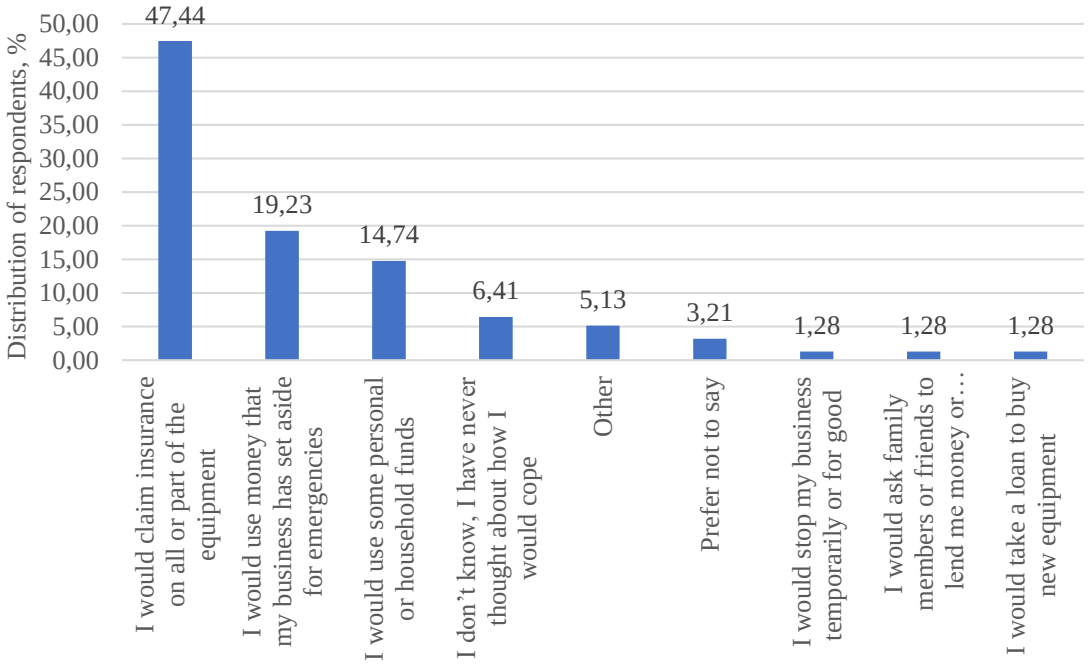
The next question was aimed at handling unexpected financial shocks, such as discovering one day that most of their equipment has been stolen. The respondents had to choose between alternatives which could describe best what they would do in such case (*Figure 34*). The majority of the respondents have been characterized by thinking ahead, 66,67% chose the first two alternatives that were indicators of good financial behaviour. 5,13% of the respondents chose the "Other" option. They had an opportunity to explicate further in detail what they would do. The responses were mostly unanimous in saying that they would either fund the replacement of the stolen machinery from the funds of the business, which are such funds that have not been separated specifically as an emergency reserve or would replace the stolen goods from the ongoing operation and operating income of the company. One reported that for their company, it is impossible to steal their heavy machinery weighting hundreds of tons, and another said that they would replace the machinery from another location or branch of the business. Another interesting response in this question was that they would immediately apply for a tender to finance the replacement from external funding. Another interesting concurrence with results of Ország-Kosztopulosz-Kovács (2015) is the overlap between the personal and business assets. In their study SME owners had to decide if they would help out a close family member with a temporary financial trouble using business assets, and this current question is similar to that in that sense that now they had to decide whether they would use their personal assets to solve a business-related financial trouble. In the 2015 study roughly one fifth of the respondents said that they would use business funds to solve

[8] An answer that they either keep track in any documented way (in either electronic or paper-based form) or "outsourcing" it to another person, such as an accountant, showed that their financial behaviour is good. Regardless of whether they keep track themselves or not, they still keep a formal notice on what is happening in the business. On the contrary, those who reported that they keep track in their head, undocumented or do not keep track of finances at all, that reflected that they are uninvolved in the financial processes of the company, which is a sign of poor financial behaviour.

family-related financial issues. In this current study 14,74% would use personal or household funds to solve this unexpected event and an additional 1,28% would ask family members or friends to loan some money or lend equipment, which shows that there is still some overlap between the personal and business assets among MSMEs of the Southern Great Plain region.

Figure 34. Imagine that tomorrow you discover that most of the equipment that you need to operate the business has been stolen (it could be computers, vehicles or other equipment). Which one of these statements best represents what you would do?

Distribution of respondents, % (n=156)

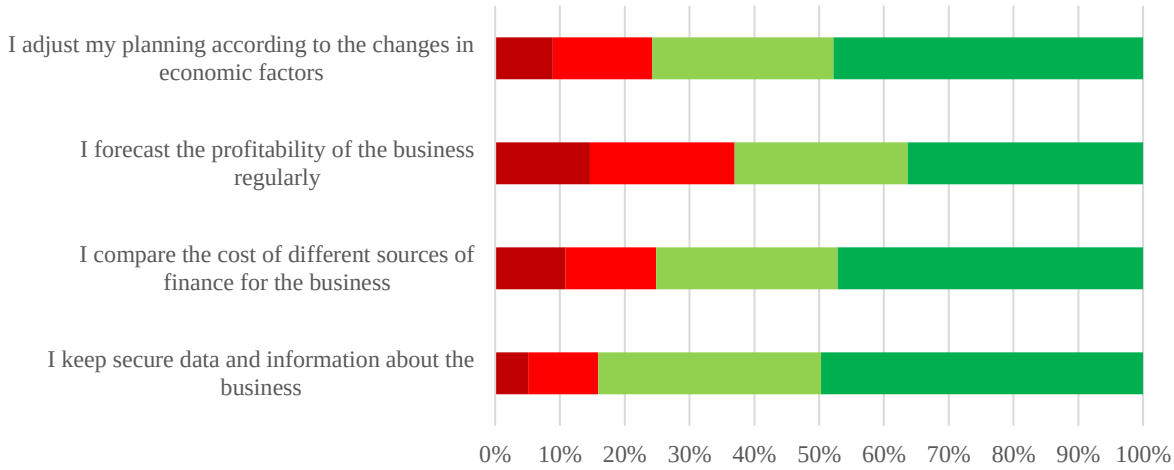


Source: own editing

Respondents had to decide on how much they agreed with certain statements concerning financial management practices at the company, where compliance with the statements (choosing to agree or highly agree) were indicators of good financial behaviour and discord (disagree or highly disagree) of poor financial practices. The majority of the respondents agreed with each statement, ranging between 63,06% to 84,08% of the respondents (*Figure 35*). The respondents agreed the most with the statements related to keeping secure data and information about the business and the least about creating regular forecasts about the profitability of the business. The results for the statements about comparing the costs of different sources of finance and adjusting their planning according to the changes in economic factors show somewhat similar results,

around three quarters of the respondents agree with these two statements (75,16% and 75,80% respectively).

Figure 35. Thinking about your business, would you agree or disagree with the following statements? Distribution of respondents, % (n=157)



	I keep secure data and information about the business	I compare the cost of different sources of finance for the business	I forecast the profitability of the business regularly	I adjust my planning according to the changes in economic factors
Highly disagree	5,10	10,83	14,65	8,92
Disagree	10,83	14,01	22,29	15,29
Agree	34,39	28,03	26,75	28,03
Highly agree	49,68	47,13	36,31	47,77

Source: own editing

The next question also could potentially be another indicator of the overlap between the household and business assets; however, the result shows great discipline in this area among the respondents. Asking them about whether the business has its own current account, 96,18% stated that the business has its own current account, and they manage strictly separate accounts for their households and for their business. Only 1,27% reported that even though the business has its own current account, they still sometimes use it for personal matters and the same share, 1,27% stated that they are using the same current account both for personal and professional purposes.

The last question in this section was aiming at finding out how they elaborate before making a financial decision or choosing a certain financial service. Considering multiple options from multiple providers is always a sign of a good financial behaviour,

which 63,69% of the respondents stated that they in fact do. 8,28% stated that they looked around but there were no other options to consider (8,28%) which also showed that they made efforts to compare some offers, even if they could not. A sign of poor financial behaviour was considering the various options from just one financial provider (16,56%) or not having considered any other options at all (7,64%). The rest either did not know how they made their latest financial decision or did not wish to respond to this question.

Overall, from the results of the above questions we can see that the respondents generally exhibit a good financial behaviour and are characterised by long-term orientation and planning ahead. In line with earlier findings, accountants play a high role in the operating of micro, small and medium enterprises. The finances of the business are mostly managed separately from their personal matters and even though to a lower degree than in earlier studies, but there is still a very slight overlap between personal and business assets when they need to solve a sudden financial issue.

6.3. Financial literacy, digital and entrepreneurial competences

The input side of the PLS-SEM models in which the effect of financial literacy, digital and entrepreneurial competences is examined on the financial outcomes of the company. Due to the restrictions of the analysis methods as explained earlier, not the individual (in many cases categorical) variables, but pre-calculated index measures will be included. Such measures include knowledge, attitude, and behaviour scores for each competence area (the way how the scores are calculated are described in earlier chapters and as well in *Appendix 2, Appendix 3* and *Appendix 4*) and as well scores measuring the financial resilience (*Appendix 5*), financial well-being (*Appendix 6*) and financial performance (*Appendix 7*) of the MSMEs. Concerning the input side of the model, higher scores along each of these measures show either a higher level of knowledge or more positive attitudes and behaviour in each of the three competence areas. Therefore decision-makers who are scoring higher along each of these nine dimensions can be regarded as being more financially literate and competent in digital and entrepreneurial matters. In this section, the descriptive statistics of the calculated knowledge, attitude and behaviour scores are presented, along with the analysis of their relationship with certain traits of the respondents.

Knowledge was measured on a scale of 0 to 5 points for each competence areas, depending on how many knowledge questions the respondents could answer. As *Table*

14 shows, every respondent could answer the first financial knowledge question correctly, and while the share of correct responses was generally high, the respondents got some lesser-known constructs wrong, such as Creative Commons (59,87% correct) or two-step verification (61,78% correct). The question answered correct in the least share is related to 4P of the marketing mix, yet supposedly, respondents got this question wrong due to simple inattention to detail, as only one word (personnel instead of promotion) got changed in the statement to make it false (hence only 46,2% got it correct).

Table 14. Share of correct answers for knowledge statements (in descending order), % of respondents

	Statement	Correct answer	Share of correct answers, %
Financial knowledge	28.a) Dividends are part of what a business pays to a bank to repay a loan.	False	100,00
	28.c) If a financial investment offers the chance to make a lot of money it is likely that there is also a chance to lose a lot of money.	True	96,18
	28.d) High inflation means that the cost of living is increasing rapidly.	True	87,90
	28. b) When a company obtains equity from an investor it gives the investor part of the ownership of the company.	True	76,43
	28.e) A 15-year loan typically requires higher monthly payments than a 30-year loan of the same amount, but the total interest paid over the course of the loan will be less.	True	76,43
Entrepreneurial knowledge	30.c) In the case of the establishment of a limited liability company (Ltd.), the amount of the share capital subscribed in the memorandum of association may not exceed HUF 3,000,000.	False	96,2
	30.a) The business plan, which sets out the objectives to be achieved by the firm and the strategy required to achieve them, is legally binding and may impose fines if the firm deviates from it.	False	93,04
	30.e) Controlling is not just an accounting activity, but the integration of planning and accounting from a managerial perspective.	True	89,24
	30. b) Both the employee and the employer may terminate the employment relationship by giving notice, in which case the period of notice shall, as a general rule, begin on the day following the notice and shall last for 30 days.	True	81,01
	30.d) The four main elements of a marketing strategy are 4P: product, price, place and personnel.	False	46,20
Digital	32.a) Cloud technology refers solely to the transfer of documents between two computers using the wireless network.	False	93,63
	32.e) IoT (internet of things) is a network of smart devices designed for real-time analytics, machine-learning and the exchange of data between themselves using the Internet.	True	83,44

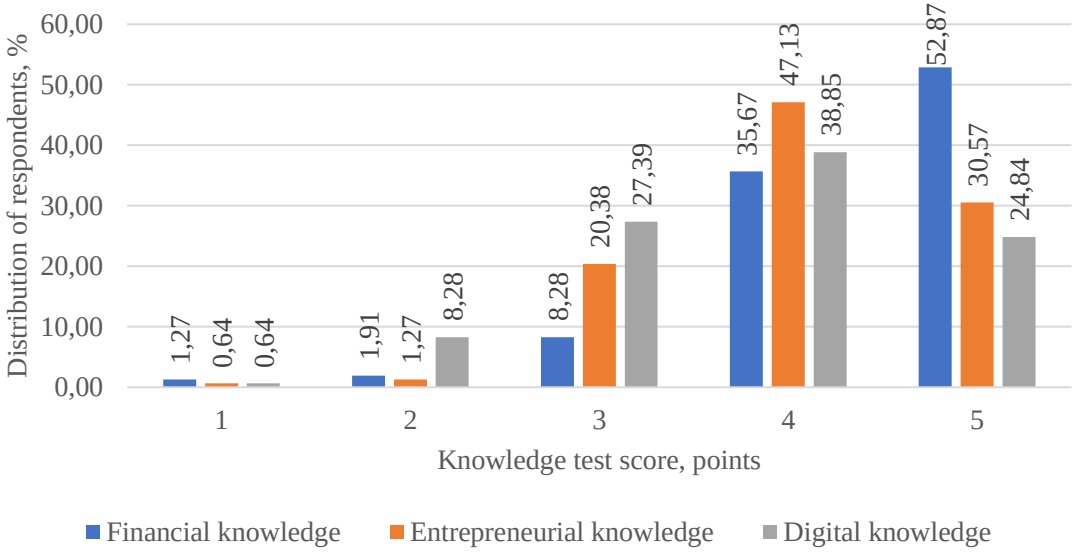
Table 14. continued

	Statement	Correct answer	Share of correct answers, %
Digital knowledge	32. b) Digital signature is a scheme used to verify the authenticity of digital documents.	True	81,53
	32.d) Two-step verification/two-factor authentication is a form of authentication when the user needs to provide their password twice in order to be able to access websites or an application.	False	61,78
	32.c) When using images that are under Creative Commons licenses, credit must always be given to the original creator.	True	59,87

Source: own editing

The below figure contains the distribution of respondents by their knowledge tests scores along each competence areas (*Figure 36*). The respondents could answer on average 4,37 financial literacy knowledge questions correct out of the 5, with a standard deviation of 0,82 points and a strong left skew (α_3=-1,545). Entrepreneurial knowledge test results were slightly lower with an average of 4,06 points and a similar standard deviation (SD=0,78) and a weaker left skew (α_3=-0,577). Most frequently the respondents got 4 out of the five correct in both the digital and entrepreneurial knowledge tests, but due to the higher share of incorrect responses in the previously mentioned topics, digital knowledge scores resulted to be the lowest on average ($\bar{x} = 3,79$, SD=0,93, α_3=-0,377). There were no respondents who couldn't answer any of the questions correctly.

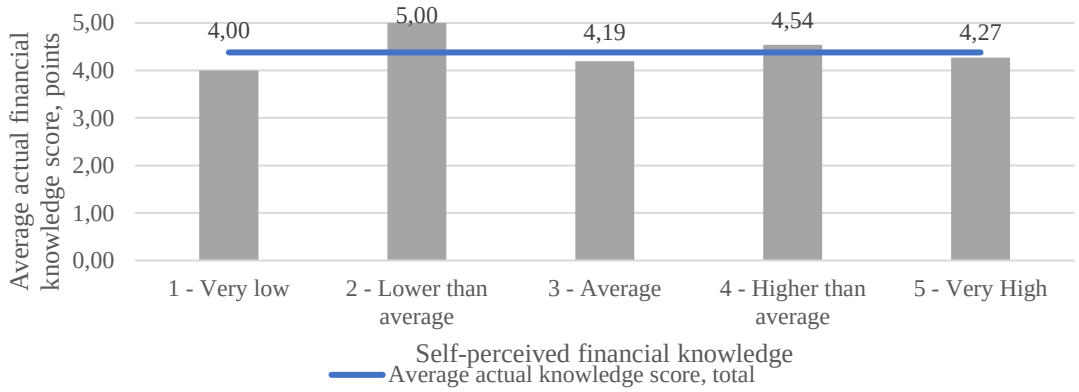
Figure 36. Distribution of respondents by knowledge test scores, %



Source: own editing

Respondents could also report on their self-perceived financial knowledge, evaluating it on a scale of 1 to 5 points, where 1 meant very low knowledge and 5 very high knowledge compared to other adults in Hungary. Almost half of the respondents (47,06%) gave themselves a rating of 4 points, a higher-than-average evaluation, while nearly a third (33,99%) gave themselves an average evaluation (3 points) and 16,99% a very high score (5 points), leaving only 1,31% evaluating themselves with lower-than-average (2 points) and 0,65% with very low (1 point) scores. The average evaluation of the respondents was 3,78 points (SD=0,76), and contrasting their self-perceived financial knowledge with their actual financial knowledge we find that there is an extremely weak, positive between the two variables (r=0,058). Earlier studies (e.g. Lusardi-Mitchell, 2014) showed that people generally overestimate their own financial knowledge, their actual knowledge lags behind their self-perceived knowledge, and what is also true is that those who overestimate their knowledge generally perform worse on financial knowledge tests than those, who give themselves a slightly lower self-evaluation. We can observe the same happening in the sample (*Figure 37*), the average knowledge score of those who gave themselves 4 is higher than that of those, who evaluated their self-perceived knowledge very high. People with very low self-perceived knowledge tend to score worse on the actual knowledge tests as well. Perhaps interestingly, those who evaluated their knowledge to be lower than average got an excellent result (5 points), however, since only 2 persons gave such score to themselves, no far-reaching conclusions can be deduced from these results.

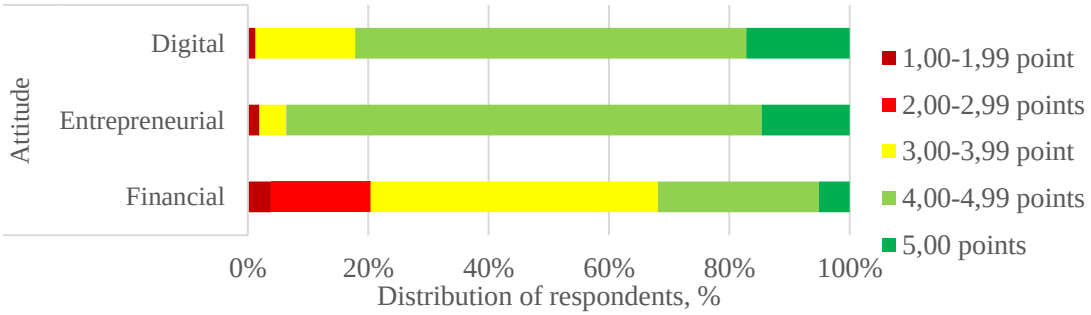
Figure 37. Average financial knowledge scores separately by self-perceived financial knowledge levels and together, points



Source: own editing

Attitudes were measured on scales of 1 to 5 depending on how much the respondents agreed with the given attitude statements. Compliance or higher agreement with the statements indicated a more positive attitude, while the for reverse scale items (as indicated in *Appendix 1* questions no. 29, 31 and 33) a higher level of agreement indicated poorer attitude. Calculating the average score for these statements (as seen in *Appendix 3*) showed us that the average score of compliance was 3,46 points for financial (SD=0,84, α_3=-0,32), 4,50 points for entrepreneurial (SD=0,59, α_3=-3,96) and 4,37 points for digital attitudes (SD=0,59, α_3=-2,18). It is important to notice that while the majority of the respondents exhibited positive attitudes (average attitudes scores of at least 3 points), and a very low share showed complete disagreement with the statements (persons who received average scores of less than 2 points), 2 persons of which were the same respondents in each attitude dimensions (*Figure 38*). Therefore, the attitudes of the majority of the MSME financial decision makers in the sample are rather good, most of them having very high attitude scores.

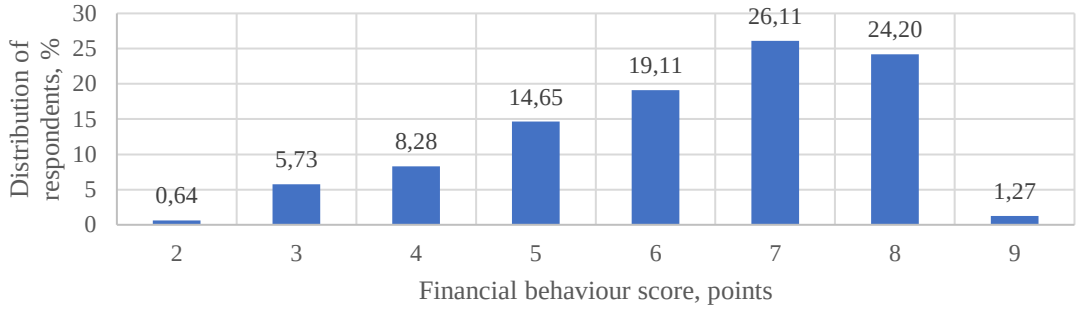
Figure 38. Distribution of respondents by average attitude scores, %



Source: own editing

Financial behaviour has been measured using 9 different questions and was scored on a scale of 0 to 9, while digital and entrepreneurial competences were measured on scales of 1 to 5 (as described in *Appendix 4*). Higher scores meant better, more sound behaviour, including such elements as long-term financial orientation and the ability to manage household and business funds separately. Most of the variables forming financial behaviour have already been introduced earlier as financial management habits of the financial decision-makers reflected their behaviour when it comes to taking financial decisions. The respondents obtained an average of 6,27 points on a scale of 0 to 9 points, with a standard deviation of 1,54 points (or 24,51%) and a weak left skew (α_3=-0,601), indicating a generally good financial behaviour (*Figure 39*).

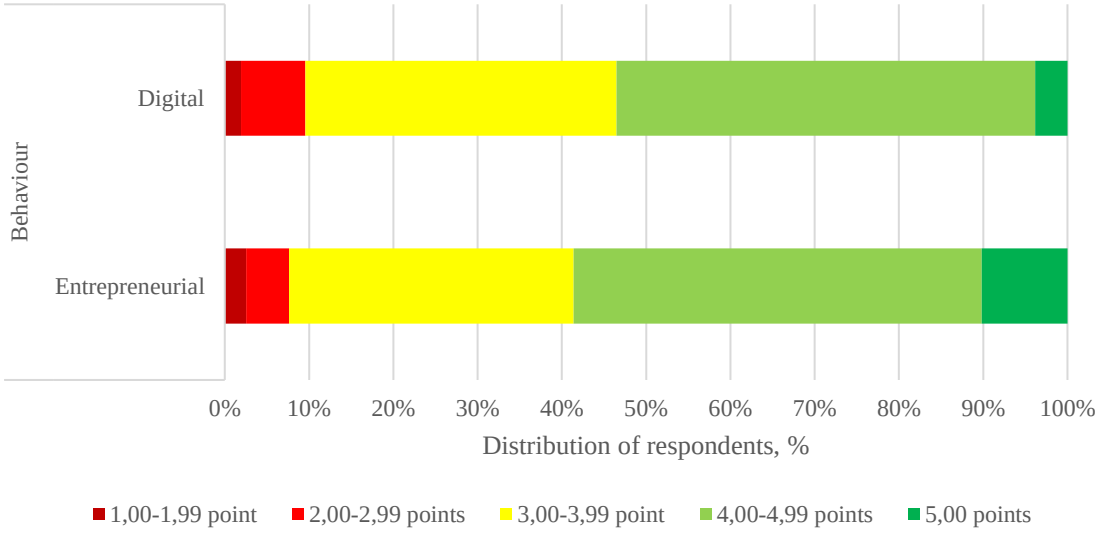
Figure 39. Distribution of respondents by financial behaviour score, %



Source: own editing

Digital an entrepreneurial behaviour was obtained as the average of the responses for the items described in *Appendix 4*. The average digital behaviour score of the respondents is 3,81 points (SD=0,731; α_3=-0,799), with 4 being both the median and the most frequent digital behaviour score. The average entrepreneurial behaviour score is just slightly higher, 3,91 points (SD=0,716; α_3=-1,113) *Figure 40* below shows the distribution of digital and entrepreneurial behaviour scores. It can be seen that the absolute majority of the respondents are between 3,00 and 4,99 points on average, and even though the distributions seem to be similar, only a weak relationship (r=0,349) can be examined between these two variables, two respondents score complete opposite values (1 and 5) on the two scales.

Figure 40. Distribution of respondents by financial behaviour score, %



Source: own editing

Conclusively, financial literacy, digital and entrepreneurial competences of the respondents seem to be of an overall high level, MSME decision-makers exhibiting good practices and positive attitudes. The lack of variation and high average scores in the knowledge test results is either the indication of excellence (which contradicts the literature) or the result of the simplicity of the test with a high possibility to get true-or-false statements correct just by guessing.

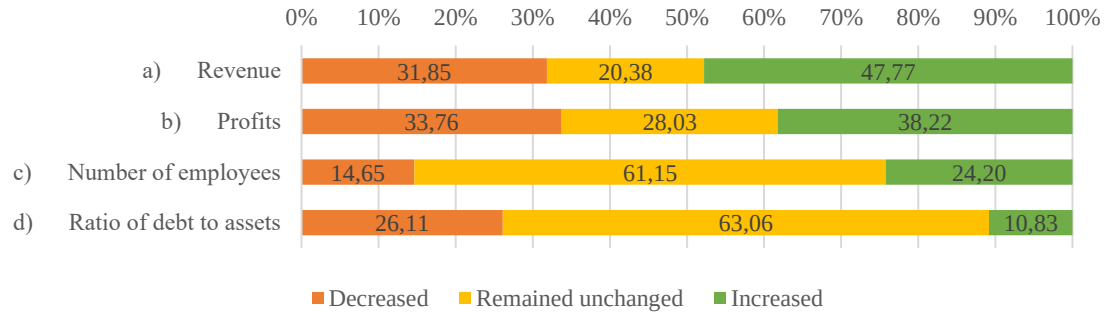
6.4. Financial outcomes

Financial outcomes are composed of three main areas: financial resilience, well-being and performance. Respondents had to evaluate their companies along these three dimensions, hence the results are their perception of the financial status of the businesses, not their actual financial outcomes.

One weakness of the adapted OECD questionnaire is that it did not contain questions for the actual accounting-based metrics of the companies, only for the approximate annual revenue, adjusted to million HUF in the Hungarian translation ($\bar{x}$ = 489,33; SD=1063,343; α_3=4,275; Mo=40; Me=152,5). Other than that, respondents could only evaluate subjectively if their business was successful on a scale of 1 to 5 (34,39% and 33,12% giving 4 and 5 values, therefore the majority evaluating their business as successful) and could report on how their revenue, profits, employees and debt-to-asset ratio (*Figure 41* below) changed in the previous fiscal year. The survey was

conducted at the beginning of the pandemic; therefore, the results still show that these metrics remained either unchanged or improved for the companies.

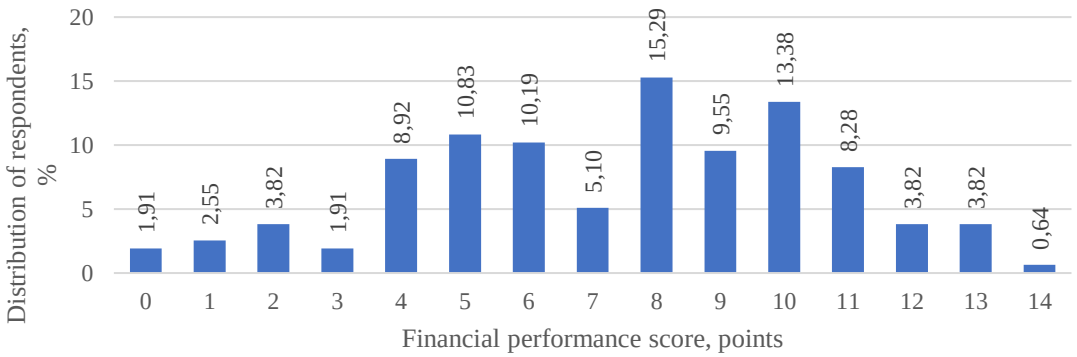
Figure 41. Have the following indicators increased, decreased or remained stable in the previous fiscal year? Distribution of respondents, %



Source: own editing

All the above measures except for the annual income have been used to calculate performance scores for the businesses (*Appendix 7*). As it can be seen below (*Figure 42*), respondents evaluated their businesses' performance on a very wide range, the majority of the respondents perceiving the performance to be somewhat average or in the middle. with an average score of 7,40 points (SD=3,162; α_3=-0,269) Perceived performance has a moderately strong (H=0,471) relationship with the main activity of the business with businesses operating in financial services had the best ($\bar{x} = 10{,}87$; n=12) and agricultural businesses the worst perceived performance ($\bar{x} = 4{,}11$; n=4). Industry and other businesses were dominating the sample (with 58 companies from each areas) so it is not surprising that their average performance scores were close to the mean score of all businesses (7,36 and 7,05 points respectively).

Figure 42. Distribution of financial performance scores, %



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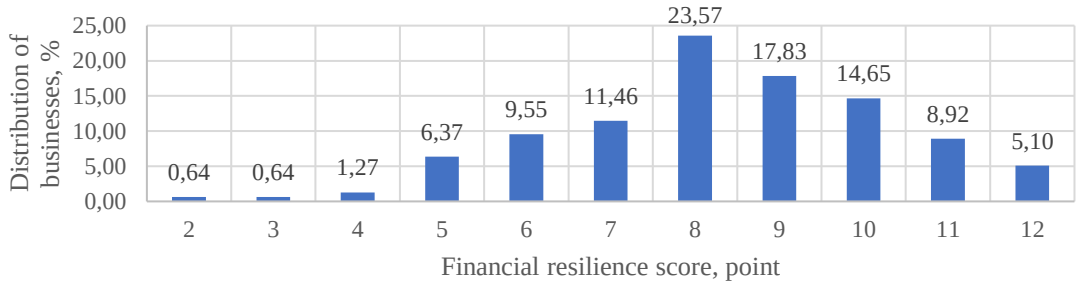
Financial resilience and well-being measures were adapted from a different OECD questionnaire (OECD 2020a) and been altered (in their wording) to fit business-related setting; therefore, their evaluation is done on a different scale than that of the other measures. Financial resilience is measured on a scale of 1 to 12, where higher scores mean that the businesses are more equipped to handle unexpected financial shortfalls and crises (which is a skillset that could have become handy during the pandemic). The average financial resilience score is 8,32 points (SD=1,985; α_3=-0,31) and the distribution of the scores seems to be nearly normal with just a weak left skew (*Figure 43*). The majority of the businesses (53,3%) are below the average resilience scores, signalling that most respondents perceive their businesses not be resilient enough and therefore not able to handle financial shortcomings.

Figure 43. Distribution of financial resilience scores, %



Source: own editing

The availability of a so-called financial cushion is an indicator of resilience (it is a part of both financial resilience and well-being, yet the survey adapted included financial cushion as an indicator of financial resilience). If having lost their main source of income, businesses had reserves to continue their business as usual most frequently for 1-3 months (35,7%), 3-6 months (22,9%) or even for at least 6 months (30,6%). It is interesting to contrast this result with the OECD results (2020a) among households, where the most frequent response from the Hungarian households was that they had a financial cushion either for about a week (34,8%) or for about a month (27,8%). This showed that the opposite pattern is present among individuals, they are generally not characterized by long-term orientation and by holding savings, so in this term businesses seem to be perceived more resilient than average households.

A resilient business is able to cope with a financial shortfall, i.e. to cover sudden major expenses. Asking about this, roughly half (54,8%) of the businesses reported they

could face an expense exceeding their monthly revenue, while 30,6% reported that they could not (the rest either could not or did not want to respond). A pattern can be seen in the responses, which signals that the majority of the businesses were planning ahead to have some reserves, however most commonly not on a long term; there is a moderate relationship between the availability of the financial cushion and the ability to cope with a shortfall (C=0,279).

Financial well-being has been measured on a 0-42 scale which is different than the original 0-20 scale from the OECD (2020a) questionnaire as all of the CFPB (2015) statements have been included in this study. Average financial well-being score of the businesses is 30,15 points (or 71,77% of the maximum obtainable score), with the majority having scored above the mean (SD=7,17; α_3=-0,752; Mo=37, Me=31). Contrasting this with Hungarian households (OECD 2020a), they scored an average of 10,8 points (54,1% of the maximum score), which together with the results introduced above about the financial cushion shows that businesses seem to be more stable financially than Hungarian households. Financial well-being and resilience have a moderate, positive relationship (r=0,619), those respondents that evaluate their businesses to be more equipped against shortfalls also more likely to perceive their financial well-being to be better. This contradicts that assumption that those who might experience a higher level of well-being might get overly comfortable with their situation, making them less reactive against crises.

As mentioned earlier, the availability of a financial cushion appears within the frame of financial well-being as well. If there is a cushion which provides a safety net around the business, it would not happen that the business would experience that they could not cover their monthly expenses. Roughly the same share of respondents stated having experienced a shortfall (46,5%) and not having experienced that (49,7%), which has a moderate (H=0,494) relationship with their well-being. The average well-being score of those respondents that have experienced such shortcomings is 26,85 points, way lower than the on average 33,58 points of those whose expenses were always covered in the 12 months prior the survey. In the above-mentioned OECD (2020a) survey among households, only 20% of the Hungarian households reported not meeting their costs in the previous 12 months. However, while in the case of households, it is easier to adjust consumption and expenses to the available budget to a certain degree (e.g. by limiting the

consumption of certain products or by looking for substitute goods), companies might not have such ease in looking for ways to cut costs.

6.5. PLS-SEM path analysis results

6.5.1. Results of the simplified PLS-SEM model

Due to the limitations of the PLS-SEM method, especially the sample size requirements and having only 157 valid responses in the survey, the research question and hypotheses has been approached using two simplified versions of the conceptual models. The first path model contains the competences and financial outcomes as latent variables and each dimension of these construct have been calculated as a single variable, a score based on the evaluation rules adapted from the literature (see the calculation of these indicators in the *Appendix*). This chapter introduces the results of this first, simplified model, beginning with the evaluation of the measurement model and then proceeding to the path model. Each of the analyses were run using weighting based on the size categories of the companies and bootstraps were run using 10000 subsamples.

The first step of the analysis is the evaluation of the outer model. Since the input side of the model (the competences) was composed of formative constructs, and the output side (financial outcomes) was a reflective construct, in their evaluation we have to consider different indicators. As for the reflective constructs, internal consistency is first considered: both Cronbach's alpha is above the required threshold of 0,7 and composite reliability also has a satisfactory value, indicating that financial performance, resilience and well-being each measures the same phenomenon (α=0,742; CR=0,854). Convergent validity is also satisfied with an AVE value above the 0,5 threshold (AVE=0,662) and the standardized outer loadings exceeding 0,7 (*Table 15*). Discriminant validity could not have been fully evaluated in this case. The Fornell-Larcker criterion was satisfied (square root of AVE was higher than the highest correlation with any other constructs), supporting the uniqueness of the financial outcomes construct, however, the HTMT ratio could not have been calculated, due to the fact that all the other latent variables in the model were formative constructs. After running a bootstrap analysis on 10000 subsamples to determine the significance of the indicators, every indicator of financial outcomes resulted to be significant, as the below table shows it well.

Table 15. Evaluating the goodness of the model of the simplified PLS model

Latent variable (Cronbach a, AVE, CR)*		Item	First version				Final version			
			Outer weight/loading		VIF***	t-value (p-value)**	Outer weight/loading		VIF	t-value (p-value)
			original	sample			original	sample		
Formative constructs	**Financial literacy**	Financial behaviour	0,515	0,424	1,172	2,215 (0,027)	0,635	0,634	1,139	3,198 (0,001)
		Financial attitude	0,678	0,654	1,196	2,886 (0,004)	0,582	0,549	1,139	2,659 (0,008)
		Financial knowledge	-0,256	-0,215	1,06	0,856 (0,392)				
	Digital competences	Digital behaviour	1,038	0,819	1,893	2,67 (0,008)	1	1		n.a.
		Digital attitude	-0,067	0,109	1,912	0,152 (0,879)				
		Digital knowledge	-0,341	-0,305	1,038	1,420 (0,156)				
	Entrepreneurial competences	Entrepreneurial behaviour	0,861	0,738	1,006	2,490 (0,013)	1	1		n.a.
		Entrepreneurial attitude	0,459	0,373	1,038	1,042 (0,297)				
		Entrepreneurial knowledge	-0,046	-0,049	1,034	0,226 (0,822)				
Reflective construct	**Financial outcomes (α=0,742; AVE=0,662; CR=0,854)**	Financial performance	0,815	0,799		8,991 (0,000)	0,803	0,792		11,777 (0,000)
		Financial resilience	0,733	0,729		6,734 (0,000)	0,753	0,748		9,511 (0,000)
		Financial well-being	0,886	0,878		13,848 (0,000)	0,880	0,875		20,900 (0,000)

*only measured for reflective constructs
**significance of factors weights is considered for formative constructs and loadings for reflective constructs
***VIF measures are only considered for formative constructs as long as there are at least 2 indicators forming a given latent variable
n.a. not applicable, the significance of weights where the construct has only one indicator cannot be tested
Source: own editing

In the case of a formative constructs, redundancy analysis is not considered in this study due to the nature of the conceptual framework (i.e. the constructs are not composed of both formative and reflective indicators simultaneously), but collinearity diagnostics and a bootstrap analysis to assess the significance of the outer weights is carried out. The above table contains the VIF measures of every formative indicator in the model, which in every case stay below the value of 5, indicating there is no multicollinearity present in the models. The significance of the outer weights was examined with the help of a

bootstrap analysis. As the above table shows, after the first running of the bootstrap analysis, every knowledge item and two attitude items (digital and entrepreneurial attitude) resulted to have insignificant weights. Insignificant items were eliminated through an iterative process . First knowledge items were eliminated from the model (thus rejecting H1), followed by the insignificant attitude elements (digital and entrepreneurial attitude, partially rejecting H2) and after re-running the outer model evaluation, the final indicators that remained in the models were the attitude and behavioural elements for financial literacy and only behaviour for the other two competences.

The path coefficients in the model show us the relationships between the constructs. The below *Table 16* contains the results of the bootstrap analysis to evaluate the significance of the paths in the inner model. By observing the path coefficients, we can see that every competence has a positive effect on the financial outcomes of the SMEs and the relationships between the competence areas seem to be positive. However, based on the results of the bootstrap analysis, two paths result to be insignificant in the model, neither the path from digital competences to entrepreneurial competences (t=0,504, p=0,614), nor the one from financial literacy to financial outcomes result to be significant (t=0,536, p=0,592).

Table 16. Path model evaluation, simplified model, before removing insignificant paths

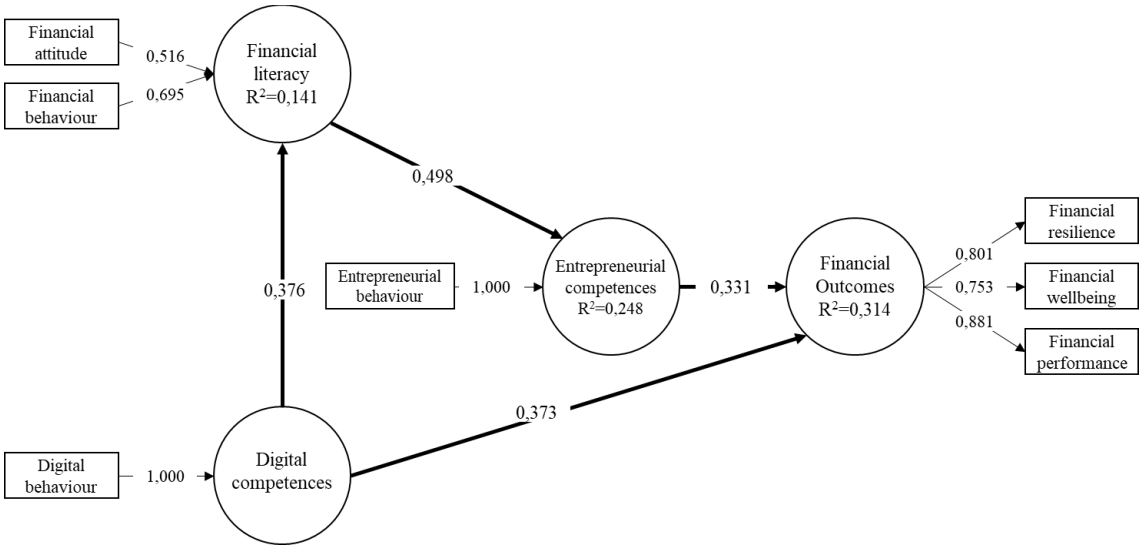
Path	**Path coefficients**				**total effects**	
	Original	**Bootstrap sample**	**Standard deviation**	**t-value (p value)**	**value**	**t-value (p value)**
Digital competences -> Enterpreneurial competences	0,09	0,086	0,178	0,504 (0,614)	0,264	1,486 (0,137)
Digital competences -> Financial Literacy	0,38	0,386	0,11	3,465 (0,001)	0,380	3,465 (0,001)
Digital competences -> Financial outcomes	0,353	0,345	0,102	3,452 (0,001)	0,460	4,458 (0,000)
Enterpreneurial competences -> Financial outcomes	0,3	0,292	0,136	2,202 (0,028)	0,300	2,202 (0,028)
Financial Literacy -> Enterpreneurial competences	0,459	0,46	0,103	4,466 (0,000)	0,459	4,466 (0,000)
Financial Literacy -> Financial outcomes	0,072	0,091	0,135	0,536 (0,592)	0,210	1,946 (0,052)

Source: own editing

The two insignificant paths have been deleted from the model and a last iteration of the inner model analysis was run. After eliminating every insignificant indicators from

the model, the evaluation of the path model can follow. As a result of the previous bootstrapping, only the below paths remained in the model (as seen on the below *Figure 44*). Each path kept in the model shows moderate, but positive and significant effects. Financial literacy does not have a direct effect on financial outcomes, however, by examining its total (and in this case, indirect) effect, we see that it is still significant, positive, but weak (0,498*0,331=0,165, p=0,025). This means that financial literacy does not contribute directly to SME finances, however, the results confirm that it exhibits a significant indirect influence through entrepreneurial competences. Concerning the total effects of the other two competences on financial outcomes, digital competences have the strongest total effect (a direct effect of β=0,373 and an indirect effect of 0,376*0,498*0,331). This is followed by entrepreneurial competences (β=0,331), thus confirming that digital competences have the strongest influence on perceived financial outcomes, mainly due to the fact that it influences financial literacy directly and entrepreneurial competences indirectly as well. Based on this model, the hypotheses of H4 are all supported, the hypothesized relationships between the competences apply and are all positive.

Figure 44. Final path model with significant paths, simplified PLS-SEM model



Source: own editing

The above figure contains the R^2 values of the endogenously explained constructs, based on the above, the multiple coefficients of determination indicate weak to moderate explanatory power. *Table 17* contains the final model's evaluation, including the previously mentioned path coefficients and total effects, and further complementing it

with the f^2 effect sizes. The effect sizes show that financial literacy has the strongest effect on entrepreneurial competency (f^2=0,330), however this effect is still moderate, similarly as how digital competences only exhibit moderate effect on financial literacy (f^2=0,164) and financial outcomes (f^2=0,189). Entrepreneurial competences have a small effect on financial outcomes with f^2=0,148. Based on this it can be concluded that financial literacy has the strongest effect on the endogenous constructs in the model. This can partially be explained by the fact that financial literacy and entrepreneurial competences mediate the effect of digital competences on financial outcomes, by omitting either of these constructs from the model, the explanatory power of the model would decrease greatly.

Table 17. Path model evaluation, simplified model, after removing insignificant paths

Path	Path coefficients				Total effects		f^2
	Original	Bootstrap sample	Standard deviation	t-value (p value)	Value	t-value (p value)	
Digital competences -> Enterpreneurial competences					0,187	2,644 (0,008)	
Digital competences -> Financial Literacy	0,376	0,379	0,111	3,396 (0,001)	0,376	3,396 (0,001)	0,164
Digital competences -> Financial outcomes	0,373	0,37	0,104	3,570 (0,000)	0,435	4,355 (0,000)	0,189
Enterpreneurial competences -> Financial outcomes	0,331	0,331	0,107	3,097 (0,002)	0,331	3,097 (0,002)	0,148
Financial Literacy -> Enterpreneurial competences	0,498	0,501	0,112	4,444 (0,000)	0,498	4,444 (0,000)	0,330
Financial Literacy -> Financial outcomes					0,165	2,248 (0,025)	

Source: own editing

The main conclusion of this first, simplified model is that knowledge and attitude elements (except for financial literacy) do not have a significant impact on the competences of SME decision-makers, which ultimately means that it is more of their actions, not their actual factual knowledge and beliefs, are what matters when it comes to making financial decisions in the company. The relationships and overlaps between the competence areas is supported by the model, as how to the use of FinTech services, financial literacy needs to be complemented by further digital competences (as supported by e.g. Nemoto-Koreen, 2019), or how financial literacy can have a direct effect on entrepreneurial competences, similarly as how e.g. Nwachukwu-Chládková-Žufan (2017) regarded financial and economic literacy a part of entrepreneurial competences.

The examined effect of the competences on perceived financial outcomes also supports H5, however it needs to be noted that in the case of financial literacy the effect is only indirect as the path between financial literacy and financial outcomes resulted to be insignificant, and as a consequence, got removed from the model. These results however need to be treated carefully, as this is a simplified version of the original research framework and the indicators included in the model have been calculated as a linear combination or average of the responses of the original variables, thereby losing some information content in the transformation process. As it was discussed earlier in the methodological chapter, through the use of the Hierarchical Components Model (HCM), more than one "layers" of the constructs can be examined. The competences and financial outcomes of this model can be further broken down to their dimensions, making it possible for every original variable to be included in the measurement model instead of their combinations. The results of the HCM model are introduced in the next chapter.

6.5.2. Results of the hierarchical components model (HCM)

The purpose of the HCM model is to break down the dimensions of the original constructs and making those dimensions latent variables in the model, and to include as many of the original variables as possible. This way the constructs can be explained in a more realistic way, basing the path coefficients and explanatory power of the model more on the actual, observed values than the transformed indicators of the previous model. The HCM model was run in two stages, first, following the evaluation of the measurement model, the significant indicators were selected and with the help of them, latent variable scores were calculated for each of the dimensions. These latent variable score were then re-loaded into the path model as indicators and inner model evaluation was last carried out following a similar procedure as seen before.

The HCM model analysis was done using the previously introduced two-stage approach. In the first stage, a structural model was created which contained the competence as the higher-order components (HOC) and their dimensions as lower-order components (LOC). The variable scores based on *Appendices 2 to 7* from the questionnaire were then connected to both the HOCs and the LOCs as separate indicators and the usual structural model evaluation was carried out, considering the multicollinearity and significance of the formative indicator weights and Cronbach alpha, AVE, composite reliability and significance of the reflective indicators. This means that

e.g. instead just one financial knowledge score calculated from the number of correct responses (as it was in the simplified model), a total of 5 variables were connected as indicators to the financial knowledge LOC. Insignificant indicators were then iteratively removed from the model, resulting in an outer model where only such indicators remain that have a significant effect on the latent variables they are sought to explain. *Appendix 8* contains the result of the very first step of this iterative process, we can see there that knowledge constructs contained the most insignificant indicators, which were then one-by-one removed from both the LOCs and the HOCs. *Appendix 9* shows the final composition of the LOCs.

Based on the indicators that remained significant in the model (as described in *Appendix 9*), latent variable components have been generated and re-loaded into the original path model as indicators. As the second stage of the HCM model, outer and inner model evaluations have been carried out using the same procedures as it has been introduced in the case of the simplified model. Outer model evaluation of the second stage can be found on the below *Table 18*, from where it is prevalent that neither knowledge elements exhibit a significant effect on any of the components. The fact that in the case of each of the three knowledge dimensions, only one variable remained significant already foreshadowed that knowledge did not result to have a significant impact on either of the competences. This way another result confirms the rejection of H1; and through keeping every attitude and behaviour elements, H2 and H3 are accepted based on this model. Before we exclude the knowledge dimension from the competences, it is important to notice however, that both financial and entrepreneurial knowledge had negative weights. This indirectly means that if they were to remain in the model, higher level of knowledge would be associated with lower perceived financial outcomes. This would imply that those, who are more knowledgeable, due to their knowledge base, could assess the financial status of their business more accurately, have a better understanding of it, resulting in a rather pessimistic view of it only because of their higher knowledge.

Table 18. Evaluating the goodness of the model, second stage, HCM model

Latent variable (Cronbach a, AVE, CR)*		Item	First version				Final version			
			Outer weight/loading		VIF***	t-value (p-value)**	Outer weight/loading		VIF	t-value (p-value)
			original	sample			original	sample		
Formative constructs	Financial literacy	Financial behaviour	0,530	0,519	1,181	6,472 (0,000)	0,544	0,542	1,111	5,947 (0,000)
		Financial attitude	0,653	0,645	1,12	6,848 (0,000)	0,685	0,681	1,111	7,823 (0,000)
		Financial knowledge	-0,183	-0,177	1,063	1,556 (0,120)				
	Digital competences	Digital behaviour	0,511	0,518	2,141	9,283 (0,000)	0,535	0,55	2,102	9,147 (0,000)
		Digital attitude	0,511	0,500	2,106	10,095 (0,000)	0,542	0,527	2,102	9,678 (0,000)
		Digital knowledge	0,162	0,158	1,062	1,674 (0,094)				
	Entrepreneurial competences	Entrepreneurial behaviour	0,624	0,622	1,296	6,989 (0,000)	0,643	0,649	1,272	6,804 (0,000)
		Entrepreneurial attitude	0,499	0,493	1,276	4,299 (0,000)	0,524	0,519	1,272	4,287 (0,000)
		Entrepreneurial knowledge	-0,144	-0,145	1,038	1,65 (0,099)				
Reflective construct	Financial outcomes (α=0,690; AVE=0,610; CR=0,821)	Financial performance	0,740	0,734		9,226 (0,000)	0,739	0,736		9,589 (0,000)
		Financial resilience	0,662	0,660		7,021 (0,000)	0,651	0,64		6,296 (0,000)
		Financial well-being	0,923	0,915		28,963 (0,000)	0,928	0,921		32,876 (0,000)

*only measured for reflective constructs
**significance of factors weights is considered for formative constructs and loadings for reflective constructs
***VIF measures are only considered for formative constructs as long as there are at least 2 indicators forming a given latent variable
n.a. not applicable, the significance of weights where the construct has only one indicator cannot be tested
Source: own editing

The final path model consists of 2 dimensions for each competence areas (behaviour and attitude), an improvement compared to the simplified model, and contains each of the three financial outcome dimensions as it did previously. As the first step of the inner model evaluation, the significance of the paths is assessed through bootstrap analysis. As it can be seen in *Table 19*, the path coefficient between digital competences

and financial outcomes is not significant, therefore this path has been excluded from the path model and the bootstrap and model assessment has been repeated once more.

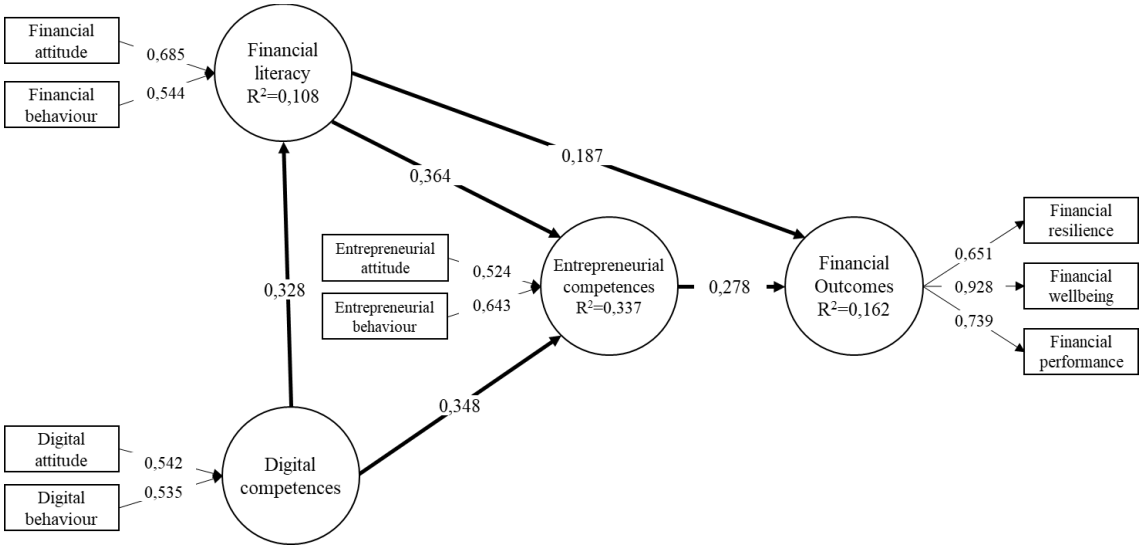
Table 19. Path model evaluation, HCM model, before removing insignificant paths

Path	Path coefficients				Total effects	
	Original	Bootstrap sample	Standard deviation	t-value (p value)	value	t-value (p value)
Digital competences -> Enterpreneurial competences	0,356	0,361	0,130	2,731 (0,006)	0,471	3,474 (0,001)
Digital competences -> Financial Literacy	0,311	0,323	0,082	3,772 (0,000)	0,311	3,772 (0,000)
Digital competences -> Financial outcomes	0,078	0,078	0,092	0,848 (0,397)	0,247	3,321 (0,001)
Enterpreneurial competences -> Financial outcomes	0,230	0,240	0,108	2,142 (0,032)	0,230	2,142 (0,032)
Financial Literacy -> Enterpreneurial competences	0,369	0,372	0,069	5,391 (0,000)	0,369	5,391 (0,000)
Financial Literacy -> Financial outcomes	0,195	0,194	0,085	2,29 (0,022)	0,280	3,587 (0,000)

Source: own editing

After the last bootstrap analysis, each of the remaining paths resulted to be significant, and the below path model can be drawn (*Figure 45*). It is interesting to compare this path model to that of the simplified PLS-SEM model (in the previous chapter) from two aspects. First, each competence areas are now comprised of two dimensions, both attitudes and behaviour (which are more likely to be inherent attributes of individuals, and as such, could be developed, but not through traditional education such as factual knowledge). Second, financial literacy of MSME decision-makers now resulted to have a significant direct effect on the perceived financial outcomes of the company, while digital competences does not have a direct, only indirect effects through both financial literacy and entrepreneurial competences. Concerning the relationships of the competence areas, H4 is supported, Digital competences have a positive, direct effect on both financial literacy and entrepreneurial competences, and as well financial literacy has a positive direct effect on entrepreneurial competences of a similar strength, as we can see it on the below *Figure 45* as well.

Figure 45. Final path model with significant paths, HCM model



Source: own editing

The results are not fundamentally different from what we have seen in the case of the simplified model. Even though due to the exclusion of independent variables at the first stage and some information loss as a result of the components generated, the R^2 values are slightly lower.

Contrary to the previous model, here financial literacy exhibits the strongest total effect (0,187+0,364*0,278=0,289) on the perceived financial outcomes, followed by entrepreneurial competences (β=0,278) and digital competences (which only has an indirect effect of 0,348*0,278+0,328*0,364*0,278+0,328*0,187=0,192). Total effects are significant for each path, and what we need to notice is the medium effects of digital competences (f^2=0,163) and financial literacy (f^2=0,179) on entrepreneurial competences. The results support the theory on the overlap of competences and how digital skills and financial skills could be segments of entrepreneurial competences (as e.g. for operating a business, it is crucial to have some degree of both digital and financial competences), similarly to how the EntreComp framework (Bacigalupo et al. 2016) is structured. This latter observation contradicts the results of the previous model, because as even though we could see how important role digital competences play in affecting the other competence areas, in this case its total effect on perceived financial outcomes remains lower than that of financial literacy (*Table 20*). It is worth mentioning though that even though digital competences do not have a direct effect on perceived financial outcomes, the overall total effect of every competences resulted to be positive and significant on

financial outcomes, meaning that this model, similarly to the simplified path model, supports H5.

Table 20. Path model evaluation, HCM model, after removing insignificant paths

Path	Path coefficients				Total effects		f^2
	Original	Bootstrap sample	Standard deviation	t-value (p value)	Value	t-value (p value)	
Digital competences -> Enterpreneurial competences	0,348	0,353	0,145	2,409 (0,016)	0,468	3,135 (0,002)	0,163
Digital competences -> Financial Literacy	0,328	0,331	0,080	4,096 (0,000)	0,328	4,096 (0,000)	0,121
Digital competences -> Financial outcomes					0,192	2,887 (0,004)	
Enterpreneurial competences -> Financial outcomes	0,278	0,285	0,091	3,059 (0,002)	0,278	3,059 (0,002)	0,071
Financial Literacy -> Enterpreneurial competences	0,364	0,367	0,068	5,369 (0,000)	0,364	5,369 (0,000)	0,179
Financial Literacy -> Financial outcomes	0,187	0,189	0,082	2,282 (0,022)	0,289	4,103 (0,000)	0,032

Source: own editing

6.6. Summary of the empirical research: theses, limitations

The aim of this chapter is to summarize the result of the empirical research, highlighting the most important results that helped to make decisions on the research hypotheses. Theses are formulated and the most important links to the reviewed literature are made as well. Apart from the results, this chapter also sheds light on some of the experienced difficulties and limitations of the study and points out future research opportunities. The below *Table 21.* summarizes the research hypotheses and their decisions.

Table 21. Decisions on the research hypotheses

Hypothesis		**Decision**
H1	The knowledge dimension of each competences has a positive, significant effect on perceived financial outcomes.	Rejected
H2	The attitude dimension of each competences has a positive, significant effect on perceived financial outcomes.	Partially accepted
H3	The behaviour dimension of each competences has a positive, significant effect on perceived financial outcomes.	Accepted
H4	Competence areas are positively related to each other. H4a: Financial literacy has a positive effect on entrepreneurial competences. H4b: Digital competences have a positive effect on financial literacy. H4c: Digital competences have a positive effect on entrepreneurial competences.	Accepted
H5	Every competence has a positive effect on perceived financial outcomes.	Accepted

Source: own editing

In the upcoming paragraphs theses are formulated which can all be generalized to MSMEs of the Southern Great Plain of Hungary. Knowledge dimensions resulted to be insignificant in the path models. In both models knowledge elements had negative weights, which could imply that those who have better knowledge and better understanding of business processes might have a more pessimistic view of the financial outcomes of the company. The first hypothesis was therefore rejected.

Thesis 1: Knowledge of financial decision-makers does not have a significant effect on perceived financial outcomes of MSMEs.

The insignificant effect of knowledge on the perceived financial outcomes contradicts the literature. Even though it seems from the results that knowledge has no effect on how MSME decision-makers perceive financial outcomes of the business, the

results need some further elaboration. First, the negative weights of the knowledge dimensions in both the simplified and the HCM model might imply that those, who have a higher level of knowledge have a worse perception of financial outcomes. This could be due to the assumption that higher knowledge levels are accompanied with a better outlook on the business and thus a better-informed and more pessimistic view concerning the overall performance and stability of the business. However, this remains just an assumption, as the knowledge test questions did not provide a detailed enough overview of the actual knowledge on the respondents. The MSME financial literacy framework (OECD 2018a) even though describes the knowledge areas (topic) related to the different life-stages of MSMEs, it does not specify the proficiency level entrepreneurs should exhibit at certain stages of the SME life-cycle. Neither does the adapted survey tool (OECD 2020b), which, in line with most of the other OECD financial literacy surveys (OECD, 2016, 2018b, 2020a, 2022), only measures knowledge through true and false statements. As previously criticized by de Clercq (2019), the knowledge test tool of OECD/INFE is not suitable to accurately measure knowledge of the respondents. Even though the above-mentioned study by de Clercq (2019) investigated an OECD/INFE adult financial literacy assessment (OECD 2016), the conclusions of the study apply in this case as well. True or false questions can only measure whether the respondents are familiar with different notions, but are not suitable to measure their proficiency, i.e. how much they know about the different topics. A better understanding of knowledge levels of the respondents might require longer surveys with various types of assessment tools and needs to be analysed more in detail, which is beyond the scope of this current research.

Attitude dimensions resulted to be all significant in the HCM model and were partially present in the simplified model. Positive weights imply that those with better attitudes and beliefs are more optimistic about their financial outcomes. As a result, the second hypothesis is partially accepted, as even though each of the three attitude dimensions resulted to have a positive, significant effect in the HCM model, digital and entrepreneurial attitudes were not significant in the simplified model. Behaviour dimensions have significant and positive effect in both path models. Based on the results in can be deduced that what has the most influence in financial decision-making is the behaviour of persons, their practices, acts and prior experience, even if that might sometimes be contrary to either their beliefs or factual knowledge.

Thesis 2: Financial attitudes of financial decision-makers have a positive, significant effect on perceived financial outcomes of MSMEs.

Thesis 3: Behaviour of financial decision-makers has a significant, positive effect on perceived financial outcomes of MSMEs.

Regarding the fourth hypothesis about the interrelatedness of the competences, only one path between digital competences and entrepreneurial competences resulted to be insignificant in the simplified path model, however, the indirect effect of digital competences on entrepreneurial competences through financial literacy resulted to be significant, meaning that the fourth hypothesis is fully supported by the evidence. This is in line with the findings of Sariwulan et al. (2020) and demonstrates that these competences are strongly intertwined and cannot be, or at least should not be, examined in isolation from each other.

Thesis 4: Competence areas of financial decision-makers of MSMEs are positively and significantly related to each other.

Concerning the fifth hypothesis about the effect of the competences on perceived financial outcomes, the results vary highly depending on the complexity of the applied model, however the fifth hypothesis is accepted. It is important to notice however, that the effect of competences on perceived financial outcomes is not necessarily direct, but in certain cases are only indirect through entrepreneurial competences. Path coefficients are overall positive, however, in the simplified model financial literacy and in the HCM model, digital competences did not have a significant direct effect on perceived financial outcomes. Yet, total effects were positive and significant for every competences, meaning that by improving the level of each competences, perceived financial outcomes will increase. This conclusion should be treated carefully though, as e.g. in the HCM model competences did not include the knowledge dimension, therefore improving the competence levels is possible through teaching good practices and influencing the norms and beliefs of MSME decision-makers, other than improving their factual knowledge). One important conclusion of this part of the analysis is that each of these competences can affect jointly financial decisions of entrepreneurs, making financial literacy equally as important as the other two competences. This is in line with Lusardi (2019), stating that "*In today's world, financial literacy should be considered as important as basic literacy, i.e., the ability to read and write*" (Lusardi, 2019, p. 7.).

Thesis 5: Every competence of financial decision-makers has a positive significant total effect on perceived financial outcomes of MSMEs.

Concerning the limitations of the study, perhaps one of the most important limitation of the study is the small sample size. As described before, I contacted a total of 3050 businesses operating at the Southern Great Plain region and while 159 responses were received yielding a 5,21% response rate, a further 106 reactions arrived in the form of replies to the initial invitation and the reminder asking for participation in the survey. The majority of the rejection emails expressed reservations about the anonymity of the survey, some of them claiming that by asking for the number of employees, location (county) and net income (rounded to million HUF) one could easily identify the businesses and refrained from participation. Some respondents criticized the length of the survey, saying that during the pandemic, participating in a survey was the least of their concern, while some others refused to take part, because they thought that the survey questions were not realistic, lifelike, and suggested rewording some of the questions to reflect on the everyday activity of MSMEs a bit more. The timing of the survey wasn't perfect either, as data collection was running during the harshest era of the pandemic, with strict austerity measures on both the businesses and on individuals and as well at the same time many were still occupied with compiling their balance sheets for the May deadline, hence did not make time to complete the survey. The feedback received has been documented and will be used in a future research to simplify the survey and to clarify the questions that were not completely obvious for the participants. As a further research direction, a national sample could be taken where spatial comparisons would become possible.

Financial resilience is measured on a scale of 1 to 12 (*Appendix 5*), while financial well-being is measured on a scale of 0-42 (*Appendix 7*). In the case of these financial outcome dimensions, some questions are not given equal weight in the scoring of them. This raises concerns in the case of the simplified PLS-SEM model, where the financial resilience and well-being scores are calculated as the sum of the individual variable scores (but not in the HCM model, where each questions are considered as individual indicators). To test whether these items with higher possible values distort the results of the analyses, both models have been re-run by omitting the problematic variables (e.g. question no. 36) from the calculation of the financial resilience and well-being scores. The results remained largely unchanged. Weights, loadings and path coefficients changed slightly,

however, the significance of the indicators and paths remained the same as in the case of including these variables in the model. Since the scores have been adapted from the OECD survey tool, despite the possible considerations raised by the unequal weight of the individual questions, no changes have been made in the scoring of financial resilience and well-being.

Another limitation of the study is that since the questions were adapted from the OECD questionnaire (OECD 2020a, 2020b) as a verified questionnaire, there was little to no room for adjusting the questions to the research objectives. Concerning the financial outcome measures, the Likert-scale variables did not make it possible to objectively evaluate the financial status of the businesses but were focusing on how the respondents evaluated certain aspects. This in fact could also mean that due to certain shortfalls (e.g. lack of knowledge, overly optimistic attitude etc.) the respondents could have a false impression of the actual finances of the company. In future research, more "hard" numerical financial indicators should be included in the survey. Even if there would not be questions directly asking about ROE or ROI of the companies, by asking for the metrics needed to calculate certain financial indicators, we could get a more accurate view of the actual financial performance of the businesses. What needs to be considered is that the measures should be comparable, e.g. in percentage forms and not in absolute terms, as some measures (e.g. the total income) might not necessarily be comparable among the different activities and business sizes. As a conclusion therefore, the survey needs to be redesigned, knowledge questions need to be more diversified, and new questions for financial indicators should be included, yet it should be kept in mind to keep the survey as compact as possible.

7. Conclusion

In micro, small and medium-sized enterprises, financial decision-making is often concentrated in the hands of one person, so that the competences of that person play a key role in financial decision-making and therefore on the impact of these decisions on the operation of the business. The aim of this dissertation was to examine how three competence areas, financial literacy, digital and entrepreneurial competences are intertwined in the process of financial decision-making and to see in practice the impact of these competences on the financial outcomes of MSMEs using a novel approach of PLS-SEM path analysis.

The use of PLS-SEM path analysis is not new to the study of financial literacy and competences, various studies have been published in the previous two decades. However, the studies generally focused on one or two of the above competences and except for one studied example (Sariwulan et al. 2020), they did not include all three simultaneously, even though there is ample evidence for the interrelatedness of them. This study focuses predominantly on financial literacy. This has been a deliberate decision and is due to the aim of wanting to show that although financial literacy is not generally considered as a competence in the literature, but is treated as an abstract phenomenon, it is the same as the other two competences, both in its structure and in its impact on individuals. Therefore, financial literacy should be treated equally as a competence, and thus it is included in the research model as an equal element alongside entrepreneurial and digital competences.

One novelty of this work has been therefore the joint examination of these competences and the conceptual framework that has been created to assess their joint effect on the financial outcomes of MSMEs. Financial literacy has been defined along the OECD (2015, 2018a, 2020b) definition, while the Entrecomp (Bacigalupo et al. 2016) and DigComp (Carretero-Vuorikari-Punie, 2017) frameworks provided as a basis for defining the other two competence areas. Out the output end of the research model, perceived financial outcomes composed of financial performance, resilience and well-being which were adapted from OECD (2020a, 2020b).

The most substantial added value of this study is the application of an extended PLS method called hierarchical component model (HCM). The limitations of the widely used PLS-SEM method, as we could see it in the simplified model, did not allow for a

detailed analysis of the dimensions (knowledge, skills, attitudes) that make up each competence, but sought to characterise them with a single measure. The HCM method extends the application of PLS-SEM and allows competences to be analysed along their sub-dimensions including more indicators, thus contributing to more detailed results and understanding of the underlying constructs. The empirical study investigated financial decision makers of micro, small and medium enterprises in the Southern Great Plain Region on their perception of the financial performance of the enterprise using a hierarchical component model on a sample of 157 valid items. The results demonstrated the applicability of the HCM method and its limitations in this topic, showing that attitudes and behaviour have a positive significant effect on the perception of financial outcomes. Knowledge has a negative but not significant effect, indirectly suggesting that those with higher knowledge tend to have a more negative perception of performance than those with lower knowledge.

The findings of the study highlight the need for joint development of the competences. One of the most important implication of the study is that the key to SME success and survival is the complex development of financial literacy, digital and entrepreneurial competences of financial decision-makers. Even though financial literacy development programmes do exist in Hungary, and financial support is available to some degree to support digitalization, policymakers do not pay enough attention to SMEs when it comes to competence development. The economic recession of the pandemic showed that those who can not adapt quickly enough to the rapidly changing circumstances will have to bear the negative consequences of the recession. The key of survival lies not in material assets but in the continuous development of the human factor. This does not necessarily mean that employees and decision-makers must thrive for excellence in every competences. This rather means that they should make efforts to keep learning continuously and to dare to ask for help when in need.

There is need for financial education, the importance of which has been recognized in the past 20 years. While several countries adapted national strategies to improve financial literacy and financial inclusion (Kovács-Terták, 2019, Kovács-Pásztor, 2022), many is designed to educate only children and adolescents and do not promote openness, nor affect attitudes and behaviour but focus merely on factual knowledge improvement. Therefore, policy makers are recommended to develop programmes which first and foremost promote financial attitudes and behaviour and second, does it in way

that includes digital and entrepreneurial competences. Even though the majority of the SMEs are aware of the importance of developing competences, they are not self-motivated, and currently, they are not pressurized by policymakers either. More emphasis should be taken to support the most vulnerable group, micro-businesses, which account for the vast majority of entreprises.

Overall, this research has demonstrated the possibility of applying the HCM method in the complex assessment of competences. The model can be adapted and further refined by scholars to explore the dynamics of competences and their effect on financial outcomes. The results can help in uncovering problematic areas and facilitate targeted actions in competence development. The results contribute to the better understanding of the usability of the HCM method and provide a basis for refining the survey and for further analyses in SME financial literacy research.

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Appendix

Appendix 1. Questionnaire for empirical research of doctoral dissertation

Business characteristics-Demographics of the business

1. **How would you characterise your business, is it …?**
   a) An autonomous profit-oriented business, making independent financial decisions
   b) A branch of another business
   c) A subsidiary of another business
   d) A non-profit business
   e) Don't know
   f) Prefer not to say

2. **Is your business under domestic or foreign ownership?**
   a) Domestically owned business
   b) Foreign owned business
   c) Prefer not to say

3. **Do you own this business (alone or with others)?**
   a) Yes (alone or with others)
   b) No
   c) Don’t know
   d) Prefer not to say

4. **Are you involved in taking financial decisions for this business?**
   a) Yes (alone or with others)
   b) No
   c) Don’t know
   d) Prefer not to say

5. **How many full-time equivalent people are working in this business, including yourself?**

6. **In which year did your business begin operations?**

7. **Where is the business located?**
   a) Bács-Kiskun county
   b) Békés county
   c) Csongrád-Csanád county

8. What is the main activity of your business?

a) Industry and manufacturing
b) Agriculture
c) Services-financial services
d) Services-IT services
e) Services-education
f) Services-legal services
g) Other services
h) Don't know
i) Prefer not to say

9. Does this business export products or offer services abroad?

a) Yes
b) No
c) Not applicable (due to characteristics of the business, e.g. retail trade)
d) Prefer not to say

10. What is the form of your business?

a) Self-employed
b) Single member limited liability company
c) Limited partnership
d) Public limited company
e) Limited liability company
f) Corporation/company limited by shares

Business characterics-Financial management

11. In the past 24 months [or since business creation if the business existed for less than 24 months], has any of these people helped you in taking financial decisions for the business?

	Yes	No	Don't know	Not Applicable	Prefer not to say
a) A business partner					
b) A book-keeper or accountant external to the business					
c) A business financial advisor external to the business					
d) A financial intermediary (e.g. bank)					
e) A public agency or institution					
f) Family or friends					
g) Other (please specify)					

12. In the past 24 months [or since business creation if the business existed for less than 24 months], have you asked for help or support about any the following matters?

	Yes	No	Don't know	Not applicable	Prefer not to say
a) Managing cash flow and/or liquidity needs					
b) Accessing external financing (e.g. tender)					
c) Applying for loans or borrowing					
d) Involvement of venture capital or other sources of external financing					
e) Evaluating the financial performance of the business					
f) Any type of taxes					
g) Book-keeping and/or accounting					
h) Assessing the business' exposure to any type of risk					

13. **How do you keep track of the financial records of the business?**
    a) In electronic format (e.g. MS Excel or dedicated software)
    b) In paper form (e.g. noting them in a notebook; keeping receipts and invoices)
    c) I keep track of financial records in my head
    d) Someone else does it for me (e.g. an accountant)
    e) In another way
    f) I do not usually keep track
    g) Don't know
    h) Prefer not to say

14. **Imagine that tomorrow you discover that most of the equipment that you need to operate the business has been stolen (it could be computers, vehicles or other equipment). Which one of these statements best represents what you would do?**
    a) I would use money that my business has set aside for emergencies
    b) I would claim insurance on all or part of the equipment
    c) I would take a loan to buy new equipment
    d) I would use some personal or household funds
    e) I would ask family members or friends to lend me money or equipment
    f) I would stop my business temporarily or for good
    g) I don't know, I have never thought about how I would cope
    h) Other (please specify)
    i) Don't know
    j) Prefer not to say

15. **Thinking about your business, would you agree or disagree with the following statements? (1-4 highly disagree to highly agree)**

	1	**2**	**3**	**4**	**Prefer not to say**
a) I keep secure data and information about the business					
b) I compare the cost of different sources of finance for the business					
c) I forecast the profitability of the business regularly					
d) I adjust my planning according to the changes in economic factors					

16. Does your business have a current or savings account? If so, which of the below statements best represents the situation of your business?

a) Yes, I use the same account for both my household and business finances
b) Yes, I have separate accounts for my household and for my business, but I find it quite difficult to manage household and business finances separately
c) Yes, I manage strictly separate accounts for my household and for my business
d) No, my business does not have a current or savings account
e) Don't know
f) Prefer not to say

17. Which of the following statements best describes how you made your most recent choice about a financial product or service for the business (e.g. current account, business loan, insurance policy, etc.)?

a) I considered several options from different financial providers before making my decision
b) I considered the various options from one financial provider
c) I didn't consider any other options at all
d) I looked around but there were no other options to consider
e) Don't know
f) Prefer not to say

<u>Business characterics-Demographics of respondent</u>

18. What is your gender?

a) Female
b) Male
c) Other
d) Prefer not to say

19. In which year were you born?

20. What is the highest educational level that you have completed?

a) Less than primary school
b) Primary school
c) Vocational secondary school
d) High school (grammar school)
e) Bachelor (Ba/Bsc) program or equivalent
f) Master (Ma/Msc) program or equivalent
g) Doctoral degree (DLA or PhD)

21. Have you received education in subjects related to business, economics or finance as part of formal or informal education? You can choose more than 1 option if applicable.

a) Yes, as part of secondary education
b) Yes, as part of higher education
c) Yes, as part of informal online education (e.g. online courses)
d) Yes, as part of out-of-school training (e.g. trainings organized at workplace)
e) No
f) Prefer not to say

22. Have you ever received training on how to manage business finances? You can choose more than 1 option if applicable.

a) Yes, as part of formal education (e.g. high school or university courses)
b) Yes, as a part of informal education (e.g. online courses, trainings)
c) No
d) Prefer not to say

23. Have you ever received training on personal money management? You can choose more than 1 option if applicable.

a) Yes, as part of formal education (e.g. high school or university courses)
b) Yes, as a part of informal education (e.g. online courses, trainings)
c) No
d) Prefer not to say

24. For how long (how many years) have you been a business owner, also including any previous businesses?

☐☐

25. Does any of your parents currently own a business, or owned a business in the past?

a) Yes
b) No
c) Don’t know
d) Prefer not to say

26. Have you thought about how you will fund your own retirement or maintain yourself when you will no longer work due to old age?

a) Yes
b) No / Not yet
c) Don’t know
d) Prefer not to say

Financial literacy

27. How would you rate your overall knowledge about financial matters compared with other adults in Hungary?

a) Very low 1 - Very high 5
b) Don't know
c) Prefer not to say

28. Please decide whether the following statements are true or false!

	True	False
a) Dividends are part of what a business pays to a bank to repay a loan.		
b) When a company obtains equity from an investor it gives the investor part of the ownership of the company.		
c) If a financial investment offers the chance to make a lot of money it is likely that there is also a chance to lose a lot of money.		
d) High inflation means that the cost of living is increasing rapidly.		
e) A 15-year loan typically requires higher monthly payments than a 30-year loan of the same amount, but the total interest paid over the course of the loan will be less.		

29. Thinking about your business, would you agree or disagree with the following statements? (1-5 highly disagree to highly agree)

	1	2	3	4	5
a) I set long term financial goals for the business and strive to achieve them					
b) I am confident to approach banks and external investors to obtain business finance					
c) I prefer to follow my instinct rather than to make detailed financial plans for my business *(reverse scale)*					

Entrepreneurship competences

30. Please decide whether the following statements are true or false!

	True	False
a) The business plan, which sets out the objectives to be achieved by the firm and the strategy required to achieve them, is legally binding and may impose fines if the firm deviates from it.		
b) Both the employee and the employer may terminate the employment relationship by giving notice, in which case the period of notice shall, as a general rule, begin on the day following the notice and shall last for 30 days.		
c) In the case of the establishment of a limited liability company (Ltd.), the amount of the share capital subscribed in the memorandum of association may not exceed HUF 3,000,000.		
d) The four main elements of a marketing strategy are 4P: product, price, place and personnel.		
e) Controlling is not just an accounting activity, but the integration of planning and accounting from a managerial perspective.		

31. Would you agree or disagree with the following statements? (1-5 highly disagree to highly agree)

	1	2	3	4	5
a) I can spot opportunities and transform them into strategies that create value for my business.					
b) In my opinion finding new opportunities and challenges promotes the further development of my business.					
c) I always act responsibly when making business decisions considering the effect of my decisions.					
d) I do not support unethical behaviour in business.					
e) I can efficiently organize and mobilise resource (e.g. material and non-material resources, human resources) to achieve business goals.					
f) I think motivation and perseverance is key in managing employees successfully.					
g) I can organise, plan and develop actions and adapt them to changing circumstances.					
h) I believe I have to take responsibility for my business-related decisions.					
i) I can value the risk and uncertainty of business decision and can choose between them along pre-defined evaluation rules.					
j) I support diversity and freedom of speech within my business.					

Digital competences

32. Please decide whether the following statements are true or false!

	True	False
a) Cloud technology refers solely to the transfer of documents between two computers using the wireless network.		
b) Digital signature is a scheme used to verify the authenticity of digital documents.		
c) When using images that are under Creative Commons licenses, credit must always be given to the original creator.		
d) Two-step verification/two-factor authentication is a form of authentication when the user needs to provide their password twice in order to be able to access websites or an application.		
e) IoT (internet of things) is a network of smart devices designed for real-time analytics, machine-learning and the exchange of data between themselves using the Internet.		

33. Would you agree or disagree with the following statements? (1-5 highly disagree to highly agree)

	1	2	3	4	5
a) When looking for information, I always carry out my own research from credible sources.					
b) I prefer information from reliable sources.					
c) I use digital technologies to work together with colleagues and partners inside and outside my business.					
d) I prefer the use of different digital channels to enhance communication with colleagues and partners.					
e) I create my own digital resources and modify existing ones to adapt them to the needs of my business.					
f) I carefully consider how, when and why to use digital technologies to ensure that they are used with added value.					
g) I can detect the risks and apply measures to avoid them when working in a digital environment.					
h) I think that the protection of personal and company data is essential when it comes to working in a digital environment.					
i) I can detect and solve technical problems with the least assistance from IT professionals.					
j) I believe that constantly improving digital skills is a necessity nowadays.					

Financial resilience

34. Do you do any of the following for your business?

	Yes	No	Don't know	Not Applicable	Prefer not to say
a) Make a plan to manage income and expenses					
b) Keep a note on spending					
c) Keep an amount of money reserved for operating costs and an amount reserved for unexpected expenses separately					
d) Make a note of upcoming expenses to make sure your business doesn't miss them					
e) Use a banking app or money management tool to keep track of your business's expenses					
f) Arrange automatic payments for regular expenses					

35. If your business faced a major expense today-equivalent to a monthly revenue of the business- would you be able to pay it without borrowing the money?

a) Yes
b) No
c) Don't know
d) Prefer not to say

36. If your company lost the main source of its revenue, how long could you continue to cover business as usual (e.g. paying for regular expenses, labour costs etc.) without borrowing any money or selling any property?

a) Less than a week
b) At least a week, but not one month
c) 1-3 months
d) 3-6 months
e) 6 months or more

Financial well-being

37. Does your business have any specific financial objectives or goals?

a) Yes
b) No
c) Don't know
d) Prefer not to say

38. Sometimes income does not quite cover the expenses of the business. In the last 12 months, has this happened to your business?

a) Yes
b) No
c) Don't know
d) Prefer not to say

39. Please decide on how well the below statements describe the situation of your business.

	1	**2**	**3**	**4**	**5**
a) My business can handle a major unexpected expense					
b) The financial future of the business is being secured					
c) Because of the current money situation of the business, I feel like the business can never reach its goals. *(reverse scale)*					
d) Me and my co-workers can enjoy life because of the way money is managed at my business.					
e) My business is just getting by financially. *(reverse scale)*					
f) I am concerned that the money my business has or will save won't last long. *(reverse scale)*					

40. Please decide on how often do these statements apply to your business?

	1	**2**	**3**	**4**	**5**
a) Covering unexpected expenses (e.g. extra benefits for employees, annual premium) put a strain on the finances of the business for the month. *(reverse scale)*					
b) My business has money left over at the end of the month after covering all operational expenses.					
c) My business is behind with finances. *(reverse scale)*					
d) The finances control the life of the business. *(reverse scale)*					

Financial performance questions

41. What was the approximate annual revenue of this business in the previous fiscal year (in million HUF)? IF your business began operations less than one year ago, what do you expect to be the annual turnover of this business this fiscal year?

42. Would you say that your business was successful in the previous fiscal year [or over the past 6 months if the business existed for less than 12 months]? (1-5 Highly disagree-highly agree)

1-Highly disagree | | | | | | 5-Highly agree

43. Have the following indicators increased, decreased or remained stable in the previous fiscal year [or over the past 6 months if the business existed for less than 12 months]?

	Decreased	Remained unchanged	Increased
a) Revenue			
b) Profits			
c) Number of employees			
d) Ratio of debt to assets			

44. What was the gross profit ratio of your firm in the last year (total sales revenue minus cost of goods and services sold, divided by total sales revenue)?

a) Negative ratio
b) 0-10%
c) 10-20%
d) 20-30%
e) More than 30%
f) Don’t know
g) Prefer not to say

Appendix 2. Calculation of knowledge scores

Financial knowledge score

Question number	Statement	Solution	Score
28.a)	Dividends are part of what a business pays to a bank to repay a loan.	False	1 if response is correct, 0 otherwise
28. b)	When a company obtains equity from an investor it gives the investor part of the ownership of the company.	True	1 if response is correct, 0 otherwise
28.c)	If a financial investment offers the chance to make a lot of money it is likely that there is also a chance to lose a lot of money.	True	1 if response is correct, 0 otherwise
28.d)	High inflation means that the cost of living is increasing rapidly.	True	1 if response is correct, 0 otherwise
28.e)	A 15-year loan typically requires higher monthly payments than a 30-year loan of the same amount, but the total interest paid over the course of the loan will be less.	True	1 if response is correct, 0 otherwise
Total score			**0-5 points**

Source: own editing

Entrepreneurial knowledge score

Question number	Statement	Solution	Score
30.a)	The business plan, which sets out the objectives to be achieved by the firm and the strategy required to achieve them, is legally binding and may impose fines if the firm deviates from it.	False	1 if response is correct, 0 otherwise
30. b)	Both the employee and the employer may terminate the employment relationship by giving notice, in which case the period of notice shall, as a general rule, begin on the day following the notice and shall last for 30 days.	True	1 if response is correct, 0 otherwise
30.c)	In the case of the establishment of a limited liability company (Ltd.), the amount of the share capital subscribed in the memorandum of association may not exceed HUF 3,000,000.	False	1 if response is correct, 0 otherwise
30.d)	The four main elements of a marketing strategy are 4P: product, price, place and personnel.	False	1 if response is correct, 0 otherwise
30.e)	Controlling is not just an accounting activity, but the integration of planning and accounting from a managerial perspective.	True	1 if response is correct, 0 otherwise
Total score			**0-5 points**

Source: own editing

Digital knowledge score

Question number	**Statement**	**Solution**	**Score**
32.a)	Cloud technology refers solely to the transfer of documents between two computers using the wireless network.	False	1 if response is correct, 0 otherwise
32. b)	Digital signature is a scheme used to verify the authenticity of digital documents.	True	1 if response is correct, 0 otherwise
32.c)	When using images that are under Creative Commons licenses, credit must always be given to the original creator.	True	1 if response is correct, 0 otherwise
32.d)	Two-step verification/two-factor authentication is a form of authentication when the user needs to provide their password twice in order to be able to access websites or an application.	False	1 if response is correct, 0 otherwise
32.e)	IoT (internet of things) is a network of smart devices designed for real-time analytics, machine-learning and the exchange of data between themselves using the Internet.	True	1 if response is correct, 0 otherwise
Total score			**0-5 points**

Source: own editing

Appendix 3. Calculation of attitude scores

Financial attitude scores

Question number	**Statement**	**Score**
29.a)	I set long term financial goals for the business and strive to achieve them	1 for highly disagree 5 for highly agree
29. b)	I am confident to approach banks and external investors to obtain business finance	1 for highly disagree 5 for highly agree
29.c)	I prefer to follow my instinct rather than to make detailed financial plans for my business *(reverse scale)**	1 for highly agree 5 for highly disagree
Total score (average of scores above)		**1-5**

*reverse scale items refer to such statements where disagreeing with a statement means the respondent has better attitudes in a certain topic

Source: own editing

Entrepreneurial attitude scores

Question number	**Statement**	**Score**
31.b)	In my opinion finding new opportunities and challenges promotes the further development of my business.	1 for highly disagree 5 for highly agree
31.d)	I do not support unethical behaviour in business.	1 for highly disagree 5 for highly agree
31.f)	I think motivation and perseverance is key in managing employees successfully.	1 for highly disagree 5 for highly agree
31.h)	I believe I have to take responsibility for my business-related decisions.	1 for highly disagree 5 for highly agree
31.j)	I support diversity and freedom of speech within my business.	1 for highly disagree 5 for highly agree
Total score (average of scores above)		**1-5**

Source: own editing

Digital attitude scores

Question number	Statement	Score
33.b)	I prefer information from reliable sources.	1 for highly disagree 5 for highly agree
33.d)	I prefer the use of different digital channels to enhance communication with colleagues and partners.	1 for highly disagree 5 for highly agree
33.f)	I carefully consider how, when and why to use digital technologies to ensure that they are used with added value.	1 for highly disagree 5 for highly agree
33.h)	I think that the protection of personal and company data is essential when it comes to working in a digital environment.	1 for highly disagree 5 for highly agree
33.j)	I believe that constantly improving digital skills is a necessity nowadays.	1 for highly disagree 5 for highly agree
Total score (average of scores above)		**1-5**

Source: own editing

Appendix 4. Calculation of behaviour scores

Financial behaviour scores

Question number	**Question/statement**	**Score**
13.	How do you keep track of the financial records of the business?	1 for a), b), d), or e) (keeping track formally) 0 otherwise
14.	Imagine that tomorrow you discover that most of the equipment that you need to operate the business has been stolen (it could be computers, vehicles or other equipment). Which one of these statements best represents what you would do?	1 for a) or b) (thinking ahead) 0 otherwise
15.a)	I keep secure data and information about the business	1 for agreeing (3 or 4) 0 otherwise
15.b)	I compare the cost of different sources of finance for the business	1 for agreeing (3 or 4) 0 otherwise
15.c)	I forecast the profitability of the business regularly	1 for agreeing (3 or 4) 0 otherwise
15.d)	I adjust my planning according to the changes in economic factors	1 for agreeing (3 or 4) 0 otherwise
16.	Does your business have a current or savings account? If so, which of the below statements best represents the situation of your business?	1 for c) (managing financial accounts separately) 0 otherwise
17.	Which of the following statements best describes how you made your most recent choice about a financial product or service for the business (e.g. current account, business loan, insurance policy, etc.)?	1 for a) and d) (considering other options) 0 otherwise
26.	Have you thought about how you will fund your own retirement or maintain yourself when you will no longer work due to old age?	1 for a) (thinking ahead) 0 otherwise
Total score		**0-9**

Source: own editing

Entrepreneurial behaviour scores

Question number	Statement	Score
31.a)	I can spot opportunities and transform them into strategies that create value for my business.	1 for highly disagree 5 for highly agree
31.c)	I always act responsibly when making business decisions considering the effect of my decisions.	1 for highly disagree 5 for highly agree
31.e)	I can efficiently organize and mobilise resource (e.g. material and non-material resources, human resources) to achieve business goals.	1 for highly disagree 5 for highly agree
31.g)	I can organise, plan and develop actions and adapt them to changing circumstances.	1 for highly disagree 5 for highly agree
31.i)	I can value the risk and uncertainty of business decision and can choose between them along pre-defined evaluation rules.	1 for highly disagree 5 for highly agree
Total score (average of scores above)		**1-5**

Source: own editing

Digital behaviour scores

Question number	Statement	Score
33.a)	When looking for information, I always carry out my own research from credible sources.	1 for highly disagree 5 for highly agree
33.c)	I use digital technologies to work together with colleagues and partners inside and outside my business.	1 for highly disagree 5 for highly agree
33.e)	I create my own digital resources and modify existing ones to adapt them to the needs of my business.	1 for highly disagree 5 for highly agree
33.g)	I can detect the risks and apply measures to avoid them when working in a digital environment.	1 for highly disagree 5 for highly agree
33.i)	I can detect and solve technical problems with the least assistance from IT professionals.	1 for highly disagree 5 for highly agree
Total score (average of scores above)		**1-5**

Source: own editing

Appendix 5. Calculation of financial resilience scores

Question number	**Question/statement**	**Score**
34.a)	Make a plan to manage income and expenses	1 for agreeing, 0 otherwise
34.b)	Keep a note on spending	1 for agreeing, 0 otherwise
34.c)	Keep an amount of money reserved for operating costs and an amount reserved for unexpected expenses separately	1 for agreeing, 0 otherwise
34.d)	Make a note of upcoming expenses to make sure your business doesn't miss them	1 for agreeing, 0 otherwise
34.e)	Use a banking app or money management tool to keep track of your business's expenses	1 for agreeing, 0 otherwise
34.f)	Arrange automatic payments for regular expenses	1 for agreeing, 0 otherwise
35.	If your business faced a major expense today-equivalent to a monthly revenue of the business-would you be able to pay it without borrowing the money?	1 for a) (yes, would be able to cover unexpected expense), 0 otherwise
36.	If your company lost the main source of its revenue, how long could you continue to cover business as usual (e.g. paying for regular expenses, labour costs etc.) without borrowing any money or selling any property?	1 through 5 (1 for a) to 5 for e) in ascending order)
Total score		**1-12**

Source: own editing

Appendix 6. Calculation of financial well-being scores

Question number	**Statement**	**Score**
37.	Does your business have any specific financial objectives or goals?	1 for a) (having a specific financial objective or goal), 0 otherwise
38.	Sometimes income does not quite cover the expenses of the business. In the last 12 months, has this happened to your business?	1 for b) (not having experienced such shortage of income), 0 otherwise
39.a)	My business can handle a major unexpected expense	0 for highly disagree 4 for highly agree
39.b)	The financial future of the business is being secured	0 for highly disagree 4 for highly agree
39.c)	Because of the current money situation of the business, I feel like the business can never reach its goals. (reverse scale)	0 for highly agree 4 for highly disagree
39.d)	Me and my co-workers can enjoy life because of the way money is managed at my business.	0 for highly disagree 4 for highly agree
39.e)	My business is just getting by financially. (reverse scale)	0 for highly agree 4 for highly disagree
39.f)	I am concerned that the money my business has or will save won't last long. (reverse scale)	0 for highly agree 4 for highly disagree
40.a)	Covering unexpected expenses (e.g. extra benefits for employees, annual premium) put a strain on the finances of the business for the month. (reverse scale)	0 for highly agree 4 for highly disagree
40.b)	My business has money left over at the end of the month after covering all operational expenses.	0 for highly disagree 4 for highly agree
40.c)	My business is behind with finances. (reverse scale)	0 for highly agree 4 for highly disagree
40.d)	The finances control the life of the business. (reverse scale)	0 for highly agree 4 for highly disagree
Total score		**0-42**

Source: own editing

*Appendix 7. C*alculation of financial performance scores

Question number	**Statement**	**Score**
42.	Would you say that your business was successful in the previous fiscal year [or over the past 6 months if the business existed for less than 12 months]?	0 for highly disagree 4 for highly agree
43.a)	Have the following indicators increased, decreased or remained stable in the previous fiscal year [or over the past 6 months if the business existed for less than 12 months]? - Revenue	0 for decreased 1 for remained unchanged 2 for increased
43.b)	Have the following indicators increased, decreased or remained stable in the previous fiscal year [or over the past 6 months if the business existed for less than 12 months]? - Profits	0 for decreased 1 for remained unchanged 2 for increased
43.c)	Have the following indicators increased, decreased or remained stable in the previous fiscal year [or over the past 6 months if the business existed for less than 12 months]? - Number of employees	0 for decreased 1 for remained unchanged 2 for increased
43.d)	Have the following indicators increased, decreased or remained stable in the previous fiscal year [or over the past 6 months if the business existed for less than 12 months]? - Ratio of debt to assets	0 for decreased 1 for remained unchanged 2 for increased
44.	What was the gross profit ratio of your firm in the last year (total sales revenue minus cost of goods and services sold, divided by total sales revenue)?	0 for negative ratio 4 for more than 30%
Total score		**0-16**

Source: own editing

Appendix 8. Outer model evaluation in the HCM model (first stage, first version)

Latent variable (Cronbach a, AVE, CR)*	Item	Outer weights/loadings**		VIF***	t-value (p-value)
		Original	Bootstrap sample		
Financial attitude	q29a	0,593	0,599	1,177	6,853 (0,000)
	q29b	0,347	0,335	1,180	4,004 (0,000)
	q29c	0,429	0,420	1,098	5,251 (0,000)
Financial behaviour	q13_score	0,120	0,115	1,059	2,417 (0,016)
	q14_score	0,073	0,067	1,042	1,141 (0,254)
	q15a_score	0,268	0,256	1,365	6,617 (0,000)
	q15b_score	0,319	0,312	1,456	11,461 (0,000)
	q15c_score	0,338	0,329	1,389	11,854 (0,000)
	q15d_score	0,351	0,347	1,445	12,206 (0,000)
	q16_score	0,076	0,067	1,020	2,089 (0,037)
	q17_score	0,088	0,091	1,082	1,329 (0,184)
	q26_score	0,075	0,068	1,062	1,159 (0,247)
Financial knowledge	q28a_score	0,641	0,347	1,000	2,141 (0,032)
	q28b_score	0,091	0,080	1,149	0,322 (0,747)
	q28c_score	0,130	0,115	1,275	0,387 (0,699)
	q28d_score	-0,184	-0,142	1,126	0,621 (0,534)
	q28e_score	-0,742	-0,559	1,003	3,092 (0,002)
Digital attitude	q33b	0,274	0,261	1,938	8,226 (0,000)
	q33d	0,249	0,266	1,334	4,471 (0,000)
	q33f	0,334	0,354	1,647	5,448 (0,000)
	q33h	0,253	0,245	1,680	8,157 (0,000)
	q33j	0,278	0,274	1,613	9,753 (0,000)
Digital behaviour	q33a	0,234	0,222	1,101	5,356 (0,000)
	q33c	0,309	0,308	1,649	17,021 (0,000)
	q33e	0,309	0,313	1,820	11,473 (0,000)
	q33g	0,293	0,295	1,556	12,82 (0,000)
	q33i	0,269	0,269	1,463	12,478 (0,000)
Digital knowledge	q32a_score	0,088	0,050	1,073	0,363 (0,717)
	q32b_score	0,123	0,087	1,061	0,511 (0,610)
	q32c_score	-0,290	-0,239	1,048	1,355 (0,176)
	q32d_score	0,842	0,714	1,057	5,299 (0,000)
	q32e_score	0,341	0,300	1,068	1,338 (0,181)
Enterpreneurial attitude	q31b	0,283	0,307	1,472	3,823 (0,000)
	q31d	0,219	0,200	1,622	3,088 (0,002)
	q31f	0,319	0,339	2,128	4,656 (0,000)
	q31h	0,305	0,300	2,577	5,53 (0,000)
	q31j	0,189	0,180	1,267	3,727 (0,000)

Latent variable (Cronbach a, AVE, CR)*	Item	Outer weights/loadings**		VIF***	t-value (p-value)
		Original	Bootstrap sample		
Enterpreneurial behaviour	q31a	0,239	0,243	1,751	7,763 (0,000)
	q31c	0,259	0,258	1,784	11,786 (0,000)
	q31e	0,251	0,253	1,755	12,146 (0,000)
	q31g	0,275	0,274	1,859	11,395 (0,000)
	q31i	0,245	0,245	1,714	11,33 (0,000)
Enterpreneurial knowledge	q30a_score	-0,749	-0,597	1,139	2,986 (0,003)
	q30b_score	0,096	0,071	1,078	0,431 (0,666)
	q30c_score	-0,378	-0,286	1,141	1,921 (0,055)
	q30d_score	0,151	0,165	1,045	0,524 (0,601)
	q30e_score	0,280	0,202	1,093	0,855 (0,392)
Financial performance (α=629; AVE=0,447; CR=0,762)	q42	0,833	0,830		25,281 (0,000)
	q43a_score	0,807	0,804		23,944 (0,000)
	q43b_score	0,792	0,790		20,456 (0,000)
	q43c_score	0,565	0,559		6,587 (0,000)
	q43d_score	-0,295	-0,291		2,537 (0,011)
	q44_score	0,553	0,551		7,322 (0,000)
Financial resilience (α =0,512; AVE=0,193; CR=0,498)	q34a_score	0,164	0,136		0,660 (0,509)
	q34b_score	-0,019	-0,039		0,081 (0,935)
	q34c_score	0,445	0,415		3,147 (0,002)
	q34d_score	0,027	0,012		0,150 (0,881)
	q34e_score	0,198	0,175		1,041 (0,298)
	q34f_score	0,125	0,106		0,726 (0,468)
	q35_score	0,768	0,732		12,779 (0,000)
	q36	0,823	0,797		12,718 (0,000)
Financial well-being (α =0,822; AVE=0,375; CR=0,862)	q37_score	-0,013	-0,011		0,178 (0,859)
	q38_score	0,494	0,492		6,943 (0,000)
	q39a_score	0,741	0,743		17,296 (0,000)
	q39b_score	0,792	0,792		21,480 (0,000)
	q39c_score	0,613	0,608		6,973 (0,000)
	q39d_score	0,664	0,664		10,560 (0,000)
	q39e_score	0,822	0,821		23,932 (0,000)
	q39f_score	0,667	0,667		11,065 (0,000)
	q40a_score	0,630	0,628		8,253 (0,000)
	q40b_score	0,586	0,585		6,501 (0,000)
	q40c_score	0,561	0,553		6,072 (0,000)
	q40d_score	0,298	0,294		2,751 (0,006)

*only measured for reflective constructs

**significance of factors weights is considered for formative constructs and loadings for reflective constructs

***VIF measures are only considered for formative constructs as long as there are at least 2 indicators forming a given latent variable

Source: own editing

Appendix 9. Outer model evaluation in the HCM model (first stage, final version)

Latent variable (Cronbach a, AVE, CR)*	Item	Outer weights/loadings**		VIF***	t-value (p-value)
		Original	Bootstrap sample		
Financial attitude	q29a	0,607	0,613	1,177	6,870 (0,000)
	q29b	0,34	0,324	1,18	3,690 (0,000)
	q29c	0,42	0,412	1,098	4,985 (0,000)
Financial behaviour	q13_score	0,127	0,125	1,058	2,419 (0,016)
	q15a_score	0,279	0,275	1,299	8,301 (0,000)
	q15b_score	0,328	0,326	1,427	12,124 (0,000)
	q15c_score	0,347	0,346	1,378	13,798 (0,000)
	q15d_score	0,355	0,355	1,419	14,210 (0,000)
	q16_score	0,072	0,065	1,01	2,012 (0,044)
Financial knowledge	q28e_score	1	1	1	
Digital attitude	q33b	0,274	0,262	1,938	8,547 (0,000)
	q33d	0,25	0,265	1,334	4,559 (0,000)
	q33f	0,333	0,352	1,647	5,499 (0,000)
	q33h	0,254	0,246	1,68	8,506 (0,000)
	q33j	0,278	0,274	1,613	10,190 (0,000)
Digital behaviour	q33a	0,235	0,224	1,101	5,439 (0,000)
	q33c	0,309	0,309	1,649	17,071 (0,000)
	q33e	0,31	0,314	1,82	11,649 (0,000)
	q33g	0,292	0,294	1,556	12,429 (0,000)
	q33i	0,268	0,267	1,463	12,834 (0,000)
Digital knowledge	q32d_score	1	1	1	
Enterpreneurial attitude	q31b	0,281	0,306	1,472	3,754 (0,000)
	q31d	0,22	0,199	1,622	2,973 (0,003)
	q31f	0,319	0,339	2,128	4,436 (0,000)
	q31h	0,304	0,297	2,577	5,000 (0,000)
	q31j	0,191	0,182	1,267	3,678 (0,000)
Enterpreneurial	q31a	0,238	0,242	1,751	8,662 (0,000)
	q31c	0,26	0,26	1,784	12,877 (0,000)
	q31e	0,251	0,252	1,755	12,136 (0,000)
	q31g	0,275	0,274	1,859	12,438 (0,000)
	q31i	0,245	0,246	1,714	11,77 (0,000)
Enterpreneurial knowledge	q30a_score	1	1	1	

Latent variable (Cronbach a, AVE, CR)*	Item	Outer weights/loadings**		VIF***	t-value (p-value)
		Original	Bootstrap sample		
Financial performance (α =629; AVE=0,447; CR=0,762)	q42	0,833	0,831		25,375 (0,000)
	q43a_score	0,807	0,804		24,303 (0,000)
	q43b_score	0,792	0,789		20,701 (0,000)
	q43c_score	0,565	0,557		6,575 (0,000)
	q43d_score	-0,296	-0,294		2,535 (0,011)
	q44_score	0,553	0,552		7,422 (0,000)
Financial resilience (α =0,494; AVE=0,503; CR=0,739)	q34c_score	0,427	0,417		3,368 (0,001)
	q35_score	0,781	0,777		17,867 (0,000)
	q36	0,847	0,846		25,206 (0,000)
Financial well-being (α =0,847; AVE=0,409; CR=0,879)	q38_score	0,495	0,494		7,082 (0,000)
	q39a_score	0,741	0,742		17,232 (0,000)
	q39b_score	0,791	0,791		21,024 (0,000)
	q39c_score	0,614	0,611		6,955 (0,000)
	q39d_score	0,663	0,663		10,512 (0,000)
	q39e_score	0,822	0,821		23,857 (0,000)
	q39f_score	0,668	0,667		11,255 (0,000)
	q40a_score	0,631	0,629		8,238 (0,000)
	q40b_score	0,586	0,584		6,482 (0,000)
	q40c_score	0,562	0,557		6,181 (0,000)
	q40d_score	0,298	0,298		2,744 (0,006)

*only measured for reflective constructs

**significance of factors weights is considered for formative constructs and loadings for reflective constructs

***VIF measures are only considered for formative constructs as long as there are at least 2 indicators forming a given latent variable

Source: own editing