

## FINANCIAL LITERACY AND NEW BUSINESS ENTRY

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### Abstract

The issue of the relationship between financial literacy and entrepreneurship is still not a fully explored research area. On the one hand, there are common views that financial literacy and education in finance are necessary in every individual's life, and that an insufficient level of financial literacy may result in erroneous economic decisions. On the other hand, research on the impact of narrowly defined financial literacy on business start-up decisions is still rare. As a result, there are no clear indications regarding the need for education in the area of finance in order to stimulate entrepreneurial decisions, including the survival of launched economic undertakings. This article deals with the relationship between financial literacy and chosen entrepreneurial aspects such as 1) Phases of Entrepreneurial Activity; 2) Entrepreneurial potential; 3) Motivation; 4) Involvement in the technology sector; and 5) Business exit reasons. All of the above aspects are embedded in the context of financial literacy. The article sheds light on the relationship between financial literacy and entrepreneurship and creates a background for further attempts to deepen understanding of this issue.

**JEL classification:** L26, G53, J24

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## INTRODUCTION

The issue of entrepreneurship is multifaceted and, therefore, complex. Entrepreneurship is a character trait (Schumpeter, 1934; Kirzner, 1973), the ability to solve complex problems (Boyles, 2012; Baggen et al., 2015), and the ability to lead (Colbert, 2003; Antonakis & Autio, 2007), as well as activities aimed at creating new business entities (Fritsch & Schmude, 2007; Estrin et al., 2011; Iftikhar et al., 2020). Looking at entrepreneurship through the prism of the last aspect allows us to combine all the characteristics presented above. Hence, the approach in which entrepreneurship is described by the creation of new business entities is a relatively frequent topic of scientific research. At the same time, the cross-section of research in this area is vast and includes, among others, the dynamics of creating new economic entities and their determinants (Sutaria & Hicks, 2004; Mella, 2006), regional determinants of entrepreneurship (Fritsch, 1992; Davidsson et al., 1994; Armington & Acs, 2002; Karahasan, 2015), the influence of institutions on the creation of new companies (Estrin et al., 2013; Marks-Bielska et al., 2021), the relationship between entrepreneurship and social capital (De Clercq & Arenius, 2006; Klyver et al., 2008) and human capital (Davidsson & Honig, 2003; Morales & Roig, 2005), instrumentalisation of entrepreneurship support by local governments (Flieger, 2013; Katimertzopoulos & Vlados, 2017; Skica & Rodzinka, 2021) and others. Although the presented classification is not exhaustive, it is impossible not to notice that the multitude of research approaches and the diverse nature of the factors used to explain entrepreneurship is a function of the lack of a single, consistent and universal definition describing entrepreneurship and thus also its determinants (Kobia & Sikalieh, 2010). Existing studies confirm this thesis, directly suggesting that the factors determining entrepreneurship are multiple and cover a broad spectrum of explanations (Levie et al., 2014).

The analysis of the literature shows that when dealing with the determinants of the creation of new business entities, factors that are beyond the influence of the entrepreneur (e.g. regulatory environment, institutional factors) and factors reflecting individual predispositions, knowledge, competencies and character traits should be treated separately (Armington & Acs, 2002; Skica, 2020). This position is logically and fully substantiated (Cunnighan & Lischeron, 1991; Cuervo, 2005). As a result, individual and environmental determinants of entrepreneurship are considered separate-

ly research studies explaining the dynamics of new registrations usually focus on one of these groups or selected individual variables (Grilo & Thurik, 2004).

Bearing in mind the above, in this article, the centre of gravity will focus on one of the features of human capital, namely financial literacy and its impact on entrepreneurship. If such studies are already conducted, they usually refer to individual factors expressing the entrepreneur's perspective and include the local dimension (Timmons & Spinelli, 2007), and omit the aspect of the relationship between financial literacy and setting up a business in a regional and national perspective (Ćumurović & Hyll, 2019). Thus, to fill this gap, our inquiry is focused on a national level, exploring the relationships between financial literacy and aggregated national-level entrepreneurship outcomes.

The identified research gap is particularly cognitively significant for at least two reasons. The first concerns the possibility of answering the question about the relationship between financial literacy and entrepreneurial activity considered not individually but from a regional or supra-regional perspective. Such an approach will allow us to capture the relationship between the studied variables in space, making it possible to indicate patterns of the studied dependence identified in the system of regions or countries.

## LITERATURE REVIEW

Financial literacy, also referred to as financial intelligence, is part of human mental intelligence and is related to finding solutions to financial problems (Kiyosaki, 2008). On the one hand, it is the ability to make informed judgments and make effective decisions about the use and management of money (Gavigan, 2010; Klapper et al., 2015). It determines the degree to which a given person understands key financial terms and has the ability to manage finances, expressed in making the right short-term financial decisions and correct long-term financial planning (Remund, 2010). In one of its operationalisations (OECD/INFE, 2020), financial literacy is divided into three constructs: financial knowledge, financial behaviour and financial attitude. The information system (including knowledge) and the system of human behaviour (based on its use) remain in close interaction (Gouws & Shuttleworth, 2009).

Financial literacy is identified with the trait of human capital and acquiring it itself as an investment (Delavande et al., 2008). It includes not only information but also the ability to use it correctly (Lusardi

& Mitchell, 2014). However, the literature shows no single standardised measure of financial literacy (Cole & Fernando, 2008). Nevertheless, its business aspect includes the ability to use information in making business decisions (McDaniel et al., 2002; Wise, 2013) and understanding and interpreting financial documents (Xiao & Porto, 2017). This understanding of financial literacy gains importance due to the complexity of financial markets, the development of new financial products and services (Al-Tamimi & Kalli, 2009), the financialisation of the economy (Kedrosky & Stangler, 2011), as well as the assessment of investment projects that remain strictly in connection with the decision to start a business. Although financial literacy plays a role in the decision-making process of starting a business (Li & Qian, 2020), analyses dedicated to explaining this issue are much rarer than studies of financial literacy in the context of households (Ćumurović & Hyll, 2019).

The studies on the relationship between financial literacy and entrepreneurship concern many, often complementary, areas. These include entrepreneurial potential, phases of entrepreneurial activity, and motivation for starting a business. Relations of financial literacy and new business entry in the technology sector and business exit are also important in this regard.

The potential of entrepreneurship should be identified, among other aspects, with human capital represented by knowledge and skills (Becker, 1964). Research proves that better-educated people have a greater potential for pre-entrepreneurship (Kim et al., 2006). At the same time, human capital (understood as knowledge) is also shaped outside the formal education system, which makes capturing the links between human capital and entrepreneurial potential a complex task (Unger et al., 2011). According to Šubic et al. (2019), financial literacy determines entrepreneurial potential. In turn, Betancourt (2021) indicate that lower financial literacy drives the reduction in entrepreneurial potential. Lack of individual financial literacy affects negatively potential entrepreneurs (Atkinson, 2017). Interestingly, financial literacy as a human capital resource takes different patterns depending on gender. Lusardi et al. (2010) and Bucher-Koenen et al. (2012) show that men have greater financial knowledge than women (regardless of whether the analysis covers younger or older people). Studies by Oggero et al. (2020) proved that understanding finances only increases the likelihood of being an entrepreneur for men. Thus, financial literacy as an element of entrepreneurial capital is subject to differentiation due to its level and other less apparent factors (Czyżewska & Mroczek, 2020).

Research shows the positive impact of financial knowledge on entrepreneurial intentions (Bilal et al., 2020; Tekin & Asar, 2021), especially among students (Aldi et al., 2019; Hasan et al., 2020; Ahmad et al., 2021). However, it should be noted that these trends are conditioned by the chosen field of study and specialisation (Palimąka, 2020). Thus, it cannot be said that the financial literacy shaped by study programs in various fields will influence entrepreneurial decisions in the same way (Palimąka & Rodzinka, 2018). For this reason, the results of some studies showing that financial literacy is not a decisive factor in creating a new economic entity are fully understandable (Ergun et al., 2018; Nurbaeti et al., 2019). However, this does not change the fact that financial literacy contributes to building general entrepreneurial skills and can therefore be seen as a moderator of increased entrepreneurial activity (Oseifuah, 2010). The research concludes that knowledge of finance increases entrepreneurial skills (Suparno & Saptono, 2018). People with a higher level of financial literacy are more likely to engage in entrepreneurship (Ćumurović & Hyll, 2019; Li & Qian, 2020). While Herdina et al. (2022) and Fatoki (2014) show that financial skills have a significant impact on the entrepreneurial intentions of learners, Khairul et al. (2015), Powell (2015) and Phillips et al. (2016) prove that financial literacy positively affects the entrepreneurial intentions of graduates and Kabo (2021) confirms that financial literacy stimulates the business entry of older people as well.

There is a relationship between financial literacy and conducted entrepreneurial activity (Yin et al., 2015; Barba-Sánchez & Atienza-Sahuquillo, 2018), as well as its specific areas, for example, Internet entrepreneurship (Bayrakdaroglu & Bayrakdaroglu, 2017), and entrepreneurship in the creative sector (Abad-Segura & González-Zamar, 2019). On the other hand, digital financial competencies influence decisions about owning a company, business innovativeness, and obtained financial results (Luo et al., 2021). The competencies mentioned are essential components of financial opportunities and, therefore, impact business activities. This observation is confirmed by international research dedicated to the relationship between financial knowledge and entrepreneurship. It has shown that financial competencies express the internal ability to act in the best financial interest, which in turn has a lot to do with the decision-making process of entrepreneurs (Perotti et al., 2013).

Financial literacy helps in making decisions and starting a business. However, motivation is equally im-

portant in entrepreneurial decisions (Carroll & Mosakowski, 1987). All human activities, including entrepreneurship, result from both motivational and cognitive factors such as skills (Locke, 2000). The motivational factors influencing the decisions to start entrepreneurial activity include, among other things, the need for achievement (Johnson, 1990; Collins et al., 2000), risk-taking (Liles, 1974; Venkataraman, 1997), tolerance for ambiguity (Miller & Drodge, 1986; Sexton & Bowman, 1986), locus of control (Shapero, 1977; Begley, 1995), self-efficacy (Bandura, 1997; Baum, 1994) as well as goal setting (Baum et al., 2001). However, some studies show that people differ in their willingness and ability to engage in the entrepreneurial process due to non-motivating individual differences. People's willingness to take advantage of entrepreneurial opportunities depends on opportunity cost (Amit et al., 1995), financial capital resources (Evans & Leighton, 1989), social ties with investors (Aldrich & Zimmer, 1986) as well as their professional experience (Carroll & Mosakowski, 1987; Cooper et al., 1989).

Research highlights the link between entrepreneurship and technology. Entrepreneurship drives innovation and technical change (Croitoru, 2012). The literature uses the term technology entrepreneurship (Nathani & Dwivedi, 2019; Kilintzis et al., 2022), as well as technology-based entrepreneurship (Thomas, 2013), yet the relationship between narrowly defined financial literacy and technology entrepreneurship is not well recognised (Singhry & Abd Rahman, 2016). According to Evers et al. (2020), entrepreneurs must have the financial literacy to turn their visions into technology entrepreneurship. Indirectly, dependence on the line: financial literacy - technology entrepreneurship is indicated by Amerhanova & Seliverstova (2017). The direct relationship between financial literacy and technology entrepreneurship was proved by Singhry & Abd Rahman (2016).

Just as financial literacy has a positive effect on entrepreneurial persistence (Al Issa et al., 2019; Burchi et al., 2021), a lack of sufficient financial knowledge in the decision-making process (Wong & Aspinwall, 2004) is a relatively common cause of business failure (Bosma & Harding, 2006; Kotzè & Smit, 2008), especially in the SME sector (Joo & Grable, 2000; Hodges & Kent, 2006; Ali et al., 2018). Just as financial skills influence the creation of new companies (Kim, 2001) and their financial results (Oseifuah, 2010), the literature proves that a lack of financial management knowledge can result in the failure of business projects (Simcock, 2007). Meanwhile, research shows that entrepreneurs (especially in

the SME sector) are characterised by a low level of financial knowledge, which corresponds to the findings on the causes of bankruptcies (Nunoo & Francis, 2012; Plakalović, 2015). This problem is particularly visible in developing countries (Eniola & Entebang, 2017) and newly created enterprises (Freiling & Laudien, 2013).

These problems can be overcome by educational and training activities (Gavron, 1998), especially those focused on financial issues. Research proves the positive impact of teaching even basic financial concepts on the functioning of micro-entrepreneurs (Karlan & Valdivia, 2011). At the same time, they confirm the growing role of financial literacy in influencing the company's success. Although the level of financial literacy varies depending on the size of the enterprise, companies invariably require business and financial skills, including knowledge in the field of financial management, conditioning both the decision to start a business (Burchi et al., 2021), its survival and development (Barte, 2012), as well as the results achieved by the company (Van Rooij et al., 2011). Research also shows that as financial literacy grows, so does the number of people who start entrepreneurial initiatives (Ćumurović & Hyll, 2019), taking advantage of the many opportunities that financial markets currently offer to finance business projects, even if they are just ideas (Rigolizzo & Amabile, 2015).

The conducted literature review proves several significant gaps in knowledge about the relationship between financial literacy (treated as a form of human capital) and entrepreneurship. They will be the subject of this article, appropriately expanding and supplementing the state of knowledge on the topic under study. While there is an agreement in the literature that financial literacy is positively related to entrepreneurial activity (Albastiki & Hamdan, 2019), there is still no information about what type of entrepreneurship is supported by financial literacy to the greatest extent.

The second area that needs to be examined concerns whether entrepreneurship of people characterised by a higher and lower level of financial literacy is equally motivated by improving their own material status (Smith & Beasley, 2011; Giacomini et al., 2011). People with more financial knowledge usually have a better financial situation. Thus, their motives for starting a business may differ from people with less capital or financial knowledge. In the case of the first group, these may be motives such as autonomy (independence), recognition, self-fulfilment, and disappointment with a full-time job (Feldman & Bolino, 2000; Carter et al., 2003; Wilson et al., 2004). In the

case of the second group, they set up their business due to insufficient alternatives in the form of employment (Kautonen & Palmroos, 2010), or due to motivation for the improvement of their material status (Hessels et al., 2008; Serviere, 2010). The presented point of view corresponds to a model based on two phases describing the relationship between human capital (expressed as financial literacy) and entrepreneurship (Arshed et al., 2021). In the first phase, the low level of human capital slows down the process of creating business ideas, which increases the demand for work. Involvement in business (usually unregistered) is dictated by necessity, not an opportunity (Joo, 1998). In the second phase, when the potential of human capital is properly developed, there is an increase in involvement in entrepreneurial activities based on opportunities, motivated by a high level of financial knowledge. The growth of human capital reduces the opportunity cost of starting the business. Therefore, we observe a positive relationship between human capital and entrepreneurship (Haans et al., 2016). The literature confirms this point of view (Acs, 2006; Desai et al., 2012), examining two alternative types of entrepreneurship - necessity (push) and opportunity (pull) - based entrepreneurship.

## DATA AND METHODS

This study investigates relationships between financial literacy and different aspects of entrepreneurial endeavour. Notably, we explore the relationships between financial literacy variables and variables representing phases of entrepreneurial activity, entrepreneurial potential, motivation, involvement in the technology sector, and business exit reasons. In line with our focus on a country level, these phenomena are studied at aggregated levels of the studied economies.

For this purpose, we utilise two sources of data: 1) Global Entrepreneurship Monitor (GEM) data, specifically the Adult Population Survey (APS) Global National Level Data. GEM APS data are collected annually in each participating country using a harmonised questionnaire and addressing representative samples derived from adult working-age populations (18-64 years old), with a minimum sample size of 2000 respondents in each country). 2) OECD/INFE 2020 International Survey<sup>1</sup> data on Adult Financial Literacy collected across 26 countries utilising the OECD/INFE toolkit from individuals aged 18+. In 2020, 125,787 individuals were interviewed (with a minimum sample size of 1000 respondents in each country).

Country inclusion in our analysis depended on data availability in both surveys (Table 1).

<sup>1</sup> OECD (2020), OECD/INFE 2020 International Survey of Adult Financial Literacy  
[www.oecd.org/financial/education/launchoftheoecdinfe/globalfinancialliteracysurveyreport.htm](http://www.oecd.org/financial/education/launchoftheoecdinfe/globalfinancialliteracysurveyreport.htm) (Access 16 05 2022).

**Table 1: Data availability and number of survey participants**

Country	OECD/INFE		GEM	
	Year of survey	Number of participants	Year of survey	Number of participants
Austria	2020	1,418	2020	4,538
Croatia	2020	1,079	2020	2,000
Germany	2020	1,003	2020	3,001
Hungary	2020	1,001	2021	2,014
Italy	2020	2,036	2020	2,000
North Macedonia	2020	1,076	2019	2,000
Poland	2020	1,000	2020	8,000
Portugal	2020	1,480	2019	2,013
Romania	2020	1,060	2021	1,618
Russia	2020	83,478	2020	2,000
Slovenia	2020	1,019	2020	1,566
Total		95,650		30,750

Source: Own elaboration by authors.

The variables employed in our study reflected the phenomena under investigation, i.e., the country-level financial literacy and its components and the selected aspects of entrepreneurship at the country level. This study operationalises financial literacy according to the OECD/INFE (2018) Toolkit. It is defined as "a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing." Overall financial literacy score is obtained as the sum of financial knowledge, behaviour and attitudes scores. Financial knowledge refers to the knowledge of basic financial concepts focusing on responses to seven questions designed to test different aspects of knowledge that are widely considered useful to individuals when making financial decisions. Financial behaviour refers to financial practices (through questions regarding saving and planning, making considered purchases, and tracking cash flow) that improve the individual financial situation. Finally, financial attitudes influence decisions to act and represent individuals' biases toward financial activities through statements about money and planning for the future.

The variables representing entrepreneurial aspects are operationalised through the GEM lens and can be divided into certain thematic groups, namely: 1) Phases of Entrepreneurial Activity; 2) Entrepreneurial potential; 3) Motivation; 4) Involvement in the technology sector; and 5) Business exit reasons. The description of investigated variables is provided in Annex 1.

Regarding the methods utilised in this study, in the first phase of our analysis, we use Spearman's correlation analysis to investigate the statistical dependence between financial literacy indicators and selected indicators representing entrepreneurial aspects using Spearman coefficients.

In the second phase of our analysis, we implement K-Means clustering to divide 11 countries into 3 clusters based on the variables representing the entrepreneurial aspects that have been found significantly correlated with the overall financial literacy. We then displayed the individual countries on scatter plots to examine how they are similar or different in selected entrepreneurial aspects and how this relates to financial literacy. Finally, we conducted the nonparametric independent-samples Kruskal-Wallis test to examine the significance of differences between the clusters in financial literacy. Our results are discussed in the context of reviewed literature in the discussion section.

## RESEARCH RESULT

The overall results of Spearman's analysis are included in Annex 2 and 3. The variables that have been found significantly correlated with overall financial literacy score or the individual components of this composite indicator are shown in Annex 4.

Financial knowledge, representing the average obtained knowledge score across all individuals surveyed in a country, is significantly positively correlated with Total early-stage entrepreneurial activity within the technology sector. The results also show a negative correlation with the business discontinuance because of problems getting finance. Furthermore, it seems to be significantly negatively correlated with the early-stage entrepreneurial activity driven by necessity (the prevailing motive of earning a living because jobs are scarce) and established entrepreneurial activities driven by motives of building great wealth, continuing a family tradition, or earning a living.

According to our analysis, financial behaviour, representing individuals' actions related to their finances, is not significantly correlated with the studied entrepreneurial aspects, although it is an important component of financial literacy according to theory and the OECD/INFE definition.<sup>2</sup>

Financial attitude stands for the ability to act financially prudently and influence an individual's decision on whether to act. Financial attitude is significantly negatively correlated with business discontinuation, high job expectations within established businesses and early-stage entrepreneurial activities driven by the motive to build great wealth or a very high income.

Financial literacy is a composite indicator representing the ability to make sound financial decisions. The results show that it is significantly positively correlated with the proportion of Total early-stage entrepreneurial activity within the technology sector and negatively correlated with business discontinuance due to problems getting finance. Furthermore, it is significantly negatively correlated with early-stage entrepreneurial motives to build great wealth or a very high income and earn a living because jobs are scarce (i.e., necessity driven entrepreneurship).

In the next stage of our analysis, three clusters were formed using Agglomerative Hierarchical Clustering (Table 2) based on the variables that represent entrepreneurial aspects significantly correlated with financial literacy (see above).

<sup>2</sup> Financial literacy is a combination of awareness, knowledge, skill, attitude, and behaviour necessary to make sound financial decisions.

**Table 2: Investigated countries grouped into clusters**

Cluster	Cluster member
Cluster 1	Austria, Germany, Hungary, Poland, Portugal, Slovenia
Cluster 2	Croatia, North Macedonia, Romania, Russia
Cluster 3	Italy

*Source: Own elaboration by authors.*

The resulting average values of variables used for clustering are presented in Table 3, which clearly illustrates patterns exhibited by the constructed clusters. For example, countries in Cluster 1 reported a lower share of problems getting finance among reasons for business discontinuation, together with a lower occurrence of a desire to build great wealth as well as a necessity (i.e., need to earn a living because jobs

were scarce) among the motives behind the early-stage entrepreneurial activities. Further, Cluster 3 (comprising from only one country – Italy) is characterised by a lack of technology-oriented early-stage entrepreneurial activity and an even higher prevalence of motivation to build great wealth and necessity-driven activities among early-stage entrepreneurs.

**Table 3: Patterns of constructed clusters**

	Cluster centres				Financial literacy (mean)
	TEA_20tec	EX20_RS3	TEA20MOT2	TEA20MOT4	
Cluster 1	6.6	5.5	42.4	58.3	13.58
Cluster 2	6.9	14.1	58.6	74.9	11.95
Cluster 3	0.0	14.0	95.3	82.2	11.10

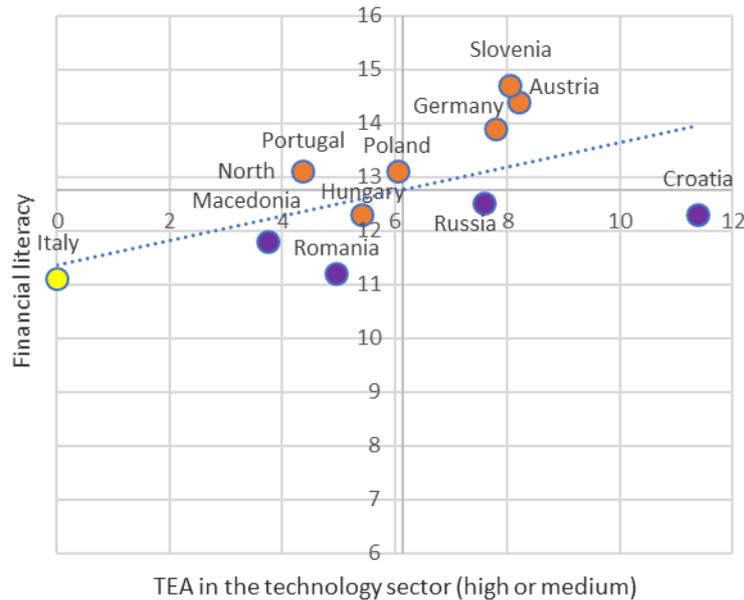
*Source: Own elaboration by authors.*

Also, looking at the mean value of the financial literacy indicator across the clusters, we can see a pattern of increasing financial literacy from Cluster 3 to Cluster 1. This is in line with our findings from the correlation analysis that indicated a negative correlation between financial literacy and business discontinuance due to problems getting finance, necessity-driven early-stage entrepreneurship, and motivation to create great wealth through engaging in business. Also, in the case of the constructed clusters, the countries classified in Cluster 1 (i.e., Austria, Germany, Hungary, Poland, Portugal, and Slovenia) reported, on average, the highest financial literacy scores and lowest occurrence of the above-mentioned entrepreneurial aspects. Furthermore, in the next step of our analysis (i.e., the independent samples Kruskal-Wallis test), we confirmed that countries classified in Cluster 1 demonstrate significantly higher financial literacy scores compared to countries in Clusters 2 and 3. This further supports our thesis on the link between financial literacy and qualitative aspects of country-level entrepreneurial activity.

The coherence of the clusters is further demonstrated when exploring the countries' financial literacy scores compared to the values of the significantly correlated entrepreneurial aspects variables (see Diagrams 1 to 4 below). To better illustrate the patterns, we have created the visualisations of these relationships while also visualising the cluster memberships.

Diagram 1 illustrates the relationship between the financial literacy score and the proportion of early-stage entrepreneurial activity involved in the technology sector. Countries classified in Cluster 1 tend to be located in the upper-right quadrant, meaning above-average financial literacy and above-average technology-oriented early-stage entrepreneurship. Cluster 2 countries show below-average financial literacy scores, yet their technology-oriented TEA is quite diverse, with Croatia outperforming the other cluster members. Cluster 3 (Italy) is a clear outlier in this pattern due to low reported technology-oriented TEA. Nevertheless, the trend line clearly shows that as financial literacy increases, so does early-stage entrepreneurship in the technology sector.

**Diagram 1: Representation of financial literacy and TEA in the technology sector (scores for investigated countries)**

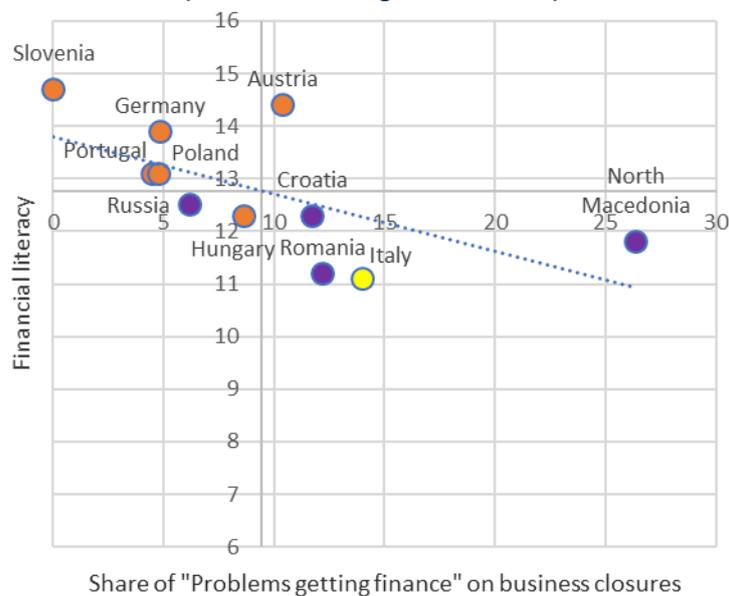


Source: Own elaboration of authors.

Diagram 2 visualises the relationship between the financial literacy scores and the share of problems getting finance as a reason for closure among those entrepreneurs who recently discontinued a business. In this case, countries grouped in Cluster 1 are located towards the upper-left quadrant, suggesting that their (in most cases) above-average country-level financial literacy scores go hand-in-hand with a low proportion of business exits due to problems in obtaining finance. In the case of Cluster 2, with the countries exhibiting

below the average financial literacy scores, we can observe a higher share of business closures due to problems getting finance, with North Macedonia being an outlier with a rather high share of this particular reason for business closure. The trend line in Diagram 2 also shows this trend. Thus, countries that exhibit higher levels of aggregate financial literacy exhibit lower rates of business discontinuation due to financing problems and vice versa.

**Diagram 2: Representation of financial literacy and business discontinuance due to problems getting finance (scores for investigated countries)**

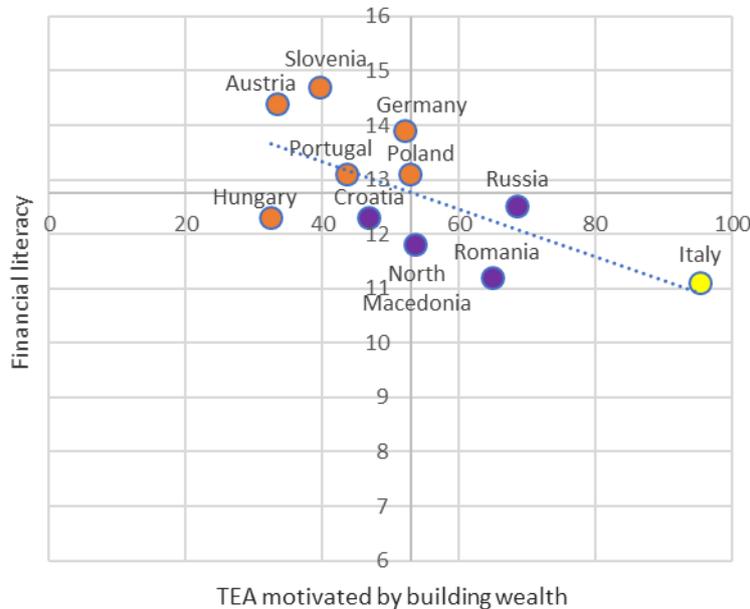


Source: Own elaboration of authors.

Diagram 3 displays the relationships between country-level financial literacy scores and the prevalence of motivation to build great wealth among early-

stage entrepreneurs. There is a very consistent pattern visible in Diagram 3.

**Diagram 3: Representation of financial literacy and TEA motivated by building wealth (scores for investigated countries)**

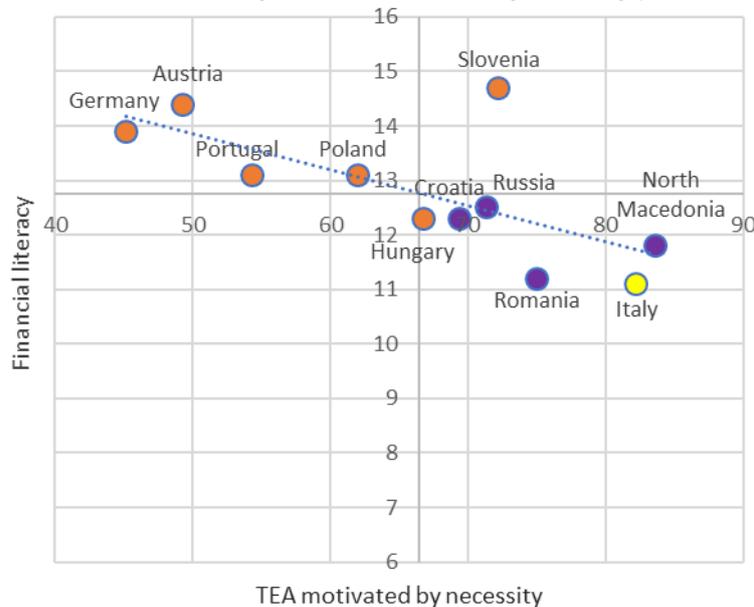


Source: Own elaboration of authors.

As indicated above, countries classified in Cluster 1 tend to report a lower proportion of great wealth-building motives and above-average financial literacy (thus located in the upper-left part of the diagram). Cluster 2 countries are located merely towards the lower-right part of the chart, indicating an increasing prevalence

of a wealth-building motive hand in hand with lower levels of financial literacy, and Cluster 3 (Italy) is consistent with this pattern. The trend line in Diagram 3 only confirms this pattern and further highlights a rather steep trend of increasing motivation to build great wealth with declining financial literacy.

**Diagram 4: Representation of financial literacy and TEA motivated by necessity (scores for investigated countries)**



Source: Own elaboration of authors.

Finally, Diagram 4 visualises the relationship between financial literacy and the prevalence of necessity-driven early-stage entrepreneurship across the analysed countries. Our findings also suggest a rather consistent pattern related to this motivational category. Cluster 1 countries with above-average financial literacy scores tend to report a lower proportion of necessity-driven early-stage business activities. In comparison, Cluster 2 countries, followed by Cluster 3 (Italy), indicate that decreasing financial literacy is accompanied by an increasing share of early-stage entrepreneurship out of necessity which is visible also on the trend line.

## DISCUSSION

The consequences of financial literacy are underexplored in entrepreneurship (Graña-Alvarez et al., 2022). Its positive impact has been explored mainly on an individual level in personal finance (Lusardi & Michell, 2014). A positive impact has been found on a firm-level in organisational capabilities and (financial and non-financial) performance (Graña-Alvarez et al., 2022). Furthermore, most research on financial literacy has been done in developing countries (Hung et al., 2009). Thus, our approach in this study focuses on European countries applying a country-level perspective using aggregated indicators of existing robust surveys for financial literacy, its components, and indicators of entrepreneurial aspects operationalised through OECD/INFE and GEM.

We will discuss our results through the thematic groups investigated.

**Phases of Entrepreneurial Activity.** Our results showed no significant correlation between financial literacy and different phases of entrepreneurial activity, so we agree with Ergun et al. (2018) and Nurbaeti et al. (2019) that financial literacy is not a decisive factor in the creation of new economic entities. However, we found that a component of financial literacy, namely financial attitudes, is significantly negatively correlated with business discontinuation as the last phase of entrepreneurial activity. Financial attitudes relate to individuals' biases (e.g., risk aversion) toward financial activities. From the previous research, we know that higher financial literacy decreases the individuals' risk aversion and develops a capacity to cope with uncertainty (Hsiao & Tsai, 2018; Huston, 2010) which is perhaps reflected in the ability of entrepreneurs to stay active and not discontinue their business activities. This finding is in line with Meoli et al. (2022), who suggested

a positive correlation between the level of financial literacy and the survival of SMEs.

**Entrepreneurial Potential.** Our results suggest that entrepreneurial potential examined through perceived suitable opportunities for entrepreneurship, confidence in one's abilities, fear of failure, and subjective perceptions of the difficulty of starting a business are not significantly correlated with financial literacy. Thus, these findings do not confirm the results of previous research that suggest higher financial literacy leads to exploiting opportunities of financial markets to finance business projects (Rigolizzo & Amabile, 2015), self-confidence plays an important role in the perception of a level of financial literacy (Bucher-Koenen et al., 2017), high level of financial literacy leading to increased awareness of the potential risks hence lowering a level of fear of failure and perceived difficulty of starting a business (Buchdadi et al., 2020).

**Motivation.** Spearman's correlation analysis showed a significant negative correlation between financial literacy and different phases of entrepreneurial activity, so we agree with Ergun et al. (2018) and Nurbaeti et al. (2019) that financial literacy is not a decisive factor in the creation of new economic entities. However, we found that a component of financial literacy, namely financial attitudes, is significantly negatively correlated with business discontinuation as the last phase of entrepreneurial activity. Financial attitudes relate to individuals' biases (e.g., risk aversion) toward financial activities. From the previous research, we know that higher financial literacy decreases the individuals' risk aversion and develops a capacity to cope with uncertainty (Hsiao & Tsai, 2018; Huston, 2010) which is perhaps reflected in the ability of entrepreneurs to stay active and not discontinue their business activities. This finding is in line with Meoli et al. (2022), who suggested a positive correlation between the level of financial literacy and the survival of SMEs.

**Entrepreneurial Potential.** Our results suggest that entrepreneurial potential examined through perceived suitable opportunities for entrepreneurship, confidence in one's abilities, fear of failure, and subjective perceptions of the difficulty of starting a business are not significantly correlated with financial literacy. Thus, these findings do not confirm the results of previous research that suggest higher financial literacy leads to exploiting opportunities of financial markets to finance business projects (Rigolizzo & Amabile, 2015), self-confidence plays an important role in the perception of

a level of financial literacy (Bucher- Koenen et al., 2017), high level of financial literacy leading to increased awareness of the potential risks hence lowering a level of fear of failure and perceived difficulty of starting a business (Buchdadi et al., 2020).

Motivation. Spearman's correlation analysis showed a significant negative correlation between financial literacy and the motives for starting a business, namely, to build great wealth or high income, and starting a business out of necessity. We know that financial literacy affects individuals' investment decisions from the literature, while a positive correlation was previously found between financial literacy and individual wealth (Van Rooij et al., 2012; Jappelli & Padula, 2013). From our results, we can deduce that more financially literate individuals engage less in early-stage entrepreneurial activity out of necessity as they can develop more sophisticated financial planning (Lusardi & Mitchell, 2011). Hence, they are not reliant on business engagement but can increasingly rely on other investment projects or employment opportunities. An interesting finding is a significant negative correlation between financial literacy and engaging in entrepreneurship to build great wealth. A high level of financial literacy leads to increased awareness of the potential risks that ventures face (Buchdadi et al., 2020), which might discourage individuals from entrepreneurial engagement.

Involvement in the technology sector. Our analysis found a significant positive correlation between financial literacy and early-stage entrepreneurial activity in the technology sector. The technology sector can be characterised by a higher dynamism of change, innovation, and capital intensity. This finding is in line with previous research claiming that managers with higher financial literacy have confidence in efficiently managing human and business resources (Egbo et al., 2020), financial literacy improves skills related to calculating,

managing, and mitigating risks associated with entrepreneurship (Wongso et al., 2020, Burchi et al. 2021), financial literacy encompasses an understanding of liquidity needs and causes of volatility which is fundamental for engaging in innovative activities (Illmeyer et al., 2017) as well as managers with higher financial literacy can convince stakeholders to finance and invest in their activities (Lema et al. 2021, Tian et al., 2020). Based on the above, we can conclude that financial literacy indirectly affects the ability of entrepreneurs to engage in activities within the technology sector.

Business exit reasons. Another potentially interesting result is the significant negative correlation between financial literacy and business discontinuation due to financing problems. The existing research suggests that managers with higher financial literacy are less likely to use informal financial resources (family resources, internal finances, financial bootstrapping, and high-cost short term resources) (Nitani et al., 2020). Also, managers with high financial literacy have increased access to debt and lower financing costs (Koropp et al., 2013), resulting from their ability to convince lenders of their venture's viability, as suggested by Koropp et al. (2013).

A limitation of our research is the availability of data. We only considered countries that participated in the OECD/INFE survey (2020) and the GEM survey (2019-2021). A limitation is also the level of the analysis, which was conducted at the national level, where the individual level or panel data would have provided an additional perspective. Also, we have only used the operationalisation of the OECD/INFE and GEM surveys, and it could be interesting to consider other groups of variables. However, to our knowledge, studies at the national level are very rare; therefore, we believe our research provides unique insights on financial literacy in the context of entrepreneurship.

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## ANNEXES

### Annex 1: Description of investigated variables

Group of variables	Variable name	Description
Financial Literacy	Financial Literacy <sup>3</sup>	The composite indicator represents the score and is a sum of the three scores of financial knowledge, behaviour, and attitudes.
	Knowledge <sup>2</sup>	The score was computed as the number of correct responses to the seven financial knowledge questions.
	Behaviour <sup>2</sup>	The score was computed as a count of the number of "financially savvy" behaviours relating to budgeting, active saving, avoiding borrowing to make ends meet, choosing products, keeping watch on financial affairs, striving to achieve goals, making considered purchases, and paying bills on time.
	Attitude <sup>2</sup>	The score was computed as the average response across three attitude questions.
Phases of Entrepreneurial Activity	Futsup20	% 18-64 pop: YES: Expects to start a new business in the next 3 years
	Disent20	% 18-64 pop: YES: Exited a business in past year, business did not continue
	Exitct20	% 18-64 pop: YES: Exited a business in past year, business continued
	Suboan20	% 18-64 pop: START-UP/NASCENT (SU): active past year, (part) owner, no wages yet
	Babybu20	% 18-64 pop: BABY BUS OWNER (BB): owns-manages business with income<3.5 years
	Estbbu20	% 18-64 pop: ESTABL BUS OWNER (EB): owns-manages business with income>3.5 years
	Anybus20	% 18-64 pop: Entrepr active: either nascent (SU), baby (BB) or established (EB)
	TEA20	% 18-64 pop: Setting up firm or owner of young firm (SU or BB)
Entrepreneurial Potential	Opport20	% 18-64 pop: YES: Good conditions to start business next 6 months in area I live
	Suskil20	% 18-64 pop: YES: Has required knowledge/skills to start business
	Frfail20	% 18-64 pop: YES: Fear of failure would prevent starting a business
	EASYST20	In your country, it is easy to start a business, agree/disagree
Motivation	TEA20MOT1	Early-stage entrepreneur motive: To make a difference in the world
	TEA20MOT2	Early-stage entrepreneur motive: To build great wealth or a very high income
	TEA20MOT3	Early-stage entrepreneur motive: To continue a family tradition
	TEA20MOT4	Early-stage entrepreneur motive: To earn a living because jobs are scarce
	EB_20MOT1	Established business owner-manager motive: To make a difference in the world
	EB_20MOT2	Established business owner-manager motive: To build great wealth or a very high income
	EB_20MOT3	Established business owner-manager motive: To continue a family tradition
	EB_20MOT4	Established business owner-manager motive: To earn a living because jobs are scarce

<sup>2</sup> Financial literacy is a combination of awareness, knowledge, skill, attitude, and behaviour necessary to make sound financial decisions.

<sup>3</sup> OECD, (2018). 2018 OECD/INFE Financial Literacy Measurement Toolkit <http://www.oecd.org/financial/education/2018-INFE-FinLit-Measurement-Toolkit.pdf> (Access 16 05 2022).

Involvement in Technology Sector	TEA20tec	% within TEA: Active in technology sectors (high or medium)
	EB_20tec	% within EB: Active in technology sectors (high or medium)
Business Exit Reasons	EX20_RS1	% within EXIT: Exit reason is the opportunity to sell
	EX20_RS2	% within EXIT: Exit reason is the business not profitable
	EX20_RS3	% within EXIT: Exit reason is problems getting finance
	EX20_RS5	% within EXIT: Exit reason is exit was planned in advance
	EX20_RS11	% within EXIT: Exit reason is government/tax policy/bureaucracy

*Source: Own elaboration of authors.*

Annex 2: Results of Spearman analysis I

	Futsup20	Disent20	Exitct20	Opport20	Suskil20	Frfail20	Suboan20	Babybu20	Estbbu20	Anybus20	TEA20
Futsup20	1.000										
Disent20	0.210	1.000									
Exitct20	0.839**	0.503	1.000								
Opport20	0.168	-0.224	0.049	1.000							
Suskil20	0.399	0.175	0.336	0.566	1.000						
Frfail20	0.790**	0.273	0.713**	0.105	0.266	1.000					
Suboan20	0.650*	0.182	0.552	-0.084	0.042	0.664*	1.000				
Babybu20	0.545	0.189	0.483	-0.140	-0.035	0.559	0.608*	1.000			
Estbbu20	-0.049	0.280	0.000	-0.126	0.140	-0.189	-0.049	0.252	1.000		
Anybus20	0.343	0.552	0.378	0.007	0.357	0.259	0.503	0.615*	0.706*	1.000	
TEA20	0.685*	0.301	0.643*	-0.056	0.070	0.643*	0.888**	0.867**	0.105	0.671*	1.000
TEA20tec	0.133	0.224	0.133	-0.629*	-0.147	0.231	0.357	-0.189	-0.070	-0.049	0.042
EB_20tec	-0.259	-0.287	-0.413	-0.399	-0.021	-0.245	0.021	-0.483	-0.161	-0.280	-0.315
EX20_RS1	0.381	0.249	0.459	-0.203	0.139	0.228	0.260	-0.157	-0.089	-0.025	0.053
EX20_RS2	0.301	0.266	0.420	-0.336	-0.175	-0.007	0.427	0.643*	0.503	0.608*	0.629*
EX20_RS3	0.077	0.217	0.119	0.133	0.203	-0.028	-0.035	0.070	-0.441	-0.056	0.091
EX20_RS5	0.193	0.301	0.378	-0.403	-0.007	0.193	0.095	0.098	0.238	0.088	0.070
EX20_RS11	-0.092	-0.606*	-0.085	0.338	0.204	-0.225	-0.430	-0.204	0.077	-0.331	-0.366
TEA20MOT	0.329	-0.210	-0.028	-0.126	0.007	0.182	0.203	0.608*	0.154	0.252	0.364
TEA20MOT2	-0.140	0.070	0.091	0.287	0.126	-0.028	-0.545	-0.133	-0.364	-0.364	-0.301
TEA20MOT3	0.601*	-0.189	0.427	0.336	0.462	0.252	0.056	0.147	-0.133	-0.042	0.126
TEA20MOT4	0.056	0.063	-0.049	0.294	0.280	0.091	-0.329	0.196	-0.245	-0.070	-0.035
EB_20MOT1	0.385	-0.105	0.098	-0.301	-0.119	0.343	0.182	0.685*	0.252	0.231	0.364
EB_20MOT2	0.140	0.070	0.343	0.524	0.378	0.189	-0.245	0.098	-0.315	-0.126	0.014
EB_20MOT3	0.427	0.035	0.140	0.483	0.713**	0.406	-0.084	0.119	-0.070	0.098	0.007
EB_20MOT4	0.182	0.105	0.084	0.098	0.035	0.231	-0.119	0.566	-0.028	0.133	0.252
EASYS20	-0.538	-0.594*	-0.727**	0.273	0.035	-0.636*	-0.531	-0.755**	0.042	-0.434	-0.741**
Fin. Literacy	-0.032	-0.110	-0.050	-0.507	-0.164	0.032	0.064	-0.174	0.452	-0.009	-0.137
Knowledge	-0.377	0.046	-0.215	-0.571	-0.406	-0.321	-0.106	-0.462	0.275	-0.159	-0.370
Behaviour	0.241	-0.077	0.155	-0.205	0.178	0.287	0.050	-0.064	0.442	0.055	-0.073
Attitude	0.023	-0.671*	-0.317	-0.257	-0.120	-0.212	0.234	0.115	0.193	0.000	0.120

Note: \* Correlation is significant at the 0.05; \*\* Correlation is significant at the 0.01 level.

Source: Own elaboration of authors.

Annex 3: Results of Spearman analysis II

	TEA20tec	EB_20tec	EX20_RS1	EX20_RS2	EX20_RS3	EX20_RS5	EX20_RS11	TEA20MOT1	TEA20MOT2	TEA20MOT3
Futsup20										
Disent20										
Exitct20										
Opport20										
Suskil20										
Frfail20										
Suboan20										
Babybu20										
Estbbu20										
Anybus20										
TEA20										
TEA20tec	1.000									
EB_20tec	0.720**	1.000								
EX20_RS1	0.452	0.132	1.000							
EX20_RS2	-0.091	-0.336	0.135	1.000						
EX20_RS3	-0.357	-0.259	0.192	0.070	1.000					
EX20_RS5	0.403	0.091	0.169	0.319	-0.179	1.000				
EX20_RS11	-0.331	-0.007	-0.290	-0.141	-0.380	0.116	1.000			
TEA20MOT	-0.231	-0.154	0.014	0.322	0.266	-0.224	-0.190	1.000		
TEA20MOT2	-0.497	-0.455	-0.228	-0.357	0.322	-0.259	0.310	-0.224	1.000	
TEA20MOT3	-0.273	-0.259	0.513	0.098	0.371	-0.210	0.204	0.490	0.182	1.000
TEA20MOT4	-0.524	-0.343	-0.541	-0.245	0.503	-0.151	0.056	0.280	0.594*	0.126
EB_20MOT1	-0.077	-0.203	-0.021	0.329	0.007	0.053	-0.113	0.902**	-0.189	0.350
EB_20MOT2	-0.594*	-0.559	-0.313	-0.161	0.357	-0.042	0.416	-0.231	0.839**	0.224
EB_20MOT3	-0.252	-0.147	-0.061	-0.364	0.322	-0.084	0.042	0.413	0.203	0.490
EB_20MOT4	-0.524	-0.531	-0.584*	0.098	0.336	-0.007	0.000	0.469	0.427	0.063
EASYS20	-0.014	0.517	-0.228	-0.510	-0.371	-0.214	0.465	-0.273	-0.154	-0.161
Fin. Literacy	0.653*	0.571	0.189	0.032	-0.799**	0.549	0.249	-0.155	-0.607*	-0.205
Knowledge	0.688*	0.554	0.296	0.011	-0.596*	0.433	0.007	-0.466	-0.448	-0.476
Behaviour	0.433	0.342	0.406	-0.032	-0.569	0.523	0.276	0.096	-0.510	0.205
Attitude	0.138	0.497	-0.188	0.262	-0.363	0.134	0.381	0.354	-0.681*	0.046

Note: \* Correlation is significant at the 0.05; \*\* Correlation is significant at the 0.01 level.

Source: Own elaboration of authors.

Annex 3: Results of Spearman analysis III

	TEA20MOT4	EB_20MOT1	EB_20MOT2	EB_20MOT3	EB_20MOT4	EASYSY20	Fin. Literacy	Knowledge	Behaviour	Attitude
Futsup20										
Disent20										
Exitct20										
Opport20										
Suskil20										
Frfail20										
Suboan20										
Babybu20										
Estibbu20										
Anybus20										
TEA20										
TEA20tec										
EB_20tec										
EX20_RS1										
EX20_RS2										
EX20_RS3										
EX20_RS5										
EX20_RS11										
TEA20MOT										
TEA20MOT2										
TEA20MOT3										
TEA20MOT4	1.000									
EB_20MOT1	0.245	1.000								
EB_20MOT2	0.643*	-0.217	1.000							
EB_20MOT3	0.671*	0.357	0.336	1.000						
EB_20MOT4	0.881**	0.538	0.517	0.503	1.000					
EASYSY20	-0.168	-0.378	-0.259	-0.035	-0.413	1.000				
Fin. Literacy	-0.676*	0.082	-0.584	-0.292	-0.516	0.301	1.000			
Knowledge	-0.758**	-0.286	-0.635*	-0.635*	-0.709**	0.353	0.830**	1.000		
Behaviour	-0.460	0.319	-0.415	0.159	-0.346	0.173	0.844**	0.499	1.000	
Attitude	-0.280	0.308	-0.437	-0.110	-0.143	0.432	0.476	0.240	0.341	1.000

Note: \* Correlation is significant at the 0.05; \*\* Correlation is significant at the 0.01 level.

Source: Own elaboration of authors.

**Annex 4: Significantly correlated variables of financial literacy and its components (Observations = 11)**

	Disent20	EB_20job	TEA20tec	EX20_RS3	TEA20MOT2	TEA20MOT4	EB_20MOT2
Disent20	1.000						
EB_20job	0.476	1.000					
TEA20tec	0.224	-0.077	1.000				
EX20_RS3	0.217	0.329	-0.357	1.000			
TEA20MOT2	0.070	0.594*	-0.497	0.322	1.000		
TEA20MOT4	0.063	0.294	-0.524	0.503	0.594*	1.000	
EB_20MOT2	0.070	0.476	-0.594*	0.357	0.839**	0.643*	1.000
EB_20MOT3	0.035	-0.035	-0.252	0.322	0.203	0.671*	0.336
EB_20MOT4	0.105	0.294	-0.524	0.336	0.427	0.881**	0.517
Fin. Literacy	-0.110	-0.466	0.653*	-0.799**	-0.607*	-0.676*	-0.584
Knowledge	0.046	-0.240	0.688*	-0.596*	-0.448	-0.758**	-0.635*
Behaviour	-0.077	-0.483	0.433	-0.569	-0.510	-0.460	-0.415
Attitude	-0.671*	-0.639*	0.138	-0.363	-0.681*	-0.280	-0.437

	EB_20MOT3	EB_20MOT4	Fin. Literacy	Knowledge	Behaviour	Attitude
Disent20						
EB_20job						
TEA20tec						
EX20_RS3						
TEA20MOT2						
TEA20MOT4						
EB_20MOT2						
EB_20MOT3	1.000					
EB_20MOT4	0.503	1.000				
Fin. Literacy	-0.292	-0.516	1.000			
Knowledge	-0.635*	-0.709**	0.830**	1.000		
Behaviour	0.159	-0.346	0.844**	0.499	1.000	
Attitude	-0.110	-0.143	0.476	0.240	0.341	1.000

Note: \* Correlation is significant at the 0.05; \*\* Correlation is significant at the 0.01 level.

Source: Own elaboration by authors.