



Lien **Vekemans**
Universiteit Hasselt
 lien.vekemans@uhasselt.be



Anneleen **Michiels**
Universiteit Hasselt



Jelle **Schepers**
Universiteit Hasselt

Entrepreneurial Financial Literacy

ABSTRACT

Given the high failure rate among SMEs, policymakers note that more time should be invested in improving financial literacy among entrepreneurs. However, there is a lack of clarity about how to define and measure financial literacy among entrepreneurs. This study takes a first step towards unravelling and measuring the concept of financial literacy among entrepreneurs by introducing Entrepreneurial Financial Literacy (EFL) as a distinct construct for the entrepreneurship domain and explore its underlying dimensions. We also address the issue of how to measure this construct and develop an EFL scale, which consists of 72 items.

Gezien het hoge falingspercentage van KMO's, merken beleidsmakers op dat meer tijd moet worden geïnvesteerd in de verbetering van de financiële basiskennis van ondernemers. Er bestaat echter een gebrek aan duidelijkheid over hoe financiële geletterdheid bij ondernemers kan worden gedefinieerd en gemeten. Deze studie zet een eerste stap in het ontrafelen en meten van het concept financiële geletterdheid bij ondernemers door Entrepreneurial Financial Literacy (EFL) te introduceren als een apart construct voor het ondernemerschap domein en de onderliggende dimensies ervan te onderzoeken. We gaan ook in op de vraag hoe we dit construct kunnen meten en ontwikkelen hiervoor een EFL-schaal, die bestaat uit 72 items.

Keywords: Financial literacy – SMEs – Entrepreneurs – Scale development

1. INTRODUCTION

Small and medium-sized enterprises (hereafter: SMEs) are of major importance for our society (Dahmen and Rodríguez, 2014, Nunoo and Andoh, 2011). They create jobs, drive innovation, increase competition and respond to changing economic trends (Green, 2013). However, a high failure rate remains among SMEs (Esubalew and Raghurama, 2020). The survival rate of new ventures after five years is less than 50 percent (Eurostat, 2020). Ten years after the start-up of the company, only ten percent of the companies remain in the market (Timmons and Spinelli, 2004).

According to Ropega (2011), one of the main reasons for this high failure rate is a lack of financial knowledge and poor management decisions. Managers of SMEs must make decisions regarding the acquisition, allocation, and use of resources. The quality of these decisions will be strongly influenced by the financial literacy of the entrepreneur. In general, financial literacy has been investigated in different contexts (e.g. consumer financial litera-

cy, or investors financial literacy) and refers to someone's ability to handle financial matters (Dahmen and Rodríguez, 2014, Rugimbana and Oseifuah, 2010, Wise, 2013). However, in the context of entrepreneurship, research is scattered and there is no consensus on a domain-specific definition and measure for financial literacy among entrepreneurs.

Despite the lack of a clear definition and measure for financial literacy in the context of entrepreneurship, research shows that entrepreneurs with limited financial knowledge are more likely to face financial difficulties (Adomako and Danso, 2014, Dahmen and Rodríguez, 2014), make ineffective decisions (Rugimbana and Oseifuah, 2010), and have more difficulties in growing their company (Ngeek, 2016). Furthermore, policymakers have already concluded that in both developed and developing countries, more time should be invested in improving the financial literacy of SME entrepreneurs. A good financial basis for the entrepreneur is an important driver for the success of the company (Sucuahi, 2013). In other words, improving financial literacy in SMEs can improve their perfor-

mance and eventually also the general economic growth and stability in a region (Dahmen and Rodríguez, 2014).

Taken together, given the importance of financial literacy for entrepreneurs in SMEs and for society in general, there is a need for a clear definition and measure. Existing literature does not yet offer a clear and consistent definition and scale for measuring the financial literacy of entrepreneurs. This definitional unclarity limits constructive progress in the entrepreneurship field as it leads to confusion and ambiguity. The aim of this study is to fill this gap by delineating the concept of Entrepreneurial Financial Literacy (EFL) and to develop an EFL scale.

The results of our study show that EFL consists of eight dimensions which can be further classified into three categories: accounting, finance, and mathematics. The accounting category consists of "Interpreting Financial Statements", "Operational Budgeting" and "Understanding and Managing Financial Risks". The Finance category consists of "Financial Analysis and Ratios", "Cash Management", "Capital Budgeting", and "Debt Management". Finally, the mathematics category consists of one dimension, namely "Mathematical Literacy". Based on a Delphi procedure, this article achieves content validity for our self-constructed EFL scale which consists of a questionnaire of 72 items.

This study contributes to the scientific literature by taking a first step towards developing the EFL concept and suggesting a scale that can measure entrepreneurs' financial literacy. Future research can build on our findings to further test the reliability and validity of our EFL measure in different large-scale samples. Once the EFL scale has been tested and validated in different contexts, this offers potential avenues for future research.

The remainder of this paper is as follows. The next section contains a literature review from which relevant EFL dimensions are distilled. This is followed by a section on scale development and content validation. In the final section, the findings and conclusions of the paper are discussed.

2. LITERATURE REVIEW

2.1. Methodology

The aim of this literature review is to delineate a conceptual definition of EFL based on current academic literature. Today, research in financial literacy of entrepreneurs is scattered, and a clear conceptual definition of EFL is lacking. A clear consistent definition improves the ability to effectively measure financial

literacy (Remund, 2010). Therefore, the final step of this literature review consists of identifying relevant dimensions that constitute the EFL concept.

The scientific databases ProQuest and ScienceDirect were used to search for relevant scientific articles on financial literacy in the context of entrepreneurship. Articles were retained when they empirically or conceptually examined the determinants of EFL, in other words: when they attempted to measure EFL. These articles were coded in three phases, as illustrated in Figure 1, similar to the method of Tabor and colleagues (2018). In first phase, an open-coding process was engaged by labelling each study with descriptive keywords that indicated its focus. The second phase consisted of axial coding (Strauss and Corbin, 1990) in which similar keywords were consolidated into eight categories: "Interpreting Financial Statements", "Operational Budgeting" and "Understanding and Managing Financial Risks", "Financial Analysis and Ratios", "Cash Management", "Capital Budgeting", and "Debt Management" and "Mathematical Literacy". The final phase of the coding process consisted of consolidating these eight categories into three broad themes: Accounting, Finance and Mathematics. These categories, and their underlying dimensions, will be the starting point for developing a definition of EFL and constructing the EFL measurement scale in the next sections.

2.2. Entrepreneurial Financial Literacy: Definition

To date, there is little consensus among academics and financial experts on how to define the concept of financial literacy as it is used in different contexts and for different purposes. For example, in 2011 the Organization for Economic Co-operation and Development defined financial literacy as "a combination of the awareness, knowledge, skills, attitudes, and behaviour required to make sound financial decisions". The United States Financial Literacy and Education Commission (2007), on the other hand, describes financial literacy as "the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being". Finally, the Australia and New Zealand banking group (ANZ) (2008) defines the concept as "the ability to make informed judgments and make effective decisions regarding the use and management of money".

Based on various conceptual definitions written between 2000 and 2010, Remund (2010) tried to describe a generally consistent definition by identifying five important components. First, financial literacy consists of knowledge about financial concepts. To manage money effectively, a basic knowledge of money must first be learned. In addition, financial literacy

Entrepreneurial Financial Literacy

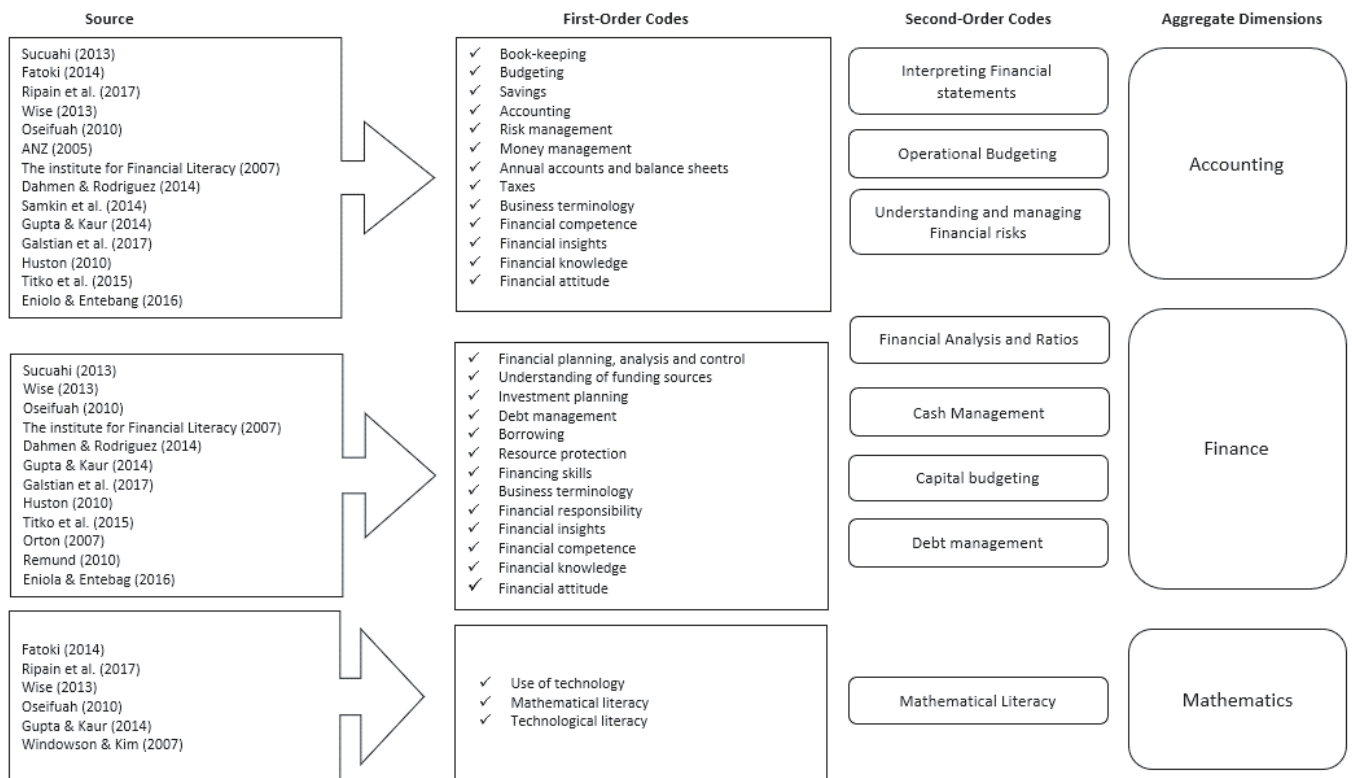


Figure 1. Conceptual model of EFL based on current literature

consists of the ability to communicate about financial literacy, the ability to manage personal finances, the confidence to plan effectively for future needs, and the skill to make effective financial decisions. Based on those components, Remund (2010) described a general and broad conceptual definition of financial literacy: "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).

Existing literature does not yet provide a clear definition of financial literacy that is specifically aimed at *entrepreneurs*. Since the financial crisis in 2008, financial literacy has become increasingly important in the entrepreneurship. Policymakers saw warning signs, such as a low savings rate, and took action to help consumers and entrepreneurs alike understand and adapt to the increasingly complex economy. For example, in 2006 the United States launched the very first national strategy to improve financial literacy among consumers and entrepreneurs. However, that strategy started without any clear definition of financial literacy and without a consistent way of measuring financial literacy. Academics and other organizations

conducting research used their own definitions and measures of understanding. Without consistency, academic progress and the ability to measure financial literacy effectively slows down. As a result, the design of financial education programs for consumers and entrepreneurs is less effective and efficient (Remund, 2010). Having a clear and consistent definition of EFL is thus considered important both for academics and practitioners. For that reason, based on current academic literature, this article attempts to propose a clear conceptual EFL definition:

Entrepreneurial Financial Literacy (EFL) is a combination of behaviour, attitude and knowledge that involves an entrepreneur's ability to manage the company's finances effectively and efficiently and requires insight in accounting, finance, and mathematics.

2.3. Entrepreneurial Financial Literacy: Dimensions

The conceptual definition of financial literacy, outlined above, refers to 3 categories: Accounting, Finance, and Mathematics (Remund, 2010). In what follows, this article will further explain these categories and elaborate on the 8 EFL dimensions.

2.3.1 Accounting

Interpreting Financial Statements. Financial statements, including annual reports and other accounting information, are among the most important sources of information for a company. Indeed, the information from financial statements can help companies manage short-term problems in certain areas such as costs, expenses, and cash flows by providing information to support monitoring and control (Mitchell *et al.*, 2000). In addition, the use of information from financial statements is also important in making strategic long-term plans. The information must therefore be interpreted correctly in order to make good decisions (Ismail and King, 2007).

In general, it has been found that financial statements help entrepreneurs to evaluate financial information and thus gain a better insight into many financial aspects and risk characteristics of their company (Carragher and Van Auken, 2013, Vanauken *et al.*, 2017). It is important that an entrepreneur is able to interpret these overviews and use them effectively to arrive at better decision-making (Van Auken, 2005).

However, small business owners often lack strong financial skills and may not fully understand the impact of their decisions. This is because decisions are taken without taking into account their financial impact, and this could lead to financial problems (Horngren *et al.*, 2015). In addition, entrepreneurs are generally optimistic about the financial potential of their company. This can lead to inaccurate assessments of potential profitability (Vanauken *et al.*, 2017). The consequence of both observations is a potential threat to the viability of the company (Timmons and Spinelli, 2004).

By contrast, entrepreneurs who are able to use and interpret financial statements and other financial statements efficiently can better evaluate and assess the impact of their decisions and available financial information. As a result, those entrepreneurs make better decisions (Breen *et al.*, 2004, Shields, 2010). If they come to better interpretations and use the information in the financial statements correctly, entrepreneurs can develop a more accurate perception of the situation and therefore make more informed decisions (Breen *et al.*, 2004).

It should be noted that the quality of the financial statements is extremely important. Several studies show that companies with inadequate accounting are more likely to fail (Lybaert, 1998, Mitchelmore and Rowley, 2013). Thus, there is a need for reliable accounting information generated by a suitable accounting system (Amoako, 2013). Timmons and Spinelli (2004) agree that accurate financial information is the basis for making good decisions.

Operational budgeting. Operational budgeting refers to planning expenses and analysing future cash flows. Budgets have two types of functions (Jacob, 2002). On the one hand, budgets are used as a tool to ensure that assets and debt are managed effectively. It can then be seen as a means of control (Bragg and Burton, 2006). On the other hand, budgets help in achieving higher profits or minimizing losses. A budget is then seen as a tool for planning future expenditures (Fatoki, 2014).

The importance of budgeting is confirmed by several researchers. According to Abdurahman *et al.* (2012), budgeting is an important factor for the growth of any business. After all, drawing up a budget offers the opportunity to translate business strategies into action plans for both the short and long term. They do this by highlighting areas where actual performance deviates from the budgeted performance so that appropriate corrective action can be taken (Akande and Oluwaseun, 2014). In addition, budgets help entrepreneurs to think long-term, rather than just drawing conclusions based on short-term daily activities that may not affect the company's competitiveness (Dima, 2013). Finally, budgets help identify factors that contribute the most to the profitability of the business. Through budgets, the entrepreneur can decide on how to improve profitability (Hill, 2015).

Derived from previous studies, it is of importance that entrepreneurs should be able to understand and use operational budgets to facilitate the decision-making process. In other words, being able to draw up and understand effective and realistic budgets has a significant positive impact on the success of the company (Sucuahi, 2013). Nevertheless, determined in previous literature, most SME entrepreneurs do not know how to properly use formal budgets in the decision-making process (Fatoki, 2014, Sucuahi, 2013). That could be one of the possible causes of small business failure (Warue and Wanjira, 2013).

Financial risk management: Understanding and managing risks. Risk management is important to all businesses, especially small and medium-sized enterprises that are particularly sensitive to business risk and competition (Blanc Alquier and Lagasse Tignol, 2006). This is because risk is seen as a problem that can impact the objectives of a business entity. This is because there is the possibility that both expected and unexpected events have a negative impact on the capital and on the profit of the company (Watkins, 2012).

This article focuses on financial risks. These are mainly caused by movements in financial markets and the changing attitude of the company towards individual financial instruments (Fetisovová, 2012). In other words, a financial risk refers to the possibility that cash flows from a business are not enough to

pay creditors and fulfil other financial responsibilities. Financial risks come in various forms. On the one hand, there are external forms of financial risk related to changes in the financial markets. This concerns risks related to exchange rates, interest rates, and raw material prices. On the other hand, there are sources of financial risk that arise from the internal environment of the company. This concerns financing risk, insolvency risk, and liquidity risk (Napp, 2011).

Misjudgements or failure to recognize financial risks that adversely affect company performance can lead to disastrous consequences ranging from customer loss to liability for damages. If a risk is not properly managed, it can lead to bankruptcy of the company (Hollman and Mohammad-Zadeh, 1984). For that reason, risk must not only be measured efficiently, but also managed effectively throughout the company (Gwangwava *et al.*, 2014). Also Iopev and Kwanum (2012) indicate that risk management is particularly important for the survival of small businesses. Risk management should focus on recognizing future uncertainties, weighing risks, and formulating plans to address these risks (Ntlhane, 1995). In this way, a company can benefit from calculated risks (Watson, 2004).

Risk management must be integrated into the existing management of the company. Risk management within a company must be comprehensible, even without the understanding of special knowledge of risk management. The entrepreneur plays an important role in this. They must be able to see and understand how the risk situation of the company works (Napp, 2011). In other words, it is important that the entrepreneur is aware of which risks are or are not acceptable and which risks must therefore be managed. An important means by which small and medium-sized enterprises can achieve this is the use of financial analysis. More specifically, it is stated that financial ratios are used as a simple approach to assess the company's overall risk (Napp, 2011). Financial analyses and ratios are discussed further in this article.

2.3.2 Finance

Financial analyses and ratios. The absolute figures in the book-keeping do not say much. However, it is difficult or even impossible to compare those absolute figures within and between companies. A financial analysis offers a solution for this and is seen as one of the most important functions of an organization. Based on the accounting information, each company must periodically perform financial analyses (Avakumovic and Avakumovic, 2016).

Financial analyses provide insight into the liquidity, solvency, and profitability of an organization. That insight makes an important contribution to making business decisions. Ratios are important in those financial analyses. These quantify the balance sheet position of economic entities in order to be able to assess the credibility of the financial position and the activities of the company. That type of analysis can help the entrepreneur analyse the financial health of a company. A ratio analysis consists of calculating different ratios, after which they are interpreted by the entrepreneur (Avakumovic and Avakumovic, 2016).

However, it is crucial for an entrepreneur to understand what financial ratios are considered important to his business. There is a large number of ratios, but not all of them are relevant. A meaningful ratio analysis therefore starts with a qualitative study of the strategy and policy of the company concerned. This research immediately indicates which of the ratios are relevant for the company to calculate (Avakumovic and Avakumovic, 2016).

One of the most important ratios according to Isberg (1998) is return on equity (ROE) because of the fact that a for-profit company exists to create wealth for its owner. The ROE indicates at what speed the equity capital increases. The ROE can be broken down into three components, namely *net profit margin*, *asset turnover* and *leverage multiplier*. This decomposition is also referred to as the DuPont ratio. The *net profit margin* is a profitability ratio that reflects the rate at which sales are converted into profit. It is calculated by dividing the net income of a given year by the sales of the same year. Second, *asset turnover* important because they indicate how well a company's assets are being used to generate sales. Profitability is an important metric, but it does not always provide the complete picture of how well a company delivers a product or service. In other words, a business can be very profitable, but not efficient. Therefore, the second component of the DuPont ratio consists of the *asset turnover ratio*. It measures the extent to which the company generates revenue with its total asset base and is calculated by dividing the sales of a given year by the average total assets. Finally, the *leverage multiplier* is calculated. It is a leverage ratio and measures the degree to which a company depends in its capital structure on debt financing. The *leverage multiplier* is calculated by dividing the average assets by the average equity (Isberg, 1998).

It is also important that the entrepreneur understands how to interpret the financial ratios. The calculated ratio must be compared. For this, the entrepreneur can use a time series analysis in which the company's own performance is used as a benchmark. In addition, one can opt for a cross-sectional analysis in

which external performance benchmarks are used for comparison purposes. In both ways, the entrepreneur tries to understand how to improve the business process (Isberg, 1998).

Also, according to the research by Thomas III and Evanson (1987), it is important that entrepreneurs can use the information they get from financial analyses to improve the efficiency and profitability of their operations. In this way, the entrepreneur may be able to prevent bankruptcy. Furthermore, (Dahmen and Rodríguez, 2014) affirm the importance of performing and understanding financial analysis. Their research aims that the success of a company depends on calculating and interpreting financial analyses. Respondents in financial difficulties did not use financial analyses. However, they admitted that they did not have the necessary knowledge for this (Dahmen and Rodríguez, 2014).

Capital budgeting. Capital budgeting is the process of analysing investment opportunities in assets that are expected to yield benefits for more than a year (Peterson and Fabozzi, 2002). In other words, it is a decision-making process by which a company evaluates the purchase of important fixed assets such as buildings, machinery, and equipment. It contains an economic analysis to determine the profit potential of each investment proposal. Most spending on long-lived assets affects the operations of a company. They are large and permanent liabilities that affect long-term flexibility and ability to earn returns (Gupta and Jain, 2016).

One of the most well-known rules regarding capital budgeting is the use of *net present value* (NPV). In that method, they use the future cash flows where they are discounted. When that value is greater than the initial cash outflows from the investment project, the NPV is considered positive. The investment project can then be carried out because it contributes to the maximization of the value of the company. In addition, many companies use the *internal rate of return* (IRR). The IRR is a percentage that equates the present value of future cash inflows with the present value of the capital expenditure. That percentage is compared to the company's cost of capital. If the IRR is greater than the cost of capital, the investment project is considered to contribute to shareholder value creation (Bennouna *et al.*, 2010).

However, small businesses are more likely to use the *pay-back period* (PB) method, which is convenient but less sophisticated (Danielson and Scott, 2006). The method uses a predetermined period during which the initial investment must be paid back. The entrepreneur then calculates the number of years required to recoup the investment amount on the basis of future cash flows. Based on this calculation, it is checked whether the investment can be earned back in the predetermined time

span. Despite its ease of use, the PB method has a number of shortcomings. However, it ignores the time value of money and cash flows beyond the specified period. Furthermore, the set period is often determined arbitrarily without further reasoning (Graham and Harvey, 2002).

Egbide *et al.* (2013) confirm the importance of capital budgeting. According to the researchers, decisions about capital investments have a significant impact on the speed and direction of growth of the company. A wrong investment decision or over-investment could adversely affect the value of the company, making the company less competitive. In other words, it is important for an entrepreneur to be aware of how to do capital budgeting, which method is the most optimal, and why capital budgeting is important to make effective decisions.

Cash management. Cash management involves planning and controlling cash flows in and out of the enterprise, cash flows within the organization, and cash balances held by an enterprise at a particular point in time (Pandey, 2004). While common wisdom suggests that holding cash is an inefficient management choice, many companies appear to be building cash reserves to support the growth process and business development. Holding cash therefore has some advantages. Indeed, companies with a large amount of cash can finance potential investment opportunities when they arise. In addition, the possession of cash acts as a buffer against possible negative shocks in the future. However, it helps to maintain financial flexibility and take advantage of growth opportunities. This is especially important when companies have great uncertainty about growth opportunities and future transactions. Shortage of cash can lead to bankruptcy. Finally, small and medium-sized companies have to deal with asymmetric information and information coverage when seeking financing (Berger and Udell, 1998). The use of cash reduces the sensitivity to limited access to external capital markets (La Rocca *et al.*, 2019).

Moreover, holding cash resources can also have negative consequences. This is because it entails an opportunity cost equal to the return that could have been earned if the cash were invested or used for production (Hamza *et al.*, 2015).

Cash management consists of a number of facets. First, an entrepreneur should be aware of the pros and cons of cash. Efficient cash management refers to determining the optimal cash level to be held. This is done by weighing the opportunity cost of having too much cash and the trading costs of holding too little cash (Ross *et al.*, 2007). In addition, there is a great need for careful planning and monitoring of a company's cash flows over time to maintain the optimal level of cash (Hamza *et al.*, 2015). Finally, an entrepreneur must take into account the *"runway"* of the company. That term refers to the number

Entrepreneurial Financial Literacy

of months a company has left until the company runs out of cash. By carefully monitoring the *runway*, the company can look for additional external financing in time and thus try to avoid the risk of bankruptcy (Alemany and Andreoli, 2018).

Several studies recognize the importance of determining the optimal cash level. For example, the study by Grablowsky and Rowell (1980) finds that ineffective cash management contributes to the failure of small and medium-sized enterprises. Furthermore, the study by Hamza *et al.* (2015) aims that poor management of cash flows can lead to difficulties in obtaining funds.

Debt management. Knowledge related to debt is another aspect of financial literacy. The lack of proprietary resources in small and medium businesses makes debt financing an inevitable part of a total amount of capital that will be used in business (Kozubíková *et al.*, 2017). Debt literacy refers to the ability to make simple decisions related to debt contracts (Lusardi and Tufano, 2009).

First, it is known in the literature that loans can reduce a company's total capital cost as a result of the *interest tax shield*. However, that positive effect is diminished because debt financing is riskier than equity. As a result, it entails certain negative consequences. Thus, the cost of capital of the company's equity will rise. In other words, the choice with regard to the capital structure of the company will have an effect on the value of the company (Abor, 2007).

It is therefore important that entrepreneurs are aware of the advantages and disadvantages of using loans (Kozubíková *et al.*, 2017). The research by Osei-Assibey (2010) found that most micro-enterprises are illiterate with regard to corporate financing. Unbeknownst to entrepreneurs, their debts are getting bigger because of interest and high indebtedness. That can lead to the downfall of their company. In other words, it is argued that financial knowledge is one of the main determinants of a capital structure that enables growth and development of a company (Kozubíková *et al.*, 2017).

In addition, knowledge about different financing sources is an important factor. Companies that do not have a large number of financing sources should look for alternatives. The importance of non-traditional financing is gaining recognition in both developed and emerging economies. However, financing of SMEs in Europe remains mainly bank-based, despite the many policy measures proposed to develop alternative financing instruments (Rupeika-Apoga and Danovi, 2015). However, researcher Fatoki (2014) claims that small business operators are unaware of the existence of alternative financing sources, such as venture capitalists and *business angels*. According to the research by Rupeika-Apoga and Danovi (2015), the share

of alternative financing resources that was attracted was also considerably small. However, alternative financing offers the possibility of obtaining financial resources that companies would not have obtained in the case of traditional bank financing. In other words, it offers companies additional opportunities to develop certain activities (Baeck *et al.*, 2014).

2.3.3 Mathematics

Mathematical Literacy. Several studies confirm that mathematical literacy is an important aspect of financial literacy (Rugimbana and Oseifuah, 2010, Wise, 2013). More than half of the decisions made in a small or medium-sized company consist of mathematical reasoning (Taylor, 2008). A common synonym of mathematical literacy is quantitative literacy. The concept refers to the ability to reason and solve quantitative problems from a wide variety of authentic contexts and everyday situations (Dahmen and Rodríguez, 2014).

Entrepreneurs must have a sufficient level of quantitative literacy to make calculated decisions in an increasingly complex, information-oriented, knowledge-based world (McClure and Sircar, 2008). The math skills applied in an enterprise are different from the mathematics taught in educational institutions (Rosen *et al.*, 2003). Chrisman *et al.* (2013) refer to the term "business mathematics". That is math used by commercial enterprises to record and manage business activities. Most of the math problems faced by an entrepreneur in a small or medium-sized business involve applications of what is commonly referred to as a basic calculation. These consist of the addition, subtraction, multiplication and division of certain numbers (Rosen *et al.*, 2003). Entrepreneurs use mathematics in accounting, inventory management, marketing, sales forecasting, and financial analysis (Chrisman *et al.*, 2013).

In addition to business mathematics, quantitative literacy for entrepreneurs consists of actuarial arithmetic (Lusardi and Wallace, 2013) and statistics (Taylor, 2008). Calculating interest rates is considered important in determining future cash outflows and debt level. Furthermore, entrepreneurs need statistics skills to understand the mass of data collected in today's automated business environment. However, it is not enough to copy numbers obtained by computerized programs without some critical examination of the credibility of those numbers (Bajpai, 2009, Taylor, 2008).

According to the authors, dimensions discussed in previous sections inevitably require mathematical applications. However, while no research shows the direct link between quantitative literacy and enterprise performance, there are some studies that find that mathematics in education programs has

a positive effect on the financial knowledge of potential future entrepreneurs (Chrisman *et al.*, 2013, Dowse and Gearing, 1958, Raehsler *et al.*, 2012).

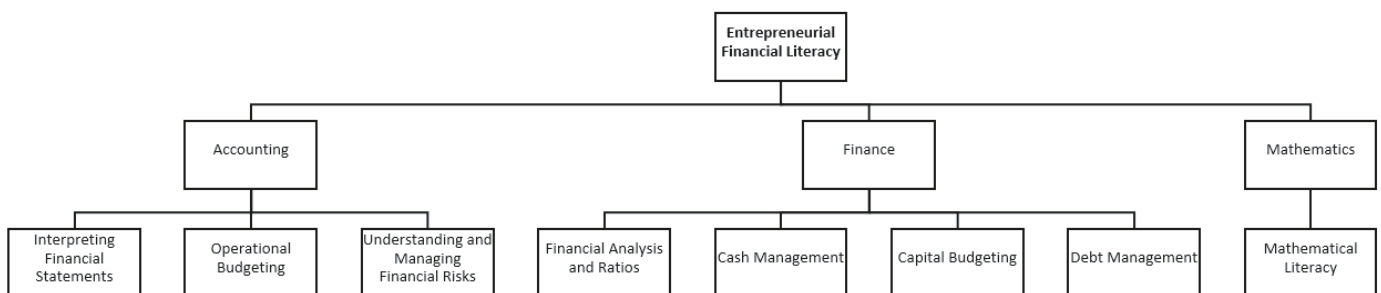
3. SCALE DEVELOPMENT

The next step in our study is to develop a scale to measure EFL that can serve as a basis for future research. This section provides an overview of the various steps that have been taken to provide content validity for our self-constructed EFL scale.

3.1. Item generation

Based on the literature study on financial literacy among entrepreneurs, EFL was coded into three broad categories (accounting, finance and mathematics). Each time, these categories were further subdivided into relevant dimensions based on the abovementioned literature review. Figure 2 provides a visual overview of the 8 EFL dimensions identified in the literature review.

Figure 2. Structure of literature study



Following the method employed by Potrich *et al.* (2016), a behavioural, attitudinal, and knowledge component is included in each of the EFL dimensions. Based on the literature study, a first provisional EFL scale is drawn up by means of a questionnaire with 73 questions.

3.2. Content Validation: In-depth Interviews

The preliminary questionnaire, which was based on the abovementioned literature review, must be validated. In a first step, this article organises in-depth interviews with several experts. The choice of the right experts is essential. Therefore, a first important step in the entire process consists of selecting suitable experts. In academic literature no consensus exists on the exact criteria to include respondents as experts. Participants are considered appropriate if they have a related background and experience on the target topic. Furthermore, it is

required that the participants are highly educated and have sufficient knowledge of the subject (Hsu and Sandford, 2007).

To this end, potential experts on EFL were screened based on their professional background, specific trainings they followed, and their current job. Multiple in-depth interviews were performed with four experts, who were mainly active in the services industry (accounting, advising) with a specific focus on entrepreneurs. They were therefore considered to be excellent candidates for the expert panel. Based on the results of the interviews with the expert panel, some adjustments were made to the questionnaire. For example, items were dropped when unanimously considered irrelevant, and certain items were rewritten, and new items added.

3.3. Content Validation: Delphi Procedure

In a second step, a Delphi procedure is used to validate the content of our EFL scale. In this method, a different panel of four other experts than the previous round- all experienced professionals in the area of business and finance - was asked

to assess the content of the questionnaire. The procedure is regarded as a group communication process that focuses on conducting research and consultation on a specific topic. Its purpose is to collect information from various experts who, after their consent, participate in the study. In this way, it is checked whether the questionnaire covers the entire knowledge area of financial literacy (Powell, 2003).

The scale was sent to each expert, with the request to judge the relevance and clarity of each item on the basis of a 4-point Likert scale (1 = not relevant at all, 2 = only relevant if question is reformulated, 3 = relevant but minor adjustment needed, 4 = very relevant).

The final assessment of each item is based on the Content Validity Index (CVI). To calculate the CVI, a ratio is made between the number of experts who agree (score 3-4) with the total number of experts. The standard set by researcher Lynn

Entrepreneurial Financial Literacy

(1986) is a CVI of at least 0.83. This means that all participating experts must agree with the relevance of the item. When an item reaches a CVI of at least 0.70, but is less than 0.83, the item is kept and adjusted (Rodrigues *et al.*, 2017, Yaghmaei, 2003, Yousefi, 2017, Zamanzadeh *et al.*, 2015).

S-CVI relates to the substantive validation of the scale as a whole. There are two methods of calculating the S-CVI. A first method calculates what percentage of items are unanimously considered relevant (S-CVI / UA). In addition, the scale is tested in its entirety by calculating the average of the sum of the CVIs per item (S-CVI / AVE). For excellent content validity, a minimum S-CVI / AVE of 0.90 and S-CVI / UA of 0.80 is required (Rodrigues *et al.*, 2017).

3.3.1. First round

The results after the first round are processed by means of the *Content Validity Index* (CVI). This shows that 9 questions should be deleted, and 24 questions should be rewritten. The scale achieves an S-CVI / AVE of 0.84 and an S-CVI / UA of 0.50 after the first round. However, these figures do not yet meet the minimum standards required, being 0.90 for S-CVI / AVE and 0.80 for S-CVI / UA (Rodrigues *et al.*, 2017).

Table I. Coverage ratio per dimensions

PANEL A – First round	
Dimension	Average
Interpreting Financial Statements	6.75
Operational budgeting	8.00
Understand and manage financial risks	7.75
Financial analyses and ratios	8.00
Cash management	8.25
Capital budgeting	8.00
Debt management	7.00
Mathematical Literacy	7.50

PANEL B – Second round

Dimension	Average
Interpreting Financial Statements	8.50
Operational budgeting	9.00
Understand and manage financial risks	9.00
Financial analyses and ratios	9.00
Cash management	8.00
Capital budgeting	8.50
Debt management	8.50
Mathematical Literacy	6.50

PANEL C – Third round

Dimension	Average
Interpreting Financial Statements	8.50
Operational budgeting	8.50
Understand and manage financial risks	8.50
Financial analyses and ratios	9.00
Cash management	9.00
Capital budgeting	8.50
Debt management	8.50
Mathematical Literacy	8.00

Based on the current items in the scale, experts were additionally asked to indicate a coverage ratio on a scale from one to ten. Table I, Panel A, shows an average score, indicating that not every dimension is sufficiently covered by the included items according to the experts. Consequently, new items must be added. Overall, 17 new questions were added. This resulted in a revised EFL scale consisting of 74 questions.

3.3.2. Second round

Based on the results from the second round, five questions were deleted from the scale. Twenty questions have been rewritten through additional comments and suggestions regarding the clarity of the question. The S-CVI / AVE and S-CVI / UA are 0.97 and 0.95, respectively in the second round. At this stage, the minimum standard for both indices was achieved (Rodrigues *et al.*, 2017). Again, experts were asked to indicate on a scale from 1 to 10 to what extent the questions for each dimension cover EFL. The results can be found in Table 1, Panel B. Due to the deletion of some items, and the addition of new items, the adjusted scale consists of a questionnaire of 73 questions after the second round.

3.3.3. Third round

The results regarding the relevance and clarity of the questions show that one question should be deleted, and five questions rewritten. The content validity of the entire scale is set at an S-CVI / AVE of 0.99 and an S-CVI / UA of 0.96. Both measures meet the established minimum standards (Rodrigues *et al.*, 2017). The ultimate coverage ratio per dimension of the scale is shown in Table 1, Panel C. This article concludes that after following the Delphi procedure, a reasonable degree of consensus has been reached after the third round. The final EFL scale consists of a questionnaire of 72 questions, divided into eight dimensions. Each dimension consists of a behavioural,

attitudinal and knowledge component. To model financial *attitude*, a 5-point Likert scale (1 = totally disagree, 5 = totally agree) is used. The purpose of this scale is to determine how entrepreneurs evaluate financial aspects in the company. Accordingly, the higher the score, the better the entrepreneur's financial attitude (Potrich *et al.*, 2016). Financial *behaviour* is also measured on the basis of a 5-point Likert scale (1 = never, 5 = always). The purpose of that scale is to determine how entrepreneurs deal with the financial aspects of the company. High scores indicate good financial behaviour (Potrich *et al.*, 2016). The financial *knowledge* of an entrepreneur is estimated on the basis of multiple-choice questions. Each correct answer represents a score of 1 point. In contrast, every wrong answer is awarded zero points (Potrich *et al.*, 2016). The full EFL questionnaire is included in Appendix.

4. DISCUSSION AND CONCLUSIONS

4.1. Discussion

Increasing attention is being put on improving financial literacy among small and medium-sized entrepreneurs (Dahmen and Rodríguez, 2014). Several studies have established a positive relationship between the entrepreneur's financial literacy and the success of his business (Sucuahi, 2013). However, the survival rate remains low, especially in SMEs (Fritsch and Weyh, 2006), where the owner-manager himself often has

sole responsibility for managing the firm's finances. According to Ropega (2011), one of the main reasons for the low survival rate of SMEs is a lack of financial knowledge and poor management decisions. However, existing literature does not yet offer a consistent definition and scale that measures financial literacy in entrepreneurs. In addition, studies make use of different interpretations, dimensions, and terminology, which hampers progressive insight into the important domain of financial literacy in entrepreneurship. This article aims to fill this gap by taking the first step in developing the Entrepreneurial Financial Literacy (EFL) concept and suggests a 72-item scale to measure the EFL concept.

Building on existing literature and a Delphi procedure with an expert panel, results indicate that the EFL construct consist of eight dimensions that can be divided into three different categories: accounting, finance and mathematics. Each dimension contains a behavioural-, attitudinal-, and knowledge component, for which items were generated based on academic literature followed by a Delphi procedure. According to the experts, no additional dimensions were suggested on top of those already identified in the literature (i.e., accounting, finance, mathematics). In the scale development process, however, it turned out that certain items were not confirmed by the experts. Those items were eliminated from the scale. Experts agreed that certain issues described in the literature are too far-reaching, irrelevant and not directly linked to the specific context of EFL, such as for example the use and calculation of

Figure 3. EFL Construct and Scale Composition

Entrepreneurial Financial Literacy (EFL) scale								
Accounting			Finance				Mathematics	
D1: Interpreting financial statements	D2: Operational budgeting	D3: Financial risk management	D4: Financial analysis & ratios	D5: Cash Management	D6: Capital Budgeting	D7: Debt Management	D8: Mathematical Literacy	
3 items	3 items	3 items	5 items	3 items	3 items	4 items	1 items	Behavioral Component
2 items	3 items	3 items	5 items	3 items	3 items	4 items	/	Attitudinal Component
4 items	3 items	1 items	5 items	3 items	3 items	4 items	1 items	Knowledge Component

ROE based on the DuPont ratio. The items concerning the attitudinal component of Mathematics have also been dropped in the process. In addition, some items were not yet discussed in the literature and have been added by the expert panel which might be an indication that existing literature on financial literacy in entrepreneurship was not only scattered but also lacking a good proxy for EFL. Figure 3 represents a visual overview of the EFL construct and shows how the proposed EFL scale is composed. A full overview of the 72 items can be found in Appendix.

4.2. Limitations and Recommendations for Further Research

The most important recommendation for future research arising from this study is that the EFL scale should be further tested. Various tests can be carried out on the basis of large-scale samples consisting of entrepreneurs. Although the 72 items proposed in Appendix are based on prior research and have passed our Delphi procedure, they still need to be tested on a large scale and to pass standard psychometric procedures (e.g., exploratory and confirmatory factor analyses) to verify the proposed content structure of EFL and ensure the items' internal consistency and interrater reliability. This is an important issue for future research since psychometrically sound constructs, and measures are essential to the credibility and academic progress of financial literacy in the entrepreneurship domain (Crook *et al.*, 2010). Surveys are an appropriate tool for future researchers to collect data and test the reliability and validity of the proposed EFL scale.

After the psychometric properties of the EFL scale have been tested, there is abundant room for several future research questions which can be empirically tested. First, existing literature emphasizes the importance of effective financial education programs. Drexler *et al.* (2014), for example, concluded that training to improve financial knowledge could have a positive effect on management decisions and financial reports of small businesses. Governments and private organizations also recognized the importance of these financial education programs and are investing significant amounts of money in them. However, there is little empirical evidence about which education programs are effective and for whom they can be useful (Bruhn and Zia, 2011). On the basis of the developed EFL scale, the effectiveness of specific financial education programs can be assessed. This can be achieved, for example, by a study based on a control group and a test group.

The socio-economic function of SMEs is well known in both developed and developing countries. However, in recent times several countries have become increasingly concerned

about the level of financial literacy of entrepreneurs (Eniola and Entebang, 2016). The results of Dahmen and Rodríguez (2014) showed that the surveyed small businesses, with an entrepreneur with limited financial knowledge, are more likely to face financial difficulties. On the basis of the developed EFL scale, the relationship between an entrepreneur's financial literacy and the performance of the enterprise can be investigated in different contexts. Finally, Atkinson (2014) confirms that financial literacy is seen as a common problem that small business entrepreneurs struggle with when starting their business. By means of the developed EFL scale, future research can investigate the relationship between financial literacy of the entrepreneur and the success rate of the start-up.

4.3. Theoretical and Practical Implications

In extant literature, a considerable number of articles have been written about the importance and the different dimensions of financial literacy in entrepreneurs (Rugimbana and Oseifuah, 2010, Sucuahi, 2013, Wise, 2013). However, existing literature on financial literacy among entrepreneurs is quite dispersed as no consistent definition exists, and a domain-specific scale that measures financial literacy in entrepreneurs is lacking. This article takes a first step towards providing definitional clarity and consequently develops a financial literacy scale which is specifically developed for the entrepreneurship domain. In addition to academic contributions, the article also has some important practical implications. First, the EFL scale developed in this paper can be an efficient resource for small business consultants. It allows them to optimize their services for small business entrepreneurs by responding to specific aspects of EFL (e.g., accounting, finance, or mathematics) where the target person scores less well. Also, for policymakers, the EFL scale can help establish effective and targeted financial education programs for entrepreneurs and potential/nascent entrepreneurs. In addition, the EFL scale can also be an important self-assessment tool for small business entrepreneurs. By means of the scale, they are able to determine in which areas they need additional training or should be assisted by an expert.

4.4. Conclusion

This article contributes to the research domain of financial literacy in the domain of entrepreneurship. This has received increasing attention since the financial crisis because of the impact of SMEs on society (Dahmen and Rodríguez, 2014). These companies contribute to economic growth through a combination of various factors. They create jobs, drive innovation and increase competition (Green, 2013, Wong *et al.*, 2005). Howev-

er, a high failure rate still remains among these companies. This could possibly be due to insufficient financial literacy of the owning-entrepreneurs (Dahmen and Rodríguez, 2014, Rugimbana and Oseifuah, 2010). For this reason, researchers started focussing on financial literacy among entrepreneurs. Since there is no consistent definition of financial literacy in the domain of entrepreneurship, the aim of this study was to unravel EFL and explore its underlying dimensions. Consequently, a preliminary EFL scale was developed by means of a thorough literature review followed by a 3-step Delphi procedure.

The final scale consists of a questionnaire with 72 items, divided into eight dimensions. Those dimensions are further classified into three categories: accounting, finance, and mathematics. The first category, accounting, consists of "Interpreting Financial Statements", "Operational Budgeting" and "Understanding and Managing Financial Risk". The second category, finance consists of "Financial Analysis and Ratios", "Cash Management", "Capital Budgeting", and "Debt Management". The third category, mathematics, consists of one dimension, namely "Mathematical Literacy". Recommended by the Organization for Economic Co-operation and Development and Potrich *et al.* (2016), the items in our scale are a mix of attitudes, behaviours, and knowledge as it is inadequate to measure only one of these aspects.

BIOGRAPHY

Lien Vekemans is currently working on a PhD project at the Research Center for Entrepreneurship and Family Firms at Hasselt University. Her research focuses on bank financing in a family firm context. More specifically, she investigates how certain family firm-specific characteristics affect the evaluation process of credit loan officers. She can be reached at lien.vekemans@uhasselt.be.

Anneleen Michiels, PhD is Associate Professor of Finance and Family Business at the Research Center for Entrepreneurship and Family firms at Hasselt University, Belgium. Her research focuses on the influence of money on the family business and the business family and is published in academic as well as practitioner-oriented journals. She can be reached at anneleen.michiels@uhasselt.be.

Jelle Schepers, PhD is an Assistant Professor at the Research Center for Entrepreneurship and Family Firms at Hasselt University (Belgium). His research focuses on strategic entrepreneurship in family firms, startups and growth-oriented firms. Contact: jelle.schepers@uhasselt.be.

REFERENCES

- Abdurahman, M. R. Addinall, J. Daniels, N. English, L. Green, J. Shade, Z. and Bruwer, J.-P. (2012), "Utilisation of budgets in clothing small medium and micro enterprises (SMMEs) within the Cape Metropole", *African Journal of Business Management*, Vol. 6 No. 25, pp. 7529-7532.
- Abor, J. (2007), "Debt policy and performance of SMEs: Evidence from Ghanaian and South African firms", *The Journal of Risk Finance Incorporating Balance Sheet*, Vol. 8 No. 4, pp. 364-379.
- Adomako, S. and Danso, A. (2014), "Financial Literacy and Firm performance The moderating role of financial capital availability and resource flexibility".
- Akande, O. and Oluwaseun, Y. (2014), "Influence of budgeting system on Entrepreneurial Business performance: perspective of Small business Owner in Lagos state Nigeria", *IOSR Journal of Business and Management*, Vol. 16 No. 6, pp. 58-64.
- Aleman, L. and Andreoli, J. J. 2018. *Entrepreneurial finance: the art and science of growing ventures*, Cambridge University Press.
- Amoako, G. K. (2013), "Accounting practices of SMEs: A case study of Kumasi Metropolis in Ghana", *International Journal of Business and Management*, Vol. 8 No. 24, pp. 73.
- Avakumovic, J. and Avakumovic, J. (2016), "Method Financial Analysis and Impact on the Quality of Decision Making", *EuroEconomica*, Vol. 35 No. 2.
- Baeck, P. Collins, L. and Zhang, B. (2014), "Understanding alternative finance", *The UK alternative finance industry report*, Vol. 2014.
- Bajpai, N. 2009. *Business statistics*, Pearson Education India.
- Bank, A. (2008), "ANZ survey of adult financial literacy in Australia", Available at: [Accessed 21 March 2011].
- Bennouna, K. Meredith, G. G. and Marchant, T. (2010), "Improved capital budgeting decision making: evidence from Canada", *Management decision*.
- Berger, A. N. and Udell, G. F. (1998), "The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle", *Journal of banking & finance*, Vol. 22 No. 6-8, pp. 613-673.
- Blanc Alquier, A. and Lagasse Tignol, M. (2006), "Risk management in small-and medium-sized enterprises", *Production Planning & Control*, Vol. 17 No. 3, pp. 273-282.
- Bragg, S. M. and Burton, E. 2006. *Accounting and finance for your small business*, John Wiley & Sons.
- Breen, J. Sciulli, N. and Calvert, C. (2004), "The role of the external accountant in small firms", *Small Enterprise Research*, Vol. 12 No. 1, pp. 5-14.
- Bruhn, M. and Zia, B. (2011), "The impact of business and financial literacy training for young entrepreneurs in Bosnia-Herzegovina".

- Carraher, S. and Van Auken, H. (2013), "The use of financial statements for decision making by small firms", *Journal of Small Business & Entrepreneurship*, Vol. 26 No. 3, pp. 323-336.
- Chrisman, J. J., Sharma, P., Steier, L. P. and Chua, J. H. (2013), "The influence of family goals, governance, and resources on firm outcomes", *Entrepreneurship Theory and Practice*, Vol. 37 No. 6, pp. 1249-1261.
- Crook, T. R., Shook, C. L., Morris, M. L. and Madden, T. M. (2010), "Are we there yet? An assessment of research design and construct measurement practices in entrepreneurship research", *Organizational Research Methods*, Vol. 13 No. 1, pp. 192-206.
- Dahmen, P. and Rodríguez, E. (2014), "Financial Literacy and the Success of Small Businesses: An Observation from a Small Business Development Center", *Numeracy: Advancing Education in Quantitative Literacy*, Vol. 7 No. 1.
- Danielson, M. G. and Scott, J. A. (2006), "The capital budgeting decisions of small businesses", *Journal of Applied Finance*, Vol. 16 No. 2.
- Dima, I. (2013), "Industrial Production Management in Flexible Manufacturing Systems/Dima Ioan Constantin", *Hershey: IGI Global*.
- Dowse, R. and Gearing, H. (1958), "Mathematics in Business", *The Computer Journal*, Vol. 1 No. 1, pp. 22-24.
- Drexler, A., Fischer, G. and Schoar, A. (2014), "Keeping it simple: Financial literacy and rules of thumb", *American Economic Journal: Applied Economics*, Vol. 6 No. 2, pp. 1-31.
- Egbide, B.-C., Agbude, G. A. and Uwuigbe, U. (2013), "Capital budgeting, government policies and the performance of SMEs in Nigeria: a hypothetical case analysis", *IFE Psychologia: An international journal*, Vol. 21 No. 1, pp. 55-73.
- Eniola, A. A. and Entebang, H. (2016), "Financial literacy and SME firm performance", *International Journal of Research Studies in Management*, Vol. 5 No. 1, pp. 31-43.
- Esubalew, A. A. and Raghurama, A. (2020), "The mediating effect of entrepreneurs' competency on the relationship between Bank finance and performance of micro, small, and medium enterprises (MSMEs)", *European Research on Management and Business Economics*.
- Eurostat 2020. Business Demography Statistics.
- Fatoki, O. (2014), "The financial literacy of micro entrepreneurs in South Africa", *Journal of social sciences*, Vol. 40 No. 2, pp. 151-158.
- Fetisovová, E. (2012), "Actual problems of small medium enterprise finance", *Bratislava: Ekonóm*.
- Fritsch, M. and Weyh, A. (2006), "How large are the direct employment effects of new businesses? An empirical investigation for West Germany", *Small Business Economics*, Vol. 27 No. 2-3, pp. 245-260.
- Grablowsky, B. J. and Rowell, D. R. (1980), "SMALL BUSINESS FINANCIAL MANAGEMENT THEORY VS. PRACTISE", *Financial Review*, Vol. 15 No. 4, pp. 39-39.
- Graham, J. and Harvey, C. (2002), "How do CFOs make capital budgeting and capital structure decisions?", *Journal of applied corporate finance*, Vol. 15 No. 1, pp. 8-23.
- Green, F. (2013), "Youth entrepreneurship", *Background paper for the OECD Centre for Entrepreneurship, SMEs and Local Development, Paris*.
- Gupta, K. and Jain, V. (2016), "Capital budgeting practices in SME'S: A study of selected enterprises of Haryana", *International Journal of Commerce and Management Research*, Vol. 2 No. 2, pp. 75-79.
- Gwangwava, E., Manuere, F., Kudakwashe, G., Tough, C. and Rangarirai, F. (2014), "An assessment of risk management practices in SMEs in Zimbabwe: A review and synthesis", *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, Vol. 19 No. 8, pp. 06-14.
- Hamza, K., Mutala, Z. and Antwi, S. K. (2015), "Cash management practices and financial performance of small and medium enterprises (SMEs) in the northern region of Ghana", *International Journal of Economics, Commerce and Management*, Vol. 3 No. 7, pp. 456-480.
- Hill, B. (2015), "How can a budget facilitate communication within an organization".
- Hollman, K. W. and Mohammad-Zadeh, S. (1984), "Risk management in small business", *Journal of Small Business Management*, Vol. 22 No. 1, pp. 7-55.
- Hornigren, C. T., Datar, S. M. and Rajan, M. V. (2015), *Cost accounting: A managerial emphasis*.
- Hsu, C.-C. and Sandford, B. A. (2007), "Minimizing non-response in the Delphi process: How to respond to non-response", *Practical Assessment, Research, and Evaluation*, Vol. 12 No. 1, pp. 17.
- Ilopev, L. and Kwanum, I. (2012), "An assessment of risk management of small and medium scale enterprises in Nigeria", *Research Journal of Finance and Accounting*, Vol. 3 No. 5, pp. 151-159.
- Isberg, S. C. (1998), "Financial analysis with the DuPont ratio: A useful compass", *The credit and Financial Management review*, Vol. 2 No. 3, pp. 11-21.
- Ismail, N. A. and King, M. (2007), "Factors influencing the alignment of accounting information systems in small and medium sized Malaysian manufacturing firms", *Journal of Information Systems and Small Business*, Vol. 1 No. 1-2, pp. 1-20.
- Jacob, K. (2002), *Evaluating your financial literacy program: A practical guide*, Woodstock Institute.
- Kozubíková, L., Klička, R. and Maňák, D. (2017), "Debt Characteristics Knowledge of Entrepreneurs in the SME Sector of the Czech Republic", *ACC Journal*.
- La Rocca, M., Staglianò, R., La Rocca, T., Cariola, A. and Skatova, E. (2019), "Cash holdings and SME performance in Europe: the role of firm-specific and macroeconomic moderators", *Small Business Economics*, Vol. 53 No. 4, pp. 1051-1078.

- Lusardi, A. and Tufano, P. 2009. Debt literacy, financial experiences, and overindebtedness. National Bureau of Economic Research.
- Lusardi, A. and Wallace, D. (2013), "Financial literacy and quantitative reasoning in the high school and college classroom", *Numeracy*, Vol. 6 No. 2, pp. 1.
- Lybaert, N. (1998), "The information use in a SME: its importance and some elements of influence", *Small business economics*, Vol. 10 No. 2, pp. 171-191.
- Lynn, M. R. (1986), "Determination and quantification of content validity", *Nursing research*.
- McClure, R. and Sircar, S. (2008), "Quantitative literacy for undergraduate business students in the 21st century", *Journal of Education for Business*, Vol. 83 No. 6, pp. 369-374.
- Mitchell, F.Reid, G. C. and Smith, J. A. 2000. *Information system development in the small firm: The use of management accounting*, Cima.
- Mitchelmore, S. and Rowley, J. (2013), "Entrepreneurial competencies of women entrepreneurs pursuing business growth", *Journal of small business and enterprise development*.
- Napp, A.-K. (2011), "Financial risk management in SME", *The use of financial analysis for identifying, analyzing and monitoring internal financial risk*, Aarhus School of Business, Aarhus University.
- Ngek, N. B. (2016), "Performance implications of financial capital availability on the financial literacy-performance nexus in South Africa", *Investment management and financial innovations*, No. 13, Iss. 2 (contin. 2), pp. 354-362.
- Ntlhane, K. E. 1995. *The application of risk management principles to smaller enterprises*. University of the Witwatersrand.
- Nunoo, J. and Andoh, F. K. 2011. Sustaining small and medium enterprises through financial service utilization: does financial literacy matter?
- Osei-Assibey, E. (2010), "Choosing not to borrow: an evaluation of perception and socio-cultural factors underlying voluntary self-exclusion".
- Pandey, I. (2004), "Capital structure, profitability and market structure: Evidence from Malaysia", *Asia Pacific Journal of Economics and Business*, Vol. 8 No. 2, pp. 78.
- Peterson, P. P. and Fabozzi, F. J. 2002. *Capital budgeting: theory and practice*, John Wiley & Sons.
- Potrich, A. C. G.Vieira, K. M. and Mendes-Da-Silva, W. (2016), "Development of a financial literacy model for university students", *Management Research Review*.
- Powell, C. (2003), "The Delphi technique: myths and realities", *Journal of advanced nursing*, Vol. 41 No. 4, pp. 376-382.
- Raehsler, R. D.Hung, K.Yang, C. W. and Stuhldreher, T. J. (2012), "Are mathematics, economics, and accounting courses important determinants in financial management: A rank order approach", *Journal of Economics and Finance Education*, Vol. 11 No. 1, pp. 48-59.
- Remund, D. L. (2010), "Financial literacy explicated: The case for a clearer definition in an increasingly complex economy", *Journal of consumer affairs*, Vol. 44 No. 2, pp. 276-295.
- Rodrigues, I. B.Adachi, J. D.Beattie, K. A. and Macdermid, J. C. (2017), "Development and validation of a new tool to measure the facilitators, barriers and preferences to exercise in people with osteoporosis", *BMC Musculoskeletal disorders*, Vol. 18 No. 1, pp. 1-9.
- Ropega, J. (2011), "The reasons and symptoms of failure in SME", *International Advances in Economic Research*, Vol. 17 No. 4, pp. 476-483.
- Rosen, L. P.Weil, L. and Von Zastrow, C. (2003), "Quantitative literacy in the workplace: Making it a reality", *Quantitative literacy: Why numeracy matters for schools and colleges*, pp. 43-52.
- Ross, S. A.Jaffe, J. F.Jordan, B. D. and Westerfield, R. W. 2007. *Core principles and applications of corporate finance*.
- Rugimbana, R. and Oseifuah, E. K. (2010), "Financial literacy and youth entrepreneurship in South Africa", *African journal of Economic and management studies*.
- Rupeika-Apoga, R. and Danovi, A. (2015), "Availability of alternative financial resources for SMEs as a critical part of the entrepreneurial eco-system: Latvia and Italy", *Procedia Economics and Finance*, Vol. 33, pp. 200-210.
- Shields, J. Small business use of management accounting reports. Small Business Institute Annual Conference, 2010.
- Strauss, A. and Corbin, J. 1990. *Basics of qualitative research*, Sage publications.
- Sucuahi, W. T. (2013), "Determinants of financial literacy of micro entrepreneurs in Davao City", *International Journal of Accounting Research*, Vol. 42 No. 826, pp. 1-8.
- Tabor, W.Chrisman, J. J.Madison, K. and Vardaman, J. M. (2018), "Nonfamily members in family firms: A review and future research agenda", *Family Business Review*, Vol. 31 No. 1, pp. 54-79.
- Taylor, C. (2008), "Preparing students for the business of the real (and highly quantitative) world", *This volume (pp. xx-yy)*. Washington, DC: Mathematical Association of America.
- Thomas Iii, J. and Evanson, R. V. (1987), "An empirical investigation of association between financial ratio use and small business success", *Journal of Business Finance & Accounting*, Vol. 14 No. 4, pp. 555-571.
- Timmons, J. and Spinelli, S. (2004), "New venture strategies: Entrepreneurship for the 21st century", *Burr Ridge, IL: Irwin-McGraw-Hill Publishers*.
- Van Auken, H. E. (2005), "A model of small firm capital acquisition decisions", *The International Entrepreneurship and Management Journal*, Vol. 1 No. 3, pp. 335-352.
- Vanauken, H. E.Ascigil, S. and Carraher, S. (2017), "Turkish SMEs' use of financial statements for decision making", *The Journal of Entrepreneurial Finance (JEF)*, Vol. 19 No. 1.
- Warue, B. N. and Wanjira, T. V. (2013), "Assessing budgeting process in small and medium enterprises in Nairobi's central

Entrepreneurial Financial Literacy

business district: A case of hospitality industry", *International journal of information technology and business management*, Vol. 17 No. 1, pp. 1-11.

Watkins, J. (2012), "A literature review of small and medium enterprises (SME) risk management practices in South Africa", *African journal of business management*, Vol. 6 No. 21, pp. 6324-6330.

Watson, G. E. H. 2004. *A situational analysis of entrepreneurship mentors in South Africa*. Citeseer.

Wise, S. (2013), "The impact of financial literacy on new venture survival", *International Journal of Business and Management*, Vol. 8 No. 23, pp. 30.

Wong, P. K.Ho, Y. P. and Autio, E. (2005), "Entrepreneurship, innovation and economic growth: Evidence from GEM data", *Small business economics*, Vol. 24 No. 3, pp. 335-350.

Yaghmaei, F. (2003), "Content validity and its estimation", *Journal of Medical Education*, Vol. 3 No. 1, pp. 3.

Yousefi, M. R. (2017), "The Clinical Competencies of Nurse Anesthetists in Response to Community Needs: A Delphi Study", *Journal of Clinical and Basic Research*, Vol. 1 No. 4, pp. 13-19.

Zamanzadeh, V.Ghahramanian, A.Rassouli, M.Abbaszadeh, A.Alavi-Majd, H. and Nikanfar, A.-R. (2015), "Design and implementation content validity study: development of an instrument for measuring patient-centered communication", *Journal of caring sciences*, Vol. 4 No. 2, pp. 165.

APPENDIX

Items of the EFL Scale

FINANCIAL BEHAVIOR	
Interpreting Financial Statements	I periodically review the financial status of my company before making decisions.
	I Use relevant financial KPI (Key Performance Indicators) when measuring set goals.
	I know the main differences between a balance sheet and income statement.
Operational budgeting	My business uses budgets to covert the overall business strategy into action plans for both short- and long-term.
	In case of a new project, my firm makes up an operational budget.
	As an entrepreneur, I periodically review operational budgets to draw conclusions about business operations.
Financial risk management	My business has established procedures to identify, analyse, and manage financial risks (for example, insufficient funds to pay suppliers).
	I am aware of the main external financial risks (such as the fluctuation of raw material prices) for my business.
	My firm uses procedures that protect the business form certain financial risks, such as relevant insurance policies.
Financial analysis and ratios	I am able to interpret the financial analyses and ratios of my company in order to make efficient decisions.
	I am aware of the liquidity, solvency, and profitability of my company in order to make good strategic decisions.
	I compare my firm's financial ratios with industry averages or with several competitors if I have data on them.
	As an entrepreneur, I know the contribution margin of the various products/services that I provide.
	I am aware of which financial ratios banks look at when deciding on granting credit.

Cash management	I try to implement efficient cash management policies to deal with possible setbacks or crisis in the future.
	I am aware of how much cash my firm spends each month. That way I can calculate how many months it will take before the cash insufficient.
	I manage my firm's working capital needs through efficient policies regarding accounts receivable, supplier, and inventory.
Capital budgeting	My company uses existing investment evaluation techniques such as net present value, internal rate of return, or payback period when deciding on investment opportunities (buildings or machinery).
	I am aware of the WACC (weighted average cost of capital of debt and equity) of my company and compare it with the return on a potential investment.
	After making an investment decision, I track the return on investment. That way I can draw my conclusions.
Debt management	I am aware of the costs associated with a loan. This means that I can determine to a reasonable degree what the interest costs will be for the next period and to what extent these will affect the result of my company.
	I am aware of the existence of alternative funding sources such as venture capitalists, business angels, and accelerators.
	As an entrepreneur, I use short-term debt for current assets, and long-term debt for fixed assets.
	I know the pros and cons of straight loans (synonym: fixed-term advance payment).
Mathematical Literacy	I am able to do certain calculations within a business context.
FINANCIAL ATTITUDE	
Interpreting Financial Statements	I find it important to periodically review the financial status of my business.
	As an entrepreneur, it is important to know the difference between a balance sheet and a profit and loss account.
Operational budgeting	I think it is important that the entire management is involved in the process of operational budgeting. In other words, it is not just my job or the job of the finance manager.
	In function of a new project, it is important that operational budgets are drawn up.
	I find it important to be involved as an entrepreneur in the process of drawing up budgets.
Financial risk management	It is important to draw up a risk plan for financial risks in order to identify, analyse and manage those risks.
	I find it important to be aware of the most important external financial risks of my company.
	I believe that risk management is extremely important for small to medium sized companies because they are particularly sensitive to business risks.

Entrepreneurial Financial Literacy

Financial analysis and ratios	I believe the interpretation of the ratios and analyses is more important than being able to calculate those ratios oneself.
	I think it is important to be aware of the liquidity, solvency and profitability of my company when making strategic decisions.
	I think it is important to compare these ratios with a sector average or with a few competitors.
	I find it important to be aware of the contribution margin of the different products/services provided by my company.
	I think it is important that an entrepreneur always keeps in mind what ratios banks look at when they decide to grant credit.
Cash management	Careful planning and monitoring of a company's cash flows is important in order to absorb possible setbacks or crisis in the future.
	It is important to consider the number of months a company has left until it runs out of cash.
	It is important that an entrepreneur is always aware of possible working capital needs in order not to limit growth.
Capital budgeting	It is important to use investment evaluation techniques when deciding on major investments.
	It is important to consider the WACC (weighted average cost of debt and equity) of my company when making an investment decision.
	I think it is important to follow up on the return of the investment made in order to learn from it.
Debt management	It is important for an entrepreneur to be able to determine to a reasonable extent what the interest costs will be in order to prevent the business from getting into financial problems.
	When a business can be defined as a start-up or a scale-up, it is important to be aware of the existence of alternative sources of financing (e.g., venture capitalists, business angels, accelerators, etc.).
	As an entrepreneur, it is important to use short-term debt for current assets, and long-term debt for fixed assets.
	As an entrepreneur, it is important to carefully consider the pros and cons of a straight loan (fixed advance) before deciding to apply for such a source of financing.
FINANCIAL KNOWLEDGE	
Interpreting Financial Statements	Assets represent the company's assets. Liabilities give an overview of all resources used to finance these assets. a) True b) False
	A depreciation charge means that cash is flowing out of my company. a) True b) False
	This document gives an overview of costs and revenues during a financial year. a) Income statement b) Balance sheet
	An available reserve on the equity of my balance sheet is a cash reserve that I have on my bank account. a) True b) False

Operational budgeting	The purpose of operational budgeting is to translate the strategy and business plan into revenues, costs, investments, cash flows and any capital requirements. a) True b) False
	The operating budget, part of the master budget, shows how much a company will sell in a subsequent period. a) True b) False
	Which of the following items is a fixed cost? a) Packing cost b) Rental cost c) Raw material cost
Financial risk management	If an entrepreneur spreads his activities of sales across different products/services, then the risk is highly likely: a) Increase b) Take away c) Staying the same
Financial analysis and ratios	Return on equity is calculated as follows: a) (Operating result / average total capital employed) x 100% b) (Profit after deduction of interest and taxes / average invested equity) x 100% c) (Interest paid / average invested loan capital) x 100%
	The net working capital of a company is as follows: Current assets + cash at bank and in hand - short-term borrowings. a) True b) False
	The gross profit margin: a) Calculates the ratio of profit to turnover $\left(\frac{\text{profit after tax}}{\text{sales}}\right)$ b) Indicates the extent to which revenue exceeds direct costs associated with sales $\left(\frac{\text{revenue-cost goods sold}}{\text{revenues}}\right)$
	The contribution margin for a certain product per unit: a) Shows how much money is generated by selling one product after deducting variable costs (Selling price - variable cost per unit) b) Shows the average cost of producing one product $\left(\text{variable cost per unit} + \left(\frac{\text{fixed costs}}{\text{number of units produced}}\right)\right)$ c) Indicates how much fixed costs should be allocated to the production of one product $\left(\frac{\text{fixed costs}}{\text{number of units produced}}\right)$
	The <i>quick of acid ratio</i> (liquidity in the narrow sense) measures a company's ability to pay its current liabilities using only its current assets. a) True b) False
Cash management	An expense only relates to the result of the business when an expense is an outgoing cash flow. a) True b) False
	A negative free cash flow means that a company has to attract additional resources. a) True b) False
	The following calculation shows the working capital requirement: equity - long-term debt - assets. a) True b) False

Entrepreneurial Financial Literacy

<p>Capital budgeting</p>	<p>A company would like to invest in a new machine. Currently one has the choice between two machines. The cost of the machine A is 50 000 euro. It is expected that this machine will generate an annual net cash flow of 10 000 euro. Machine B has a cost of which the purchase cost is 30 000 euro. It is expected that the annual cash flow resulting from this machine will be 5 000 euro. If the pre-determined payback period is fixed at 5 years, and one can only invest in one of the two machines. Which one will it be?</p> <p>a) Machine A b) Machine B</p>
	<p>The current purchase price for a new machine is 20 000 euros. When you know that the <u>current</u> value of the future profits from this machine is 25 000 euros. Will the company make the investment or not?</p> <p>a) Yes b) No</p>
	<p>When an investment yields a return of 5%, and one has a WACC of 9%, one will take the investment (WACC = weighted average cost of debt and equity).</p> <p>a) True b) False</p>
<p>Debt management</p>	<p>An incubator is like a bank. It puts money at the disposal of an enterprise. It is repaid periodically like a bank. However, the difference is that the interest rate will be much lower.</p> <p>a) True b) False</p>
	<p>If a company has an outstanding account of 100,000 euros. The company earns 2% interest per month on this and leaves the full amount on the account for one year. How much interest will the company earn (opportunity cost = 0 euro)?</p> <p>a) 2000 euro b) More than 2000 euro c) Less than 2000 euro</p>
	<p>A roll-over credit can be used as an alternative to an investment credit. Both are aimed at the long term. However, an investment loan is more flexible because you decide for yourself how much and when money will be withdrawn. There is no obligation to use the entire credit limit.</p> <p>a) True b) False</p>
	<p>A straight loan (also called a fixed advance) is a fixed-term advance. It concerns credit with a maximum term of 1 year. It is intended to cover larger cash needs, for example while waiting for your customers to pay or to finance your stocks.</p> <p>a) True b) False</p>
<p>Mathematical Literacy</p>	<p>An entrepreneur buys goods for 4 euros each. Those goods are sold for 250% of the purchase price. In year X the company sells 100 products. How much is the gross profit in year X?</p> <p>a) 500 b) 400 c) 600</p>