
Financial education of founders, is it important? A case study of Jacobs Startup Competition

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Abstract: This paper examines the effect of founders' financial education on the quality of financial information provided to investors as well as on the perceived capabilities of the founding team. The examinations are based on a unique sample of 130 international student-run start-ups. This paper finds that founding teams with at least one member having a financial education background provide more useful and specific, however less readable financial information in their business plans. The results suggest that investors regard founding teams comprised of at least one team member with financial education as more capable and competent. This effect stems from investors' screening of team members' biographic information rather than from indirect effects resulting from higher quality financial reporting in business plans. The findings contribute to the existing entrepreneurship education literature by providing empirical evidence that accounting and finance courses should be core elements of entrepreneurship curricula.

Keywords: financial education; entrepreneurship education; start-up competition; business plan; founding team; textual analysis.

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1 Introduction

Universities face the challenging task of developing curricula that provide students with the knowledge required for their future career intentions. For entrepreneurship education, this means that universities aim to instil the skills, attitudes, and characteristics into students that are needed to implement their own business ideas in highly uncertain environments (Koivumaa and Puhakka, 2013; Siddiqui and Alaraifi, 2019). In line with universities' intentions, students enter entrepreneurship programs in order to get better equipped with the tools that allow for the successful development in entrepreneurial ecosystems (e.g., Kurniawan et al., 2019; Stamboulis and Barlas, 2014). This raises the question of what types of courses and topics should ideally be covered in entrepreneurship programs.

Particularly, the integration of accounting and finance courses in entrepreneurship programs remains a matter of controversy. Opponents argue that accounting and finance knowledge is of minor relevance for founders who should focus on the implementation and development of their core businesses and rather outsource accounting activities to experts (Aronsson, 2004). In contrast, proponents argue that accounting and finance courses should be at the heart of entrepreneurship curricula (Samkin et al., 2012) as financial education plays a key role in providing founders with the skills needed to direct investment and grow their business, and thus achieve entrepreneurial success (Nwaigburu and Eneogwe, 2013; Nwokike, 2013; Wise, 2013; Byun et al., 2018).

This paper contributes to the discussion above by providing evidence on how financial education affects the quality of financial information in business plans. Moreover, it sheds light on the effect that founders' financial education has on investors' perceptions of team capabilities, including an examination of potential transmission mechanisms of higher quality financial reporting in business plans on perceived team capabilities.

This study finds the following: first, founding teams with at least one member having a financial education background provide more useful financial information in their business plans. According to the findings of innovative computer-aided textual analysis, this financial information is more specific, but less readable. Next, it finds that potential investors perceive founding teams which include financially educated founders as more capable and competent. The results reveal that this positive effect stems from investors' screening of team members' biographic information rather than from indirect effects resulting from higher quality financial reporting in business plans. The results are robust to a battery of robustness checks.

The findings of this paper contribute to existing entrepreneurship education literature in several ways and have various practical implications for universities, students, founders, and investors. First, they are of high interest for universities in the process of developing entrepreneurship curricula, as they indicate that accounting and finance courses play a crucial role in entrepreneurship education and thus should not be discounted in entrepreneurship programs. The unique study design allows to trace the positive effects of founders' financial education background back to university education, as participation in the Jacobs Startup Competition (JSC) is strictly limited to student-run start-ups. Therefore, it reduces the risk of omitted variables such as founders' work experiences in accounting. Such biases are common when examining the effects of study programme choices on graduates' skills and attitudes.

Second, the findings are particularly interesting for prospective and current entrepreneurship students when making their university and course decisions and assembling their founding teams. Enrolling in entrepreneurship programs that offer accounting and finance courses is of great advantage for future founders, since the financial education gained through these courses can result in a greater awareness of the inherent financial risks in the entrepreneurial ecosystem and a higher ability to address them. The unique data derived from JSC's uniform evaluation sheets generates interesting insights into investors' decision-making, which normally stay hidden, as investors' evaluations of team capabilities are typically not publicly available.

Third, the findings are of interest to investors who strive to improve their start-up evaluation models. Investors tend to use their own evaluation schemes, indicating that existing models are not fully descriptive of the determinants that contribute to their investment decisions (Shafi, 2019). This paper responds to the call for research on more realistic evaluation models (Köhn, 2018), identifying founders' financial education as an important criterion.

The remainder of this study is structured as follows: Section 2 provides background information on JSC and the relevance of financial education for founders. In Section 3, the hypotheses are developed. Section 4 presents the research methodology. In Section 5, the empirical results are presented and discussed. In Section 6, the conclusion and implications are presented.

2 Background

2.1 The Jacobs Startup Competition (JSC)

The JSC is a student-run annual competition at Jacobs University, Bremen. It provides a platform for student entrepreneurs to pitch their business ideas and to get in touch with venture capitalists, angel investors, incubators, accelerators, and other founders. Participation is limited to early-stage start-ups with an internationally scalable business idea and less than \$25,000 annual revenue. Participants come from 39 countries worldwide and are enrolled at 64 different universities. The students' home universities range from well-known institutions such as Harvard University, Oxford University, and the University of Cambridge to lesser-known institutions. From a research perspective, JSC constitutes a unique setting that allows for insights into founders' diverse educational backgrounds.

There are three stages of the competition. In stage one, all applicants submit an executive summary of their business plan, which is evaluated by mentors, i.e., venture capitalists, angel investors, and business representatives, who typically have founding experiences themselves. The mentors use a uniform evaluation form to assess the start-ups. In stage two, the best teams hand in more detailed documents, including their pitch decks. Founders are guided through their business plans by questions about their start-up's value proposition, pricing and sales strategy, financing plans, and their visions for the future. In stage three, the best candidates are invited to pitch their idea in front of a jury consisting of experienced individuals from both academia and the industry. Most jury members represent the mindset of typical venture capitalists, i.e., private equity investors who decide to provide capital to companies exhibiting high growth potential in exchange for equity stake. However, some represent the mindset of angel investors, i.e., high-net-worth individuals who decide to invest their private wealth. All jury members use a uniform evaluation form to assess the start-ups. Evaluation criteria include, inter alia, the distinctiveness of the unique selling point, the achievability of financial projections, and the portrayal of the team's capabilities.¹

The two-day annual final events take place on the international Jacobs University campus in Bremen. Alongside the final pitches, many expert talks and workshops given by successful start-up founders and entrepreneurship professionals take place. Student founders get the opportunity to meet inspiring entrepreneurs from all over the world and network with established accelerators and investors. The teams that proceed to the final get the chance to win a monetary reward, as well as access to other valuable resources.

2.2 The relevance of founders' financial education

Financial education is an opportunity for the economic development of the individual (Bull and Willard, 1993; Johannisson, 2011). The Organisation for Economic Cooperation and Development (OECD, 2005, p.13) defines financial education as: "The process by which financial consumers/investors improve their understanding of financial products and concepts and, through information, instruction, and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being." All these skills and attitudes are important characteristics for entrepreneurs.

Consequently, prior literature finds that financial education is an effective mechanism for improving financial behaviour of both consumers and entrepreneurs (Hastings et al., 2013; Fernandes et al., 2014; Zinman, 2015). Further, financial education has a strong positive impact on financial literacy (e.g., Altman, 2012; Samkin et al., 2012; Kaiser and Menkhoff, 2017). Financial literacy refers to understanding basic financial attitudes and services, saving and spending money, understanding financial records, and the awareness of financial risks (Wise, 2013). People with high financial literacy are more likely to accumulate wealth and manage it effectively (Hilgert et al., 2003; Stango and Zinman, 2009; Gale and Levine, 2010; Meoli et al., 2020).

Financial education can take place both at school and at university, as well as in non-educational settings such as at the workplace, counselling, and community-based programs (Gale and Levine, 2010). The evidence of a positive and a substantial impact on financial literacy is ambiguous for all the aforementioned approaches. However,

classroom financial education is found to effectively increase financial knowledge in many studies (Bernheim et al., 2001; Gutter et al., 2008; Kaiser and Menkhoff, 2017).

Several studies have pointed out the great importance of financial information in entrepreneurial ecosystems, especially when seeking external funding (e.g., Cassar, 2009; Fleming, 2009; Wise, 2013). For instance, Fleming (2009) finds that increased quantifications of earnings forecasts have positive effects on investors' screening judgements, and Wise (2013) highlights the signalling function of providing financial information. The high relevance of financial information, in combination with the positive effects of financial education on founders' financial literacy and behaviour, calls for a manifestation of accounting and finance courses in entrepreneurship education. However, recent studies show that they feature rarely in such curricula (Siddiqui and Alaraifi, 2019; Abad-Segura and González-Zamar, 2019).

Whilst several papers describe accounting and finance classes as one of many aspects of entrepreneurship education (e.g., Jusoh et al., 2011; Katz et al., 2016), only a few papers focus on their particular relevance. Nwokike (2013) concludes that accounting skills are essential for entrepreneurship education as they prepare students for the sustainable growth of their business. Nwaigburu and Eneogwe (2013) emphasise that entrepreneurs with basic accounting knowledge are more likely to be successful in their start-up projects. Overall, these studies point to the crucial importance of financial education for entrepreneurs. In line with this view, Siddiqui and Alaraifi (2019) argue for more entrepreneurial accounting and finance components in entrepreneurship curricula.

3 Development of hypotheses

There are three main reasons why founders' financial education is likely to positively affect the quality of financial information provided to external parties. First, financially knowledgeable founders have a greater awareness of the benefits of providing verifiable financial information when seeking funding (Köhn, 2018). Entrepreneurial ecosystems are characterised by high information asymmetries and uncertainty (Pelz, 2019). Prior literature finds that a detailed reporting of financial information to external users can lead to a reduction of ambiguity and information asymmetry (Huang, 2017; Kaya and Seebeck, 2019; Lerman, 2020; Seebeck and Vetter, 2021). Founders with a financial education background, *ex ante*, know about the relevance of financial reporting. Consequently, the quality of financial information provided in their business plans is likely to be higher.

Second, founders with a financial education background likely have a greater ability to present the most important financial information in a clearer way and in the right context (Allee and Yohn, 2009). Accounting and finance classes typically provide students with skills such as analysing and preparing financial records, budgeting, and controlling. Hence, the quality of financial information in business plans is likely to be higher for founding teams with financially knowledgeable members.

Third, providing easy-to-grasp and objectifiable information, such as quantifications of scaling opportunities, is challenging. Start-ups' growth is accompanied by increasing complexities of firm structures and business models. It demands that firms prepare documentation outlining relevant financial information, which objectively captures complex structures and can be used for performance measurement internally and externally (Cassar, 2009; Wise, 2013). Financially educated founders are likely to have

greater confidence in their ability to respond to internal and external information demands and thus provide superior information.

To summarise, financial education likely results in founders' greater awareness of the inherent financial risks in the entrepreneurial ecosystem as well as a greater ability and confidence to address external users' financial information needs. However, there can also be negative effects of financial education on the quality of information provided to users. Founders with a financial education background may not make optimal use of the scarce space in business plans by putting too much emphasis on financial aspects. Thereby, they may neglect other relevant information regarding their business models, strategies, and customer needs, which are essential to interpreting the data. Moreover, financial education may lead to less readable information due to the greater extent of the inherently more complex financial information (Loughran and McDonald, 2014).

Overall, this paper assumes that founders with a financial education background tend to provide higher quality financial information in their business plans. Thus, the first hypothesis, in the alternative form, is stated as follows:

H1: Founders' financial education background is positively associated with the quality of financial information provided in business plans.

Prior literature identifies financial literacy to be a crucial skill for founders (e.g., Allee and Yohn, 2009; Davila et al., 2009; Fleming, 2009; Nwaigburu and Eneogwe, 2013). One important way of fostering financial literacy is through financial education (Altman, 2012; Samkin et al., 2012). It allows founders to better understand the nature of business operations and the underlying structures (Davila and Oyon, 2009; Brinckmann et al., 2011; Audretsch et al., 2019). Hence, it can be expected that investors view the founding teams as more capable if they have at least one member who is financially knowledgeable. Aside from the direct effects of financial education on perceived team capabilities, it is also possible that higher quality financial information in business plans produced by financially knowledgeable founders (as predicted by hypothesis one) may have a positive effect on investors' perceptions of the team.

However, there are several potential reasons why founders' financial education may not be positively or even negatively related to perceived team capabilities. First, financial education may result in increased moral hazard concerns and thus higher agency costs. For instance, founders may have incentives to use financial resources for other purposes than those which reflect the investors' best interests (Allee and Yohn, 2009; Cumming et al., 2019). Greater financial knowledge comes alongside amplified knowledge of how-to window-dress figures and obfuscate adverse information. Therefore, a profound financial education background can increase distrust of information validity. Second, investors expect founding teams to have increased expertise in the core disciplines in which the start-up operates, which allows for better strategic planning (Henneke and Lühje, 2007; Köhn, 2018). The average team size in early-stage start-ups amounts to three founding members (Backes-Gellner et al., 2015; Kaiser and Müller, 2015). Team members with a strong accounting and finance background potentially lack in-depth product and industry expertise. Third, investors generally look for creative founders that are able to perform in rapidly changing environments (e.g., Maxwell et al., 2011; Davis et al., 2017). For instance, the findings from Davis et al. (2017) indicate that start-up performance is positively related to creativity. However, the persisting stereotype accountant is "someone who is single-mindedly preoccupied with precision and form, methodical and conservative, and a boring joyless character" (Friedman and Lyne, 2001, p.1). Strong

founders' accounting backgrounds can thus result in a presumed lack of creativity (Florin et al., 2007).

Overall, the ex-ante relationship between founders' financial education backgrounds and investors' perception of team capabilities remains unclear. On the one hand, investors are likely to appreciate financial skills when assessing the teams' capabilities by screening biographic information. In addition, higher quality financial information in business plans, which is likely driven by financial education, as described in hypothesis one, may positively affect perceived team capabilities. On the other hand, there are several reasons, as described above, why there may be no or even a negative effect of financial education on the perception of team capabilities. The second hypothesis, in the alternative form, is stated as follows:

H2: Founders' financial education background is associated with perceived team capabilities.

4 Data and methodology

The empirical analyses in this paper are based on a unique sample of 130 international student-run start-ups that took part in the JSC from 2018 to 2020. The members of the founding teams are enrolled in 64 universities located in 39 countries worldwide. The analyses of hypothesis one are based on structured executive summaries of business plans. The analyses of hypothesis two are based on aggregate evaluations of the participating teams' characteristics, which are derived from 279 individual evaluation sheets.²

According to JSC participation conditions, participants must be enrolled in a university program when applying. Consequently, founders in the setting generally do not have extensive extracurricular experiences such as comprehensive job experience. Hence, the dataset allows to draw direct inferences about the influence of accounting and finance courses on financial information provided in business plans and on the perceived capabilities of the founding team. Thereby, the research design reduces the risk of omitted variables, which is often prevalent in studies examining the effects of study program choices on graduates' skills and attitudes. Table 1 displays the composition of the dataset.

Table 1 Description of the dataset

<i>Year</i>	<i>%</i>	<i>N</i>
2018	34.6	45
2019	42.3	55
2020	23.1	30
Total	100.0	130

This table presents the sample used for the examination of hypotheses one and two.

For the examination of the first hypothesis, the following logit regression model is used:

$$\Pr(REP_QUALITY = 1) = F(\beta_0 + \beta_1 FIN_EDU_{i,t} + \beta_2 GRAD_{i,t} + \beta_3 SEX_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 TYPE_{i,t} + \beta_6 LENGTH_{i,t}) \quad (1)$$

The dependent variable is quality of reporting (REP_QUALITY), which is measured in three different ways: first, by the usefulness of financial information provided in the business plan. This measure assesses the perceived quality of the financial information provided (QUAL_PERCEIV). In contrast to the following two alternative quality measures, the usefulness of information is determined by the user's subjective expectations.

Second, by the specificity of financial information provided in the business plan (SPECIFICITY). In line with recent accounting studies (e.g., Hope et al., 2016; Seebeck and Kaya, 2022), specificity is measured using innovative text mining tools. More precisely, the Stanford Named Entity Recognizer (NER) with seven clusters, including

- 1 Locations,
- 2 organisations,
- 3 dates,
- 4 money values,
- 5 persons,
- 6 percentages,
- 7 time indications, is used.³

This approach allows for the objective quantification of the provided financial information. SPECIFICITY equals one if the founders provide above-median specificity of financial information, and zero otherwise.

Third, by the readability of the financial information provided in business plans (READABILITY).⁴ The BOG index by StyleWriter is used to measure readability. It is widely utilised in recent scientific literature to measure the readability of financial information (Bonsall et al., 2017; Blanco et al., 2020; Hasan, 2020; Seebeck and Kaya, 2022). The BOG index improves standard readability formulae such as the Flesch–Kincaid readability tests and the Gunning fog index, by measuring readability with a graded word list rather than simply using a syllable count, or word length. It further rates the readability of a document according to document type, the writing task, and the audience, using the following formula:

$$BOG = \text{Sentence } BOG + \text{Word } BOG - \text{Pep} \quad (2)$$

where the *Sentence BOG* captures a scaled average sentence length. The *Word BOG* incorporates a multitude of style issues in plain English, such as the usage of the passive voice and superfluous words as well as the word difficulty. *Pep* is a measure to account for good writing by analysing the choice of words and the names used.

The independent variable in the regression model is an indicator variable describing the financial education background of the founding teams gained through university accounting and finance courses (FIN_EDU). If at least one team member has a profound accounting and finance education background, the variable is coded as one, and zero otherwise.

The following control variables are used: level of education (GRAD), sex ratio (SEX), team size (SIZE), type of organisation (TYPE), and the number of words used to describe financial information (LENGTH). GRAD considers the founders' level of

education, differentiating between undergraduate and postgraduate founders. According to Jones (2011, 2013) entrepreneurship education varies significantly between the undergraduate and postgraduate levels. Further, Jafari-Sadeghi et al. (2020) find that a higher level of education increases entrepreneurial competency and exhibits a positive influence on business creation. SEX is the ratio of male to female team members, controlling for diversity of the founding team. The gender of team members has been found to have an influence on financial reporting decisions (Francis et al., 2015), financial reporting quality (Labelle et al., 2010), and credit access of start-ups (Henderson et al., 2015). SIZE controls for the number of team members, as bigger teams are more likely to have greater expertise and more resources to prepare their business plans likely resulting in higher reporting quality. TYPE distinguishes between different types of organisations, including B2B, B2C, and B2B2C. This control variable is based on Morris et al. (2005). It is used to describe the business model, which influences business plan structure and financial reporting (Nielsen and Roslender, 2015). Finally, LENGTH captures the length of the financial information provided in the business plans. Prior studies find that the text length influences the reporting quality. For instance, longer answers are likely to feature more specific words, but also tend to be less readable due to their more complex sentence structures (Seebeck and Kaya, 2022). LENGTH values are winsorised at the 5% level and logarithmised. Table 2 provides a description of all variables.

For the examination of the second hypothesis, the following two-stage least-squares regression model is used:

Stage 1:

$$\begin{aligned} REP_QUALITY_{i,t} = & \beta_0 + \beta_1 FIN_EDU_{i,t} + \beta_2 GRAD_{i,t} + \beta_3 SEX_{i,t} \\ & + \beta_4 SIZE_{i,t} + \beta_5 TYPE_{i,t} + \beta_6 LENGTH_{i,t} \end{aligned} \quad (3)$$

Stage 2:

$$\begin{aligned} JDMT_TEAM_{i,t} = & \beta_0 + \beta_1 REP_QUALITY_{i,t} + \beta_2 FIN_EDU_{i,t} + \beta_3 GRAD_{i,t} \\ & + \beta_4 SEX_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 TYPE_{i,t} \end{aligned} \quad (4)$$

In both stages of the regression, the control variables GRAD, SEX, SIZE, and TYPE remain unchanged from hypothesis one. For the first stage of the model, the dependent variable is the reporting quality of financial information (REP_QUALITY), as used in the examination of hypothesis one. In the second stage of the regression model, the impact of financial reporting quality in business plans on perceived team capabilities (JDMT_TEAM) is estimated. Team evaluations are based on a list of three criteria regarding the team roles, collaboration, and decision-making capabilities. Jury members evaluate the team capabilities based on the business plans and supporting documents, including the founders' CVs. In additional analyses, the jury members' assessment of the financial capabilities of the team (JDMT_FIN) is used as the dependent variable.

The number of words used to describe financial information in the business plan (LENGTH) is used as an instrumental variable. To ascertain the validity of the instrumental variable, a number of diagnostic tests are performed. Their outcomes indicate that the instrument chosen is highly significant (p-value < 0.01, F-test 10.55).⁵ LENGTH is expected to be correlated with the quality of financial reporting in business plans, but uncorrelated with the error term. Hence, it has no clear causal link to investors'

perceptions of team capabilities. In this vein, LENGTH increases REP_QUALITY, and thus the likelihood that investors perceive the team capabilities as high.

Table 2 Variable definitions

<i>Variable names</i>	<i>Variable description</i>
<i>Dependent variables</i>	
REP_QUALITY	
QUAL_PERCEIV ¹	Usefulness of financial information provided in executive summaries of business plans; Median split [1 = above-median; 0 = below-median]
SPECIFICITY ¹	Specificity of financial information provided in business plans measured by the Stanford Named Entity Recognizer (NER) with seven clusters including 1) locations, 2) organisations, 3) dates, 4) money values, 5) persons, 6) percentages, and 7) time indications; Median split [1 = above-median; 0 = below-median]
READABILITY ¹	Readability of financial information provided in executive summaries of business plans measured by the BOG-Index; Median split [1 = above-median; 0 = below-median]
TEAM_CAP	
JDMT_TEAM ²	Average jury members' evaluation of team capabilities derived from 279 individual evaluation sheets containing a uniform list of criteria [in percent]
JDMT_FIN ²	Average jury members' evaluation of financial capabilities derived from 279 individual evaluation sheets containing a uniform list of criteria [in percent]
<i>Independent variable</i>	
FIN_EDU	Financial education of founding team measured by the existence of at least one team member with a university financial education background; [1 = fin. edu. background; 0 = no fin. edu. background]
<i>Control variables</i>	
GRAD ³	Founding team's level of education [1 = undergraduate; 2 = postgraduate; 3 = mixed]
SEX ³	Founding team's sex ratio [female over male]
SIZE ³	Size of founding team [discrete]
TYPE ³	Typology of start-up's operating industry [1 = B2B; 2 = B2C; 3 = B2B2C]
LENGTH ⁴	Number of words used to describe financial information in the business plan [logarithmic, winsorised at the 5% level]

¹QUAL_PERCEIV, SPECIFICITY and READABILITY are the dependent variables in the regression model used to examine hypothesis one and in the first stage of the 2SLS regression model used to examine hypothesis two. ²JDMT_TEAM and JDMT_FIN are the dependent variables in the second stage of the 2SLS regression model used to examine hypothesis two. ³These variables are used as control variables in the examination of hypotheses one and two. ⁴LENGTH is used as a control variable in the examination of hypothesis one and as an instrumental variable in the first stage of the 2SLS regression model for hypothesis two.

5 Findings

5.1 Descriptive statistics and Pearson correlations

Table 3 presents the descriptive statistics. The average founding team size is three to four founders, with a minimum of one and a maximum of twelve team members. This is in line with earlier studies (e.g., Backes-Gellner et al., 2015; Kaiser and Müller, 2015). In 43.5% of the teams, at least one team member has a financial education background. Similar to the findings of Ughetto et al. (2019), women are under-represented in the founding teams, with a mean sex ratio of only 15.6%. The mean evaluation of team capabilities is 66%, ranging from 20% to 100%.

Table 3 Descriptive statistics

<i>Variables</i>	<i>N</i>	<i>Mean</i>	<i>Std. dev</i>	<i>Min</i>	<i>1st</i>	<i>2nd</i>	<i>3rd</i>	<i>Max</i>
<i>Dependent variables</i>								
QUAL_PERCEIV	130	0.496	0.495	0.000	0.000	0.000	1.000	1.000
SPECIFICITY	130	1.123	1.141	0.000	0.000	1.000	2.000	5.000
READABILITY	130	9.640	3.241	1.250	7.662	9.750	11.98	20.15
JDMT_TEAM	130	0.660	0.173	0.200	0.554	0.671	0.770	0.975
JDMT_FIN	130	0.508	0.195	0.150	0.400	0.501	0.650	0.900
<i>Independent variable</i>								
FIN_EDU	130	0.435	0.498	0.000	0.000	0.000	1.000	1.000
<i>Control variables</i>								
GRAD	130	2.160	0.918	1.000	1.000	2.000	3.000	4.000
SEX	130	0.159	0.207	0.000	0.000	0.000	0.333	1.000
SIZE	130	3.351	1.617	1.000	2.000	3.000	4.000	12.00
TYPE	130	2.015	0.690	1.000	2.000	2.000	3.000	4.000
LENGTH	130	77.99	53.08	26.00	38.25	66.50	115.0	215.0

This table presents the descriptive statistics for the sample used to examine hypotheses one and two. All variables are defined in Table 2. The descriptive statistics for LENGTH are presented as absolute numbers (winsorised) for easier interpretation. The regression analyses, however, are based on their natural logarithms.

Table 4 presents the Pearson correlation coefficients for all variables. The analysis provides initial evidence for a positive association between financial education background and the dependent variables QUAL_PERCEIV (0.145, $p < 0.1$) and SPECIFICITY (0.149, $p < 0.1$). However, there is a negative association between FIN_EDU and READABILITY (-0.159 , $p < 0.1$). Correlation coefficients between control variables are low (< 0.6), indicating no risk of multicollinearity. It also provides initial evidence in favour of hypothesis two, indicating a positive association between FIN_EDU and perceived team capabilities (0.343, $p < 0.01$), as well as perceived financing capabilities (0.268, $p < 0.01$). Moreover, there is a strong correlation of LENGTH and each of the three REP-QUALITY variables (i.e., QUAL_PERCEIV, SPECIFICITY, and READABILITY), which are used in the first stage of the 2SLS

regression to examine hypothesis two, but no correlation between LENGTH and JDMT_TEAM (JDMT_FIN).

Table 4 Pearson correlations between all variables

	(1a)	(1b)	(1c)	(2a)	(2b)	(3)	(4)	(5)	(6)	(7)	(8)
QUAL_PERCEIV (1a)	1										
SPECIFICITY (1b)	0.163	1									
	0.063										
READABILITY (1c)	-0.045	0.093	1								
	0.610	0.291									
JDMT_TEAM (2a)	0.082	0.029	0.017	1							
	0.353	0.742	0.848								
JDMT_FIN (2b)	0.090	0.005	-0.024	0.506	1						
	0.306	0.949	0.787	0.001							
FIN_EDU (3)	0.145	0.149	-0.159	0.269	0.297	1					
	0.089	0.089	0.073	0.000	0.002						
GRAD (4)	0.037	0.056	-0.066	-0.008	-0.020	0.054	1				
	0.672	0.523	0.457	0.925	0.890	0.539					
SEX (5)	-0.039	-0.126	0.042	0.013	0.192	-0.039	0.225	1			
	0.664	0.153	0.637	0.877	0.029	0.664	0.010				
SIZE (6)	0.012	0.025	0.060	0.276	0.167	0.012	0.265	0.156	1		
	0.895	0.775	0.497	0.002	0.058	0.895	0.003	0.076			
TYPE (7)	0.034	0.055	-0.033	-0.004	-0.098	0.034	0.039	0.009	0.048	1	
	0.700	0.534	0.707	0.966	0.269	0.700	0.559	0.294	0.586		
LENGTH (8)	0.238	0.244	-0.173	0.172	0.317	-0.021	-0.100	-0.261	0.002	0.012	1
	0.036	0.052	0.042	0.318	0.410	0.153	0.389	0.298	0.071	0.653	

This table presents the Pearson correlation coefficients and their two-tailed p-values for the main variables. Coefficients in bold present statistical significance at the 10% level. All variables are defined in Table 2. Correlation coefficients using Cramer's V provide qualitatively the same results.

5.2 Results for hypothesis one

Table 5 presents the results for the examination of the first hypothesis. The coefficient for FIN_EDU in Model 1 is 0.847 ($p < 0.05$). The marginal effect is 20.0, which means that the probability of providing highly useful financial information in business plans increases by 20% points for a team that includes at least one financially educated team member, *ceteris paribus*.⁶ In Model 2, the coefficient for FIN_EDU is 0.903 ($p < 0.05$), indicating that founders with a financial education background also present more specific financial information in their business plans. Both findings are in line with the first hypothesis stating that financial education of founders is positively associated with the quality of financial information provided in business plans. They suggest that students with a financial education background have a greater awareness of investors' demands and show greater ability to respond to them.

Table 5 Results from logistic regression analyses for hypothesis one

<i>Dependent variable</i>	<i>Model 1 (logit)</i>	<i>Model 2 (logit)</i>	<i>Model 3 (logit)</i>
	<i>QUAL_PERCEIV</i>	<i>SPECIFICITY</i>	<i>READABILITY</i>
FIN_EDU	0.847** (0.407)	0.903** (0.463)	-1.142** (0.435)
GRAD	-0.057 (0.216)	0.329 (0.250)	-0.135 (0.220)
SEX	-1.339* (0.670)	-2.726* (1.209)	1.161 (0.995)
SIZE	-0.071 (0.120)	-0.013 (0.139)	0.207 (0.122)
TYPE	0.298 (0.262)	0.168 (0.285)	-0.145 (0.260)
LENGTH	0.099** (0.037)	0.009** (0.004)	-0.042** (0.018)
Constant	-0.430 (0.561)	-2.531*** (0.934)	0.219 (0.809)
Observations	130	130	130
Pearson χ^2	128.24	126.45	128.03
Prob > χ^2	0.309	0.346	0.315
Hosmer-Lemeshow χ^2	10.19	10.14	10.03
Prob > χ^2	0.287	0.294	0.252

This table shows the regression coefficients for logit regressions of QUAL_PERCEIV, SPECIFICITY, and READABILITY on FIN_EDU and control variables. The standard deviations are displayed in parentheses. Model fit is determined based on Pearson and Hosmer-Lemeshow χ^2 -values for binary models reported at $p < 0.05$. All variables are defined in Table 2. *, **, and *** indicates significance at the 0.01, 0.05, and 0.10 levels, respectively.

However, in Model 3, a negative coefficient for FIN_EDU (-1.142; $p < 0.05$) is shown, indicating that the readability of the information provided in the business plans is lower for founding teams with a financial education background. Whilst this finding is in line with Loughran and McDonald (2014) stating that financial disclosures typically incorporate a relatively higher percentage of complex words, it raises the question of how the more specific but less readable financial information disclosed by teams with a financial education background influences the perception of founding team capabilities, which is examined in hypothesis two.

Finally, Table 5 provides the results of the goodness-of-fit test for the fitted model. First, the Pearson χ^2 goodness-of-fit test shows that the model fits reasonably well. However, detailed test statistics indicate that the number of covariate patterns is close to the number of observations, making the applicability of the Pearson χ^2 test questionable,

but not necessarily inappropriate. Next, following Hosmer, Lemeshow, and Sturdivant (2013), data was regrouped by ordering the predicted probabilities, and then ten nearly equal-sized groups were formed, resulting in a Hosmer-Lemeshow χ^2 value of 10.19 on 8 df., with a p-value of 0.287 for Model 1. Overall, the goodness-of-fit tests provide no evidence of lack of fit.

Table 6 shows the results of a series of additional tests. In Panel A of Table 6, the results of an ordinary least square (OLS) regression analyses are presented. Firstly, in Model 4, an OLS regression model with the same dependent and independent variables as presented in equation (1) is used, yielding qualitatively similar results.⁷ This regression model is also used to assess the variance inflation factors (VIFs) of all variables used in the examinations. The mean VIF is 1.052, the maximum VIF is 1.062. As all VIFs are below five, there is no reason to assume multicollinearity. Next, the table shows OLS regression results for continuous dependent variables for SPECIFICITY (Model 5) and READABILITY (Model 6).⁸ Overall, the results provide additional evidence in support of hypothesis one.

Table 6(A) Additional OLS regression analyses for hypothesis one (Panel A)

Dependent variable	Model 4 (OLS)		Model 5 (OLS)	Model 6 (OLS)
	<i>QUAL_PERCEIV</i>	<i>VIF</i> ¹	<i>SPECIFICITY</i> _{cont} ¹	<i>READABILITY</i> _{cont} ¹
FIN_EDU	0.166** (0.060)	1.050	0.114* (0.063)	0.389** (0.179)
GRAD	0.058 (0.048)	1.056	0.031 (0.023)	0.073 (0.094)
SEX	-0.460* (0.207)	1.051	-0.140 (0.986)	-0.129 (0.399)
SIZE	-0.002 (0.029)	1.048	-0.009 (0.013)	0.004 (0.005)
TYPE	-0.031 (0.058)	1.015	0.014 (0.028)	0.326* (0.335)
LENGTH	0.002** (0.001)	1.062	0.060** (0.026)	0.183* (0.085)
Constant	0.397** (0.029)		-0.064 (0.103)	1.767 (0.462)
Observations	130		130	130
Model fit ²	0.146		0.142	0.176
Mean VIF		1.052	1.052	1.052

This table shows regression coefficients for linear regressions of QUAL_PERCEIV, SPECIFICITY, and READABILITY on FIN_EDU and control variables. The standard deviations are displayed in parentheses. ¹SPECIFICITY_{cont} (Model 7) and READABILITY_{cont} (Model 8) are continuous variables. ²Model fit is determined based on R²-values. All variables are defined in Table 2. *, **, and *** indicates significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 6(B) Additional robustness analyses for hypothesis one (Panel B)

<i>Dependent Variable</i>	<i>Model 7(logit)</i>	<i>Model 8 (fixed-effects)²</i>
	<i>QUAL_PERCEIV</i>	<i>QUAL_PERCEIV</i>
FIN_EDU	0.898** (0.463)	0.171* (0.091)
GRAD	0.329 (0.250)	0.056 (0.049)
SEX	-1.727 (1.210)	-0.465* (0.209)
SIZE	-0.154 (0.140)	0.000 (0.029)
TYPE	0.175 (0.287)	0.033 (0.058)
LENGTH	0.009** (0.004)	0.002** (0.001)
CONTEXT ¹	0.002 (0.012)	
Constant	-2.641** (1.103)	-0.048 (0.195)
Observations	130	130
Model fit ³	11.258	0.102
Year FE	Not included	Included

This table shows regression coefficients for a log regression and fixed-effects regression of QUAL_PERCEIV on FIN_EDU and control variables. The standard deviations are displayed in parentheses. ¹In Model 7, the additional control variable CONTEXT is included. ²In Model 8, fixed effects are included. ³Model fit is determined based on Hosmer-Lemeshow χ^2 -values for Model 7 and on R²-values for Model 8. All variables are defined in Table 2. *, **, and *** indicates significance at the 0.01, 0.05, and 0.10 levels, respectively.

Moreover, in further additional analyses another control variable is added to the basic regression model which controls for context financial literacy on country-level (CONTEXT).⁹ In line with prior studies (e.g., Bruhn and Zia, 2011; Meoli et al., 2020), higher financial literacy of founders driven by context financial literacy may also have an influence on financial reporting in business plans, as student entrepreneurs who are ex ante more financially literate are likely to provide higher quality financial reporting. The results presented in Model 5 indicate that context financial literacy has no influence on financial reporting in business plans. However, the coefficient for FIN_EDU remains positive and significant when adding the additional control variables, supporting the initial findings.¹⁰ Thirdly, in Model 6, year-fixed effects are included to control for factors changing each year that are common to all business plans for a given year. The coefficient for FIN_EDU is positive and significant on a 10% level.

Overall, the findings support hypothesis one stating that financial education of founders results in higher quality of financial information provided in business plans.

5.3 Results for hypothesis two

Table 7 presents the results of the two-stage least-square (2SLS) instrumental variable regression of investors' perceptions of team capabilities on financial reporting quality in business plans and control variables. The first stage of the regression analyses in Models 9–11 reveal that the coefficient of LENGTH is significant for all three REP_QUALITY measures, implying that the instrumental variable is associated with quality of financial reporting in business plans. While there is a positive association between LENGTH and QUAL_PERCEIV and LENGTH and SPECIFICITY, the association between LENGTH and READABILITY is negative.

Table 7 Results from logistic regression for hypothesis two

Dependent variable	Model 9 (2SLS)		Model 10 (2SLS)		Model 11 (2SLS)	
	1 st stage	2 nd stage	1 st stage	2 nd stage	1 st stage	2 nd stage
	QUAL PERCEIV	JDMT TEAM	SPECI- FICITY	JDMT TEAM	READ- ABILITY	JDMT TEAM
REP_QUALITY		0.303 (0.286)		0.231 (0.195)		−1.288 (3.250)
FIN_EDU	0.166** (0.060)	0.085** (0.038)	0.113* (0.069)	0.080** (0.041)	−0.105** (0.0041)	0.039* (0.008)
GRAD	0.058 (0.048)	0.013* (0.002)	−0.031 (0.0022)	−0.028 (0.024)	−0.035 (0.022)	−0.104 (0.227)
SEX	−0.460* (0.207)	0.169 (0.120)	−0.183* (0.097)	0.218* (0.131)	0.199** (0.090)	0.377 (0.729)
SIZE	−0.002 (0.029)	0.061* (0.014)	0.005 (0.013)	0.020* (0.028)	0.007 (0.013)	0.050 (0.088)
TYPE	−0.031 (0.058)	−0.013 (0.030)	−0.007 (0.027)	−0.017 (0.028)	−0.006 (0.026)	0.020 (0.106)
LENGTH	0.002** (0.001)		0.001*** (0.000)		−0.041** (0.020)	
Constant	0.397** (0.029)	0.422** (0.170)	0.525*** (0.075)	0.539*** (0.082)	0.546*** (0.077)	1.270 (1.758)
Observations	130	130	130	130	130	130
Model fit ¹	0.146		0.140		0.181	
Wald test χ^2		17.18		21.46		13.03
Prob > χ^2		0.009		0.002		0.031

This table presents the results of instrumental variable regressions of perceived team capabilities on financial reporting quality in business plans (i.e., QUAL_PERCEIV, SPECIFICITY, and READABILITY), and on control variables. The standard deviations are presented in parentheses.

¹Model fit is determined based on adjusted R^2 -values. All variables are defined in Table 2. ***, **, * indicate significance at the 0.01, 0.05, and 0.10 levels, respectively.

In the second stage of the 2SLS regression, the coefficient of financial reporting quality as measured by QUAL_PERCEIV, SPECIFICITY, and READABILITY is not

significant, indicating that financial reporting quality in business plans is not related to perceived team capabilities. The findings indicate that there are no significant transmission effects that higher financial reporting quality has on investors' perceived team capabilities. However, given that only the best business plans from the start-up competition, which made it to the JSC finals, are included in the sample, it cannot be ruled out that there is a positive effect of financial reporting in business plans on perceived team capabilities when considering all participating teams.¹¹

The coefficient for FIN_EDU is significant in both stages of the regression models 9 and 10. For instance, the coefficient of FIN_EDU in Model 9 is 0.166 ($p < 0.05$) in stage one and 0.085 ($p < 0.05$) in stage two, indicating that founders' financial education background has a positive effect on the usefulness of financial information provided in business plans as well as on perceived team capabilities. The results for specificity are similar. Thus, in accordance with prior studies (e.g., Davila et al., 2009; Fleming, 2009; Allee and Yohn, 2009), the findings suggest that founders' financial education background is a crucial component of the skillset needed to succeed in the entrepreneurial ecosystem.

Interestingly, having a financial education background has a negative effect on readability of financial information provided in business plans (stage 1), but a positive effect on perceived team capabilities. This finding provides further evidence that the positive effect in the latter does not stem from higher financial reporting quality. As jury members assess the teams based on various information including the founders' CVs, it seems likely that the screening of biographic information of the founders is the key driver.

In robustness checks, perceived team capabilities (JDMT_TEAM) are replaced by perceived financial capabilities (JDMT_FIN). The results are qualitatively the same for both the first and second stage and can be interpreted as confirming evidence of the validity of the model (results are untabulated). Additional tests further revealed that founding teams without a financial education background do not identify their missing accounting knowledge as a critical weakness point for the future success of their business (results are untabulated). This is in line with the notion that founders' missing financial education background results in a lack of awareness of investors' demands of useful and specific financial information.

Overall, the results support the second hypothesis stating that founders' financial education positively affects perceived team capabilities. This positive effect of financial education cannot be attributed to higher quality financial reporting in business plans.

6 Conclusion and discussion

Entrepreneurship education has attracted great interest among researchers (Kolvereid and Moen, 1997; Matlay and Carey, 2007; Solomon, 2007; Berglund and Holmgren, 2013; Fellnhöfer and Kraus, 2015). Motivated by recent literature which finds that entrepreneurial accounting and finance are only rarely covered in many entrepreneurship programs, although desired by numerous students, this study aims at understanding whether accounting and finance courses should be considered core elements of entrepreneurship education. It provides initial empirical evidence that founders' financial education positively affects the quality of financial information provided in business plans. Moreover, financial education results in higher perceived team capabilities which

are directly driven by better evaluations of team member skills based on biographic profiles rather than indirectly through superior financial reporting practices in business plans. Overall, the results of the paper support the view that universities should include accounting and finance courses in their entrepreneurship curricula to better equip entrepreneurship students with the necessary tools and mindsets to excel in the entrepreneurial ecosystem.

This paper also demonstrates that university-based start-up competitions, such as JSC, are an important element for entrepreneurial education. This is not only because they allow students to apply their knowledge in a simulated business world, but also because they generate useful research data that enable researchers to examine how to best optimise entrepreneurship education.

The paper has a number of limitations. First, it is limited to the valuation of jury members in the JSC. In the real business world, investors may make their investment decisions differently, depending upon their individual valuation models, existing investment portfolios, environmental conditions, and personal beliefs. Second, the results are limited to student entrepreneurs without significant work experience. Graduates' operational experience in accounting, finance, and management positions can potentially compensate for missing university accounting education. However, the JSC sample reduces the risk of omitted variables typically prevalent in concurrent studies, demonstrating a link between university accounting and finance education and the quality of financial information provided by the founders as well as their perceived capabilities.

Third, the study is limited to the external accounting perspective by examining financial information provided to investors and their judgement of team capabilities. Future studies may deal with the association between financial education, internal management and control systems, and entrepreneurial success. For instance, profound accounting and finance knowledge allows for enhanced monitoring mechanisms and facilitates the identification of bottlenecks in the framework of management accounting (Cassar, 2009). Future studies may also examine how an educational background in other business disciplines affects entrepreneurial success, the quality of business plans, and perceived capabilities of the founding teams.

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Notes

- ¹For reasons of competition, the exact evaluation criteria are subject to confidentiality.
- ²Multiple evaluations from different jury members for the same business plan are aggregated to mean values, resulting in 130 observations.
- ³Specificity is measured using the Stanford NER tool version 4.2.0 (Finkel et al., 2005).
- ⁴Readability is measured using StyleWriter 4.43 by Editor Software (UK) Ltd.
- ⁵Wooldridge's (1995) test of over-identification yielded a robust score χ^2 of 2.43 with a corresponding p-value of 0.0518.
- ⁶The odds ratio is 2.323. Thus, the odds are 2.323 times higher that financially educated teams provide highly useful financial information in business plans.
- ⁷In further robustness checks, a probit regression model is used. The results remain qualitatively the same (results are untabulated).
- ⁸The two variables were logarithmised to adjust for the relative sensitivity of the data.
- ⁹Country-level financial literacy is based on the Global Financial Literacy Survey by Klapper et al. (2015).
- ¹⁰Results are qualitatively the same when using SPECIFICITY and READABILITY as dependent variables.
- ¹¹Data availability (i.e., team evaluations) is limited to teams that took part in the JSC finals, not allowing for examinations of the effects of financial reporting quality in business plans of non-finalists on perceived team capabilities.