

**THE RELATIONSHIP BETWEEN UNIVERSITY  
CONTEXT FACTORS AND STUDENTS'  
ENTREPRENEURIAL INTENTIONS, ATTITUDES, AND  
SELF-EFFICACY**

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**ABSTRACT**

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<p>Abstract</p> <p>Entrepreneurship education has grown in importance in recent years at the same time as the significance of entrepreneurship to the world's economy has increased immensely. Entrepreneurship education is believed to increase students' entrepreneurial intentions by changing their mindsets and attitudes toward the venture creation process. Although the topic has been widely researched, mixed findings have been reported about the influence of entrepreneurial education on students' entrepreneurial intentions as the causality of the relationship is hard to determine. Previous research has oftentimes disregarded the influence of contextual factors on the relationship which has been believed to be one of the reasons for the mixed findings. Therefore, this thesis aims to contribute to the existing literature by taking into consideration the university's contextual factors including program learning, entrepreneurial climate, and the achievement of Sustainable Development Goals (SDGs) in addition to participation in entrepreneurship education. The influence of these factors is examined in relation to students' entrepreneurial intentions, attitude toward entrepreneurship, and entrepreneurial self-efficacy.</p> <p>This study utilizes data collected as a part Global University Entrepreneurial Spirit Students' Survey (GUESSS) which is one of the largest research projects in the world studying student entrepreneurship. The data was collected at the University of Jyväskylä and Jyväskylä University of Applied Sciences due to which this thesis provides valuable knowledge about students' perceptions to local higher education institutions.</p> <p>It was hypothesized that the contextual factors would increase the students' cognitive characteristics. The relationships were tested by correlation and regression analysis. As a result, participation in entrepreneurship education and entrepreneurial university environment were positively related to students' entrepreneurial intentions and self-efficacy. In contrast, equality was not found to be related to students' cognitive characteristics. In addition to hypothesis testing, this thesis presents a wide variety of demographic statistics about the student population in local HEIs and their perceptions of their own universities.</p>	
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<p>Tiivistelmä</p> <p>Yrittäjyysopetuksen tärkeys on lisääntynyt viime vuosien aikana samalla, kun yrittäjyyden vaikutus maailmantalouteen on kasvanut valtavasti. Yrittäjyysopetuksen uskotaan lisäävän opiskelijoiden yrittäjyysaikomuksia muuttamalla asenteita yrityksen perustamista kohtaan. Siitä huolimatta, että yrittäjyysopetuksen vaikutusta opiskelijoiden yrittäjyysaikomuksiin on tutkittu laajasti, saavutetut tulokset ovat sekalaisia ja vaikutuksen kausaliteettia on vaikea määrittää. Aiemmat tutkimukset eivät ole juurikaan ottaneet huomioon kontekstuaalisten tekijöiden vaikutusta, minkä on uskottu osaltaan selittävän sekalaisia tuloksia. Tämä Pro Gradu -tutkielma pyrkii täydentämään olemassa olevaa tutkimustietoa ottamalla huomioon yliopiston kontekstuaaliset tekijät ja niiden vaikutuksen opiskelijoiden yrittäjyysaikomuksiin, asenteisiin yrittäjyyttä kohtaan sekä yrittäjyystaitoihin. Kontekstuaaliset tekijät sisältävät yrittäjyysopetuksen lisäksi oppimisvaikutukset, yrittäjähenkisen ilmapiirin sekä YK:n kestävän kehityksen tavoitteiden saavuttamisen. Tämä tutkielma hyödyntää aineistoa, joka on kerätty osana kansainvälistä tutkimusprojektia nimeltään Global University Entrepreneurial Spirit Students' Survey (GUESSS). Projekti on yksi maailman suurimmista tutkimusprojekteista, joka tutkii opiskelijayrittäjyyttä. Aineisto on kerätty Jyväskylän yliopistossa ja Jyväskylän ammattikorkeakoulussa, minkä vuoksi tämä tutkielma tarjoaa arvokasta tietoa paikallisille korkeakouluille opiskelijoiden näkemyksistä.</p> <p>Hypoteesien mukaan kontekstuaaliset tekijät lisäävät opiskelijoiden kognitiivisia ominaisuuksia. Muuttujien yhteyttä testattiin korrelaatio- ja regressioanalyysillä. Yrittäjyyskoulutukseen osallistumisella ja yrittäjähenkisellä ilmapiirillä todettiin olevan positiivinen yhteys opiskelijoiden yrittäjyysaikomuksiin sekä yrittäjyystaitoihin. Sen sijaan tasa-arvolla ei todettu olevan vaikutusta. Hypoteesien testaamisen lisäksi tämä tutkielma esittää runsaasti kuvailevia tilastoanalyysijä paikallisten korkeakoulujen opiskelijoista sekä heidän näkemyksistään.</p>	
Asiasanat Opiskelijäyrittäjyys, Yrittäjyysopetus, Yrittäjyysaikomus, Yrittäjyystaidot, Korkeakoulu	
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## LIST OF ABBREVIATIONS

ATE	=	Attitude Toward Entrepreneurship
GUESSS	=	Global University Entrepreneurial Spirit Students' Survey
JAMK	=	Jyväskylän Ammattikorkeakoulu (fin.: Jyväskylä University of Applied Sciences)
JYU	=	University of Jyväskylä
HEI	=	Higher Education Institution
EC	=	Entrepreneurial Climate
EE	=	Entrepreneurship Education
EI	=	Entrepreneurial Intention
ESE	=	Entrepreneurial Self-Efficacy
PL	=	Program Learning
SDG	=	Sustainable Development Goal
UE	=	University Environment
UN	=	United Nations

# 1 INTRODUCTION

## 1.1 Background and motivation

In today's world, the role of entrepreneurship is undeniable. Entrepreneurs are needed to accelerate economic growth (Turker & Sonmez, 2009) by bringing new innovations to the market (Stel et al., 2005) and by creating employment opportunities (Sutter et al., 2019). At the same time as entrepreneurship has grown in importance, higher education institutions have responded to the need of a growing number of new entrepreneurs by offering entrepreneurship education.

Entrepreneurship education has a relatively long history, and it has developed into an important part of the education system (Katz, 2003; Kuratko, 2005). For example, at Harvard Business School the first entrepreneurship course was held in 1947. Since then, entrepreneurship education programs in higher education institutions have grown rapidly and globally (Kuratko, 2005; Solomon, 2007). In addition to providing entrepreneurship courses, various universities have shifted their strategy to more entrepreneurial oriented, which have been named "entrepreneurial universities" by Etzkowitz and Leydesdorff (2000).

The influence of entrepreneurship education (EE) has received a lot of scholarly attention. Research has mostly focused on short-term subjective impact measures including entrepreneurial intentions and attitudes of which entrepreneurial intentions are the most researched one (e.g. Nabi et al., 2017; Pittaway & Cope, 2007). The results have been equivocal since both positive and negative outcomes have been reported (Nabi et al., 2017). For example, Joensuu et al. (2013) found a negative relationship between entrepreneurship education and entrepreneurial intentions in Finnish female students but most research has reported positive findings. Mixed results may be partly due to methodological and statistical factors as most of the studies are cross-sectional survey studies and control groups are not used (Bae et al., 2014; Martin et al., 2013). Also, it has been claimed that one reason for the contradictory results is disregarding contextual factors (Nabi et al., 2017). Of 156 studies included in Nabi's systematic review article only nine studies focused on contextual factors in the EE-intention relationship.

Despite the ambiguous findings, entrepreneurship education and its benefits are extolled by researchers and educators. Because students usually have only little industry experience, the university context is assumed to have a great impact on students' entrepreneurial propensity (Bergmann et al., 2016). Entrepreneurship education has been argued to be able to change students' attitudes toward the venture creation process through developing their knowledge and skills (Boukamcha, 2015). However, it is challenging to take into consideration all the



moderating factors affecting students' cognition due to which causal relationships are hard to derive from existing research. Either way, the field requires more research to better understand the influence of entrepreneurship education and the university context. Increasing understanding will enable designing entrepreneurship education in a way that enhances the transfer of knowledge among as many students as possible (Bergmann et al., 2016). Also, because entrepreneurship education programs require a substantial investment of time and resources, it is important to recognize the outcomes of work (Nabi et al., 2017).

One of the largest research projects about student entrepreneurship is Global University Entrepreneurial Spirit Students' Survey (GUESSS). The research project started in 2006 and every two to three years data is collected globally. Numerous research papers have been published based on the research project including publications in leading international academic journals (e.g., *Journal of Business Venturing and Entrepreneurship Theory & Practice*). The main goal of the research project is to provide insights into student entrepreneurship from several points of view such as family firm succession, growth and performance of new ventures, and entrepreneurial intentions. The research examines influencing factors on different levels: individual level, family level, university level, and contextual level (GUESSS, 2021). This thesis studies the data collected from the University of Jyväskylä and Jyväskylä University of Applied Sciences in 2021.

In Jyväskylä, the entrepreneurial orientation of higher education institutions is notable. For example, of all 16 international master's degree programs at the University of Jyväskylä, the International Business and Entrepreneurship is the most popular one for several years in a row. Entrepreneurial orientation can also be seen as a common entrepreneurial strategy between the University of Jyväskylä, Jyväskylä University of Applied Sciences, and Jyväskylä Educational Consortium Gradia. The three educational institutions form together education, research, and development community called EduFutura which provides flexible study paths for students with different degrees of education. The goal of EduFutura's entrepreneurial strategy is to support educational institutions in developing entrepreneurship education together and to create new businesses in the area. Because of the broad entrepreneurial orientation in Jyväskylä HEIs, this thesis provides valuable information on the impacts of entrepreneurship education on students. By obtaining knowledge of how students perceive the education and the university environment it is possible to further develop teaching and university culture.

## 1.2 Research aims and questions

This thesis aims to measure the influence of university context factors on students' cognitive factors including entrepreneurial intentions, attitudes towards entrepreneurship, and entrepreneurial self-efficacy. University context is examined through four variables: entrepreneurship education (EE), program learning (PL), entrepreneurial climate (EC), and the achievement of sustainable development goals in universities (SDGs). Two research questions are formed to illustrate the focus:

RQ 1: How do students perceive their university from an entrepreneurial perspective?

RQ 2: Do university context factors increase students' entrepreneurial intentions, attitudes, and self-efficacy?

Previous studies about the GUESSS project are used as the basis of the hypothesis formation. Especially Leiva's et al. (2021) study about the influence of the university's contextual factors on Latin American students' entrepreneurial intentions has contributed to the creation of the research model of this study. In addition, several systematic reviews are gone through to find out new perspectives on how to approach the matter. Especially, Nabi's et al. (2017) systematic review provided valuable information on how the effect of university context factors on subjective impact indicators other than entrepreneurial intentions has not been researched broadly. This affected the inclusion of attitude and self-efficacy as outcome variables instead of explaining factors as in most studies. The research model is illustrated in Figure 1. Based on existing research, it is hypothesized that the university's contextual factors have positive influences on students' cognitive factors.

The inclusion of SDGs as a measurement tool is a novel way to approach the university's influence on students. Universities around the world are in a growing need to adjust their actions, strategies, and organizations to meet the goals for sustainability (Beynaghi et al., 2016). Usually, the sustainability and responsibility work in universities relies on the SDGs developed by the United Nations which makes it reasonable to measure the work in relation to SDGs. Prior research has suggested that entrepreneurs would be paramount in attaining SDGs (Ashari et al., 2021). Therefore, it is interesting to find out whether an environment that is working toward SDGs could encourage new entrepreneurs who would, in turn, promote sustainability through their businesses.

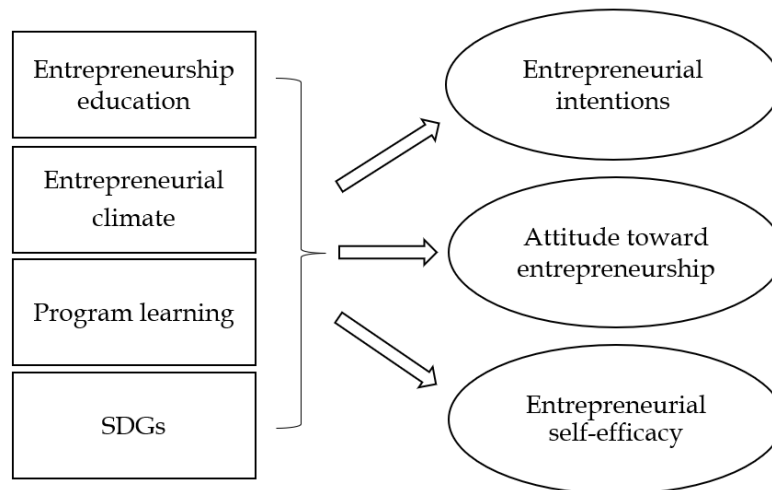


FIGURE 1. The research model.

### 1.3 Structure of the thesis

This master's thesis is structured into five chapters of which the first one presents the background and motivation of the study among research aims and questions. The second chapter introduces the theoretical framework for the study based on existing research. Also, hypotheses are presented and justified by prior research. In the third chapter, the data and methodology are presented including the process of analysis. The fourth chapter presents the results of the study including descriptive statistics and inferential statistics. The final chapter concludes the research by discussing the main findings, evaluating the study, and presenting contributions as well as limitations. Finally, future research possibilities are suggested.

## 2 THEORETICAL FRAMEWORK

Entrepreneurship is often studied by measuring entrepreneurial intentions. There are several intention models created by scholars over the years. One of the most popular ones is the Theory of Planned Behavior by Ajzen (Liñán et al., 2011). The model predicts entrepreneurial intentions through three variables: attitude towards entrepreneurship, perceived behavioral control, and social norms (Ajzen, 2011). Although individual characters have a great influence on entrepreneurial intention, it is strongly impacted by context like entrepreneurship in general (Bercovitz & Feldman, 2008; Wennberg et al., 2011). Previous literature has often-times disregarded the contextual influence on students' entrepreneurial intentions such as the characteristics of the university (Bergmann et al., 2016). One of the most important contexts for students is educational institutions. According to Bergmann, there is growing evidence of how the context inside and outside of the university is an important determinant of academic entrepreneurship.

Research on entrepreneurship education (EE) has largely focused on the relationship between EE and entrepreneurial intentions. The effect of EE on other cognitive factors such as attitude and self-efficacy has received much less attention. The existing literature presents mostly positive relationships between EE and attitude and self-efficacy but some articles report negative or non-significant results (Nabi et al., 2017.) For this reason, additional research is needed about the relationship between EE and attitude and self-efficacy.

The influence of entrepreneurship education is of particular interest in this thesis. One variable, attitude toward entrepreneurship, is taken from the Theory of Planned Behavior but otherwise, the theory is not utilized in this thesis. Instead, this thesis studies the effect of university context on students' cognitive factors including entrepreneurial intentions, attitudes towards entrepreneurship, and entrepreneurial self-efficacy. University context is studied using four variables: participation in entrepreneurship education, program learning, entrepreneurial climate, and achievement of SDGs in university.

### 2.1 Cognitive factors

Cognition is defined by Festinger (as cited in Boukamcha, 2015) as "the individual knowledge, opinion and belief about his environment, his behavior or the others' behavior" (p. 596). Boyer (as cited in Boukamcha, 2015) argues that cognitions can be developed by experiential learning. According to Mitchell et al., (2002) entrepreneurial cognitions include the knowledge structures used to assess and decide about opportunity recognition, venture creation, and growth. Thus, entrepreneurial cognitions have a significant role in the entrepreneurial

process (Pihie et al., 2013). By understanding cognitive responses one can understand how environmental stimuli affect an individual (Smith & Swinyard as cited in Boukamcha, 2015).

In this study, cognition is examined to understand the effect that entrepreneurship education and the university environment have on students. Cognition is viewed through three factors: intention, attitude, and self-efficacy.

### **2.1.1 Entrepreneurial intentions**

Intentions precede the decision to act (Ajzen, 2011). In other words, Ajzen argues that intentions illustrate an individual's motivational factors that affect behavior. The stronger the intentions, the more likely a person is going to perform a behavior (Ajzen, 1991). Therefore, entrepreneurial intentions describe a person's desire to own or start a business (Bae et al., 2014). Thompson (2009) defines entrepreneurial intentions as "self-acknowledged convictions by individuals that they intend to set up new business ventures and consciously plan to do so at some point in the future" (p. 687). According to social psychology research, intention is the best variable to predict behavior (Bagozzi et al. 1989). Intentions are impacted by cognitive factors as the earlier described Theory of Planned Behavior presents. However, entrepreneurial intentions happen in a specific context, which is why the contextual factors also have an impact on intentions.

Generally, intentions correlate strongly with actual behavior. However, the correlation can vary substantially (Ajzen, 2011). Based on 422 studies during the previous 10 years, Sheeran (2002) reported a mean overall correlation of 0.53 between intention and behavior. Based on the same review, Sheeran (2002) suggests that intentions explain 28% of the variance in future behavior. According to another meta-analysis made by McEachan et al. (2011), the intention-behavior correlation corresponds to 0.43. The researchers discovered that time acts as a moderator in intention-behavior relation. As more time passes between the measurement of intention and behavior, more events emerge that may interfere with the relationship. The extended interval between measured intention and observed behavior thus reduces the predictive validity of intention (McEachan et al., 2011). This also explains the lower correlation in McEachan's meta-analysis as the studies included had longer intervals between measured intention and behavior.

In entrepreneurship, there have been doubts about whether intentions predict actual entrepreneurial behavior. Nevertheless, several researchers consider entrepreneurial intention a crucial predictor of entrepreneurial behavior as Bae et al. (2014) state in their systematic review. The research field of entrepreneurial intention is quickly developing. However, the research often lacks systemization, which leads to disparate results.

Even though intentions predict behavior better in shorter intervals, it may not be the case when assessing students' entrepreneurial intentions. Commonly students start their careers as employees to gain experience in the field before becoming entrepreneurs (Wennberg et al., 2011). For this reason, assessing whether students' entrepreneurial intentions turn into entrepreneurial behavior right after graduation may give inadequate information. More accurate results can be obtained by measuring students' entrepreneurial intentions a few years after graduation. Although it is not measured in this thesis whether intentions turn into actual behavior, intentions are used as a measure of the effectiveness of entrepreneurship education and the university environment. It is assumed that the higher the entrepreneurial intentions of students are the higher the probability of them becoming entrepreneurs is.

### **2.1.2 Attitude toward entrepreneurship**

Attitude is generally viewed as a representation of "an evaluative integration of cognitions and affects experienced in relation to an object" (Crano & Prislin, 2006, p. 347). In other words, attitude describes how favorably a person evaluates the behavior in question (Ajzen, 1991). According to Moscovici (as cited in Boukamcha, 2015) attitude toward entrepreneurship describes the person's beliefs and knowledge about venture creation. Moscovici also takes into consideration a person's emotional and motivational aspects of entrepreneurial behavior. A positive attitude toward entrepreneurship is thus likely to enhance the entrepreneurial process (Boukamcha, 2015). Attitude is oftentimes used as a predictor of intention (Liñán et al., 2011). Therefore, attitude plays a crucial role in determining whether a person becomes an entrepreneur or not.

Attitudes are less stable than personality traits and they can be changed across time and situations in response to the environment (Robinson et al., 1991). Attitudes are molded by the individual's system values that are formed based on social and cultural patterns (Boukamcha, 2015). System values can be modified by the acquisition of new knowledge and skills derived, for example, from entrepreneurial training. Therefore, entrepreneurship education can influence students' attitudes. Also, (Ajzen, 1991) argues that attitudes are affected by exogenous influences such as traits, skills, and social and cultural support.

Attitudes are often referred to by another concept, desirability. For example, Krueger et al. (2000) use the desirability concept when assessing attitudes. Entrepreneurial desirability is defined by Lucas and Cooper (2012) as the individual's perception of the net benefit of successful entrepreneurial activity. Thus, the definition of desirability is in line with the definition of attitude. Shapero and Sokol (1982, as cited in Boukamcha, 2015) argue that individuals who possess a high level of desirability will more likely feel enthusiastic about the new venture process. Most entrepreneurs are constantly seeking economic opportunities, chal-

lenges, autonomy, authority, and self-realization. Segal et al. (2005) state that having a high desirability level positively influences the intention of becoming an entrepreneur.

### 2.1.3 Entrepreneurial self-efficacy

Self-efficacy describes a person's confidence in their abilities to act and achieve goals (Segal et al., 2005). Thus, entrepreneurial self-efficacy reflects the person's beliefs about the adequacy of their acquired knowledge and skills to establish a business (Brice & Spencer, 2007). The concept is constructed by Bandura in 1986. Self-efficacy is closely linked to motivation which influences an individual's goals and efforts (Gist & Mitchell, 1992). Simon and Tardiff (as cited in Boukamcha, 2015) suggest that the higher the self-efficacy level is, the more motivated the individual is. Self-efficacy is also related to intentions with higher self-efficacy levels leading to higher intention toward a certain behavior (Ajzen, 2011; Zhao et al., 2005). Therefore, the individual's degree of self-efficacy can be used as a predictor of behavior.

An individual's self-efficacy level influences the way the person works and takes on challenges. Bandura (as cited in Hmieleski & Baron, 2008, p. 1) describes self-efficacy levels as follows:

Individuals high in self-efficacy tend to set challenging goals; persist toward the achievement of their goals, even under difficult and stressful circumstances and recover quickly from failure, even in the face of adverse conditions.

Judging from the quote, self-efficacy can be considered to be one of the most important qualities of an entrepreneur. It is stated by several authors that without self-efficacy at all, it is improbable that a potential entrepreneur is motivated enough to set up a business (e.g. Krueger & Brazeal, 1994; Markman et al., 2005; Zhao et al., 2005) From the same perspective, Smith & Woodworth (2012) state that high entrepreneurial self-efficacy levels will increase the engagement, persistence, and performance of individuals in their entrepreneurial tasks. Similarly, Lee et al. (2011) note that people who believe in themselves and their abilities are more motivated toward a new venture creation process.

As mentioned earlier, self-efficacy is known as one of the triggers of entrepreneurial intentions (Chen et al., 1998; McGee et al., 2009). Krueger et al. (2000) argue that a person will develop their entrepreneurial intentions to the extent to which they feel capable of starting a business. In other words, individuals usually

establish higher intentions toward tasks they feel capable of performing. Thus, self-efficacy will contribute to the goals an individual is likely to achieve.

Even though most studies have found a positive link between self-efficacy and entrepreneurial intentions, Boukamcha (2015) reported that perceived self-efficacy did not affect entrepreneurial intentions. Boukamcha argues that in addition to the high entrepreneurial self-efficacy level the business idea should be compelling enough to encourage an individual to start their own business.

## **2.2 Context factors**

Context is the main focus of this study. Regarding organizations, context is defined by Johns (2006) as “situational opportunities and constraints that affect the occurrence and meaning of organizational behavior” (p. 386). For higher education students, a primary context affecting their knowledge and perceptions is universities. Existing research has reported mixed results on the relationship between contextual factors and students’ cognitive variables, yet most studies have discovered positive influences. Nonetheless, the subject is important to study further. In this thesis, context factors are studied through four variables: entrepreneurship education, program learning, entrepreneurial climate, and the achievement of SDGs in universities.

### **2.2.1 Entrepreneurship education**

Entrepreneurship education has become an increasingly important part of the education system. Entrepreneurship education is about developing entrepreneurial attitudes and skills (Bae et al., 2014). It has been debated whether entrepreneurship can be taught (Ivancevich, 1991; Ronstadt, 1987 as cited in Pittaway & Cope, 2007) but today the general view is that entrepreneurial mindset and skills can be learned. According to Liñán (2004), entrepreneurship is a learning process that is based on entrepreneurial training programs. Liñán describes entrepreneurship education as a set of training activities aimed at developing an individual’s motivation and intention toward entrepreneurial actions.

There are different types of entrepreneurship education (e.g. Gorman et al., 1997; Liñán, 2004). Fundamentally, entrepreneurship education can be about developing skills or mindsets. The teaching approach also varies depending on the students’ previous knowledge about entrepreneurship. For example, education for awareness is targeted at students with no previous experience in entrepreneurship. The objective of education is to develop students’ entrepreneurial skills and introduce them to different career options (Liñán, 2004). According to Garavan & O’Cinneide (1994), most university-level programs aim to increase students’ awareness of entrepreneurship and support nascent entrepreneurs. Another type



of entrepreneurship education is targeted at nascent and existing entrepreneurs and the purpose is to provide tools for business development (Liñán, 2004). Also, the methods used in teaching vary from course to course (Pittaway & Cope, 2007) due to which entrepreneurship education consists of a wide variety of teaching.

Entrepreneurship education has several researched benefits for future entrepreneurs (Boukamcha, 2015). At its best, EE can influence students' cognitions and enhance their willingness to start their own businesses (Liñán, 2004). By changing students' mindsets and developing their entrepreneurial orientation EE will eventually promote the new venture creation (Fayolle, 2004). For example, entrepreneurship education most likely promotes a propensity for risk-taking and expands students' awareness of market opportunities and threats (Bae et al., 2014).

*Effect on entrepreneurial intentions.* Researchers and educators are interested in how entrepreneurship education affects students' cognition and skills. Regardless of empirical attempts and several systematic reviews, it is still unknown to what extent students' entrepreneurial intentions and attitudes can be influenced by entrepreneurship education. Research is hampered by numerous influencing factors which cannot be easily moderated. Longitudinal research would be required to better assess the relationship since most of the existing research is cross-sectional survey studies. Nevertheless, the findings of existing research are presented in the following chapters.

Several systematic reviews have reported positive results of the influence of EE on students' entrepreneurial intentions. According to Bae's et al. (2014) meta-analytic review of 73 studies, EE positively influences entrepreneurial intentions with a correlation of .143. Also, Martin et al. (2013) ended up with parallel results about the EE-EI relationship with a weighted correlation of .137 in their meta-analysis. According to the most recent review by Nabi et al. (2017), 75% of the included studies measuring entrepreneurial intentions report a positive link between EE and entrepreneurial intentions but the remaining 25% of articles report mixed or negative findings. Negative influence has been reported concerning certain groups such as male German students (Packham et al., 2010), female Finnish students (Joensuu et al., 2013), and students with previous entrepreneurial exposure (Fayolle et al., 2006). In recent empirical research, for example, Morris et al. (2017) discovered a positive influence of EE on students' entrepreneurial activity in a sample of more than 30,000 students from 25 countries. Similarly, Lee et al. (2018) report positive results in a sample of 927 students in the United States.

As mentioned earlier, numerous factors are moderating the EE-EI relationship. For instance, Kolvereid and Moen (1997) have argued that students enrolling in entrepreneurship programs usually want to become entrepreneurs in the first place. This occurrence has been termed "self-selection bias" and it is confirmed by several researchers (e.g. Liñán, 2004; Noel, 2002). The bias makes it hard to

determine whether post-education entrepreneurial behavior is an outcome of entrepreneurship education or previous interest in entrepreneurship. In Bae's et al. (2014) meta-analysis, the positive results between EE and entrepreneurial intentions were moderated by cultural values. However, by controlling for pre-education entrepreneurial intentions, the EE-EI relationship seems to be nonsignificant according to Bae's et al. meta-analysis. In other words, contextual factors and the background of participants influence the EE relationship with entrepreneurial intentions and attitude toward entrepreneurship (Fayolle et al., 2006).

Leiva et al. (2021), in turn, discovered that a positive correlation between attending entrepreneurship education and entrepreneurial intentions seems to be due to the variability EE shares with program learning. The linkage between EE and program learning is further inspected in the next chapter. Also, Pittaway and Cope (2007) highlight the fact that the studies reporting positive EE-EI relationships in their systematic review do not take into account other variables affecting the relationship such as the influence of society, barriers to action, and enterprise infrastructure. For this reason, it is hard to assess the actual role of EE in the genesis of students' entrepreneurial intentions.

*Effect on attitude towards entrepreneurship.* The relationship between EE and attitude toward entrepreneurship (ATE) is far less studied compared to the EE-EI relationship, but the results are similar. Most studies suggest a positive influence of EE on attitudes toward entrepreneurship but the negative and nonsignificant results are reported, too (Nabi et al., 2017). For example, Martin et al. (2013) discovered in their meta-analysis a statistically significant relationship between EE and a positive perception of entrepreneurship with a correlation of .109. Similar to the EE-EI relationship, nonsignificant and negative results of the EE-ATE relationship are found regarding certain groups such as Spanish students (Lanero et al., 2011) and South-African students (Mentoor & Friedrich, 2007).

*Effect on entrepreneurial self-efficacy.* As self-efficacy is a dynamic construct, it can be developed by learning and by gathering experience (Mcstay, 2008). According to several authors, EE is linked to entrepreneurial self-efficacy (ESE) that may in turn increase entrepreneurial intentions (Wilson et al., 2007; Zhao et al., 2005). Similar to ATE, there are far fewer studies about the relationship between EE and entrepreneurial self-efficacy and the results are somewhat equivocal (Nabi et al., 2017). However, most studies report positive EE-ESE relationships. For example, Martin et al. (2013) discovered a statistically significant relationship between EE and entrepreneurship-related skills and knowledge with a correlation of .237 in their meta-analysis.

Malebana and Swanepoel (2014) suggest that entrepreneurial skills are mostly derived from entrepreneurship training programs. As ESE describes the person's beliefs about their skills, entrepreneurship education plays a crucial role in the

creation of high ESE levels. Thus, according to Malebana and Swanepoel individuals participating in EE tend to have a higher ESE toward venture creation. Similarly, Boukamcha (2015) detected in his case study that individuals felt more capable of starting a business of their own after an entrepreneurial training session.

However, entrepreneurial education has been detected to have a negative influence on students' entrepreneurial self-efficacy according to Chang and Rieple (2013). The authors found a negative relationship between EE and entrepreneurial skills among British students. Also, Souitaris et al. (2007) have reported non-significant results between EE and entrepreneurial self-efficacy.

Generally, it seems that students with less previous exposure to entrepreneurship tend to respond more to entrepreneurship education and can be more affected by the influence of the university (Nabi et al., 2017). Because this thesis examines specifically students without current or nascent entrepreneurship activity and the majority of existing research is reporting a positive influence of EE, it is hypothesized that:

*H1. Participation in entrepreneurship education increases students' entrepreneurial intentions (H1a), attitude toward entrepreneurship (H1b), and entrepreneurial self-efficacy (H1c).*

### **2.2.2 Program learning**

Program learning describes how well students acquire knowledge from education (Souitaris et al., 2007). Participation in entrepreneurship education alone will unlikely have any positive impacts unless learning has occurred. Learning is defined by Rae and Carswell (2001) as a "cognitive process of acquiring and structuring knowledge, of making meaning from experience and of generating new solutions from existing knowledge" (p. 152). Thus, learning increases knowledge and it is strongly related to prior comprehension.

Souitaris et al. (2007) present a conceptual classification originally created by Johannisson (1991) about learning from entrepreneurship education. The classification includes five levels: "Why entrepreneurs act (values, motivation), what needs to be done (knowledge), how to do it (abilities, skills), who should we know (social skills, networks), and finally when to act (experience and intuition)" (Souitaris et al., 2007, p. 572). The classification sums up the versatile features and skills an entrepreneur should obtain. In this study, program learning is assessed by using statements based on Johannisson's classification.

*Effect on cognitive variables.* As proposed in the earlier chapter, entrepreneurship education increases students' entrepreneurial intentions and attitudes towards entrepreneurship. It is assumed that the influence is due to the benefits derived from the education, in other words, due to program learning. Leiva et al. (2021)

discovered a positive correlation between program learning and entrepreneurial intention in their study of Latin American students. Also, Bergmann et al. (2016) found that entrepreneurial learning had a highly significant positive influence on nascent entrepreneurship. However, Souitaris et al. (2007) did not find any correlation between program learning and students' attitudes and intentions.

Previous research has found factors that moderate the effect of program learning. For example, Hytti et al. (2010) discovered that students with intrinsic motivation taking part in a compulsory EE program reported lower learning and less satisfaction with the program because they expected more. In contrast, students participating in the program with extrinsic motivation were more satisfied as they had lower expectations. Also, students' family embeddedness (Palmer et al., 2021) and the type of course (elective vs. compulsory) (Hahn et al., 2020) have been detected to influence the effect program learning has on students' intentions and attitudes.

Because the majority of existing research reports a positive influence on program learning, it is hypothesized that:

*H2. A higher level of program learning increases students' entrepreneurial intentions (H2a), attitude toward entrepreneurship (H2b), and entrepreneurial self-efficacy (H2c).*

### **2.2.3 Entrepreneurial climate**

Entrepreneurial climate describes the work environment at universities from an entrepreneurial perspective (Geissler et al., 2010). In the GUESSS research project, the variable is called university environment, but it will be referred to as entrepreneurial climate in this thesis. Entrepreneurial climate means how well the university succeeds in encouraging and motivating students to become entrepreneurs (Silva et al., 2021). The entrepreneurial climate is measured by students' perceptions of how well the atmosphere at the university inspires students to develop new business ideas (Franke & Lüthje, 2004), whether the climate is favorable for becoming an entrepreneur and whether students are encouraged to engage in entrepreneurial activities.

*Effect on cognitive variables.* Universities' role has been mostly examined in relation to regional economic development. Studies about the influence of the entrepreneurial climate in a university on students' cognitive factors are scarcer and influencing results are hardly obtained (Silva et al., 2021). Geissler et al. (2010) suggested that the entrepreneurial climate to which students are exposed would be an interesting variable when assessing students' entrepreneurial intentions. Since then, there have been some studies conducted that link university characters with entrepreneurial career options. For example, Turker and Sonmez (2009)

examined the effect of educational support, in other words, a supportive university environment on students' career choices. According to their study, university contributing to sufficient knowledge and inspiration about entrepreneurship might increase the possibility of choosing an entrepreneurial career. Schwarz et al. (2009) proposed similar results as they found out that positive perceptions of university actions to promote entrepreneurship increases students' willingness to become an entrepreneur.

Research about the influence of the entrepreneurial climate in a university on students' attitudes and self-efficacy is even scarcer. Some studies utilize Ajzen's Theory of Planned Behavior in assessing the influence of the entrepreneurial culture. For instance, Silva et al. (2021) examined how the entrepreneurial climate affects attitude toward entrepreneurship and the other TBP variables, social norms, and perceived behavior control. Only social norms were significantly affected by the entrepreneurial climate while the influence on attitude toward entrepreneurship and perceived behavior control was weak and not significant (Silva et al., 2021).

Regardless of the scarcity of the prior research, it is hypothesized that:

*H3. Entrepreneurial climate increases students' entrepreneurial intentions (H3a), attitude toward entrepreneurship (H3b), and entrepreneurial self-efficacy (H3c).*

#### **2.2.4 Sustainable development goals in universities**

Sustainable development goals (SDGs) are created and adopted by the United Nations Member States, and they create the targets and guidelines for the 2030 Agenda for Sustainable Development (United Nations [UN], n.d.). The agenda strives for global partnership in ending poverty and other deprivations as well as in tackling climate change and preserving forests and oceans. 17 SDGs include no poverty (1), zero hunger (2), good health and well-being (3), quality education (4), gender equality (5), clean water and sanitation (6), affordable and clean energy (7), decent work and economic growth (8), industry, innovation and infrastructure (9), reduced inequalities (10), sustainable cities and communities (11), responsible consumption and production (12), climate action (13), life below water (14), life on land (15), peace, justice and strong institutions (16) and partnership for the goals (17) (UN, n.d.).

To achieve SDGs, cooperation is needed at several levels from the international level to the individual level. Similarly, actions are needed from all actors including states, private sectors, societies as well as scientific communities. Universities have not only a great opportunity but also a duty to lead change in societies. In recent years, universities have started to pay attention to SDGs in their strategies.

Rector's Council of Finnish Universities (UNIFI) brings together all 13 universities in Finland with common principles, goals, and forms of action to promote sustainable development and responsibility. The goals have been guided by SDGs, Paris Climate Agreement, and Suomen Sitoumus2050. The council has created 12 theses on sustainable development and responsibility to speed up the sustainability actions in universities (Unify, n.d.). A corresponding council for universities of applied sciences is called Arene, the Rector's Conference of Finnish Universities of Applied Sciences. Members of Arene include all 24 universities of applied sciences in Finland and sustainability and responsibility work is one of Arene's strategic priorities (Arene, n.d.).

At JYU, sustainability and responsibility are principal themes in university strategy. A development group called Sustainable and Responsible University of Jyväskylä has been established at the university (JYU, n.d.). The operations model of the development group is based on SDGs, and it covers economic, social, cultural, and ecological responsibility. Since 2013, JYU has been granted WWF Green Office Certificate, which means that JYU is committed to complying with the Green Office criteria and to plan, report, and implement the university's annual environmental work. The Green Office criteria are based on 12 SDGs which include, for example, decent work (8) and innovation (9).

At JAMK, sustainability development and responsibility work are also based on United Nations' SDGs. The work is done in collaboration with Arene, and it is coordinated by the sustainable development committee (JAMK, n.d.). JAMK has been a part of the Principles of Responsible Management (RPME) initiative created by the United Nations that serves as a platform to raise responsibility issues in schools of business. RPME commits universities of applied sciences to provide future business players with the skills needed to balance economic and sustainable development goals through six principles (JAMK, n.d.).

In HEIs, the sustainability and responsibility work can be divided into different categories. For example, Arene divides the actions for increasing carbon handprint into three categories: education, RDI (research, development, and innovation), and management and staff competence (Arene, 2020). The target of education is to train experts who will promote sustainable development and combat the negative effects of climate change in society. The goal of RDI is to produce solutions to sustainability challenges and to reduce the impacts of climate change. For management, sustainability work means acting as an economically, ecologically, culturally, and socially responsible employer. Another side of sustainability work relates to reducing carbon footprint, for example, by reducing emissions (Arene, 2020).

In this study, SDGs relate to two question batteries. Through these instruments, it is measured how well SDGs are being achieved in universities in the minds of students. The first instrument measures how well the university ensures that all

students have equal access to affordable and quality education and have equal participation, representation, and voice in the university's decision-making. The factor also measures how well the university ensures that all students acquire the knowledge and skills needed to promote sustainable development. Thus, the SDGs measured by the first factor are education (4), gender (5), inequality (10), and sustainability (11). The second instrument describes how well the university enhances, facilitates, and supports the development of research, technology, innovation, and entrepreneurship as well as collaboration with local authorities and firms to provide employment for all students. The second factor also measures how well the university enhances the development of sustainable and green practices to mitigate climate change. The SDGs measured by the second factor include innovation (9), work (8), and sustainability (11). In other words, SDGs are one way to measure the university environment from different perspectives.

*Effect on cognitive variables.* The effect of achieving SDGs in university on students' entrepreneurial intentions and other cognitive variables has not yet been researched as such. However, Romdhane et al. (2021) studied the contribution of SDGs to entrepreneurial intentions in a wider population aged 18-64 in 31 OECD countries. In their study, the authors found out that SDG 5, gender equality, positively affects entrepreneurial intentions. Also, SDG 8, decent work, and SDG 16, peace, justice, and strong institutions, have positive influences on entrepreneurial intentions. On the contrary, SDG 15, life on land, and SDG 17, partnership for the goals, represent barriers to entrepreneurial intentions. Based on the results, it can be concluded that economic growth is no longer the origin of entrepreneurial intentions but creating a decent job in a sustainable way is. However, increasing demands for sustainability can be interpreted as obligations and therefore decrease entrepreneurial intentions (Romdhane et al., 2021).

Regarding the SDGs, it is hypothesized that:

*H4.* Achieving the applicable SDGs in university increases students' entrepreneurial intentions (H4a), attitude toward entrepreneurship (H4b), and entrepreneurial self-efficacy (H4c).

## 2.3 Summary

Research about students' entrepreneurial intentions has largely focused on the influence of entrepreneurial education and individual characters. Contextual factors have often been disregarded although entrepreneurial intentions have been claimed to be strongly impacted by context as entrepreneurship in general (Bercovitz & Feldman, 2008; Wennberg et al., 2011). Reliable results are hard to

obtain of the extent to which entrepreneurial intentions can be influenced by entrepreneurship education as there are numerous influencing factors hampering the research. Also, student entrepreneurship has mostly been studied regarding entrepreneurial intentions although there are other cognitive characteristics, such as attitude toward entrepreneurship and entrepreneurial self-efficacy, that affect the probability of entrepreneurial behavior.

Entrepreneurship education is about developing entrepreneurial attitudes and skills (Bae et al., 2014) and it has been argued to being able to change students' mindsets (Bergmann et al., 2016). Program learning, in turn, describes the entrepreneurial learning outcomes yielded from education. It is assumed that the influence of participation in entrepreneurship education is due to the benefits derived from the education, in other words, due to program learning. Mostly positive influences of entrepreneurial education and program learning on students' entrepreneurial intentions, attitudes, and self-efficacy have been reported (Bae et al., 2014; Martin et al., 2013; Nabi et al., 2017). However, there are several moderating factors influencing the relationship such as self-selection bias meaning that students who are interested in entrepreneurship in the first place tend to participate in entrepreneurship education (Kolvereid & Moen, 1997). Therefore, it is hard to determine the direction of the causality of the relationship.

In addition to entrepreneurship education and program learning, university context is researched through entrepreneurial climate and the achievement of SDGs in universities. Entrepreneurial climate describes how well the university succeeds in encouraging and motivating students to become entrepreneurs (Silva et al., 2021) and the achievement of SDGs represents the success of the sustainability and responsibility work carried out by the university. Neither of these variables have been widely researched in relation to students' cognitive characteristics. However, e.g., Turker and Sonmez (2009) have reported in their study that university contributing to sufficient knowledge and inspiration about entrepreneurship might increase the possibility of choosing an entrepreneurial career. Regarding the SDGs, one study was found to measure the influence of SDGs on entrepreneurial intentions in a larger population aged 18-64. SDG 5, gender equality and SDG 8, decent work, were found to positively influence entrepreneurial intentions, which contribute to the hypothesis formation of this thesis. Altogether, more research of the influence of the university context on students' cognitive characteristics is required to which this thesis aims to contribute.



### 3 DATA AND METHODOLOGY

This study aims to measure how students perceive their university from an entrepreneurial perspective. It is of interest to find out whether university context factors increase students' entrepreneurial intentions and cognitive characteristics. This chapter presents the methodology used in the study. First, the qualities of quantitative research are described in general. This is followed by a presentation of the data collection process with an introduction to the questionnaire. Lastly, the process of analysis is described including the statistical methods used.

#### 3.1 Quantitative research

This study uses a quantitative research design which is best suited for processing a large amount of data. The quantitative research method strives to examine established hypotheses through a statistical analysis which allows for verifying the existing theories and developing new ones. An added benefit of quantitative research is its replicability since the method relies on an objective analysis only.

There are several data collection methods used in quantitative research that are suitable for different types of research. This study is carried out using a survey as a research method. A survey, especially an electronic survey, allows for an easy and fast way to collect information from a specific group of individuals. In addition, the research can be well standardized and carried out with relatively few resources. Thus, surveys are well-suited for descriptive studies when a large amount of empirical data is needed. Surveys are also commonly used to describe and explore human behavior, which is also a core of this study (Singleton & Straits, 2009). Furthermore, the results of a quantitative study may be generalizable to the whole population if the research is conducted in an orthodox manner.

Survey studies can be categorized into two segments: cross-sectional surveys and longitudinal surveys. Cross-sectional surveys collect information at one point in time and aim to describe the situation of the moment (Groves et al., 1992). Longitudinal surveys, on the other hand, collect information from various points in time, which allows for the inspection of changes over time (Billiet & Loosveldt, 1988). The data utilized in this study is part of longitudinal research but because this study examines data collected only at one point in time, this study is cross-sectional by nature.

## 3.2 Data collection

This thesis utilizes data collected by the Global University Entrepreneurial Spirit Students' Survey (GUESSS). GUESSS is one of the largest entrepreneurship research projects that has been established in 2003 at the University of St. Gallen in Switzerland. The main goal of the research project is to provide novel insights into student entrepreneurship from an academic and practitioner-oriented perspective. Every 2 to 3 years data is collected globally through online surveys. The data collection is coordinated by country teams in every participating country. In Finland, LUT University is responsible for the collection and processing of the data. The latest data collection took place in 2021. A total of 267,366 students participated from 58 countries, which are both record numbers.

This thesis analyzes data collected from the University of Jyväskylä (JYU) and Jyväskylä University of Applied Sciences (JAMK). The survey was emailed to students from different faculties by the university personnel. The total number of respondents was 190 of which 115 were studying at JYU and 75 at JAMK. The time of data collection varied between the two universities. At JAMK, the responses took place between mid-February and mid-April whereas the responses from JYU dated from the end of May to the end of June. Unfortunately, the number of students reached is not known, and thus, the response rate cannot be determined. The data collection took place before the initiation of this research project due to which there is no more detailed information on the data collection phase available.

### 3.2.1 The questionnaire

The data was collected through an online survey which included validated and up-to-date measurement instruments created by the research team. The survey consisted of a total of 11 sections of which 5 are examined more closely in this thesis. The survey begins with questions about one's studies (level and field of studies) and proceeds to career choice intentions (right after graduation/5 years later and nascent/active entrepreneurship) in the second section. The background information of the respondents is derived mainly from the first two sections.

The main focus of this study is on the third section consisting of university-related questions and on the fourth section focusing on entrepreneurial characteristics. The university-related variables collected include entrepreneurial climate (EC, in the survey called university environment, UE), program learning (PL), participation in entrepreneurship education (EE), and the achievement of the United Nations SDGs in the university of which all are utilized in this study. Entrepreneurial characteristics collected include entrepreneurial intention (EI), atti-

tude toward entrepreneurship (ATE), entrepreneurial self-efficacy (ESE), and locus of control of which the first three variables are used in this thesis. Nascent and active entrepreneurs were excluded from the fourth section due to which this thesis focuses on students with no current entrepreneurial activity. The fifth section collected information about family entrepreneurship, which is not utilized in this study, and the sixth section included questions about personal information (age, gender, marital status).

The rest of the sections not used in this thesis consisted of questions about one's own business, one's planned own business, and parents' business to those applicable to the questions. The survey was concluded by inquiring about their interest in taking part in future surveys and thanking the respondents for participation. The completion time of the survey was estimated to be roughly 10 minutes which was conveyed to students.

The key variables are presented in Table 1 with question examples and references used for the operationalization of the variables. For more detailed information about the questionnaire, see Appendix 1.

TABLE 1. Operationalization of key variables.

Variable	Question example	Reference
Entrepreneurial intention	I am determined to create a business in the future.	Linan & Chen, 2009
Attitude toward entrepreneurship	Being an entrepreneur implies more advantages than disadvantages to me.	Linan & Chen, 2009
Entrepreneurial self-efficacy	<i>Please indicate your level of competence in performing the following tasks...</i> Identifying new business opportunities	Zhao et al. 2005; Chen, 1998; George & Zhou, 2001; Denoble, 1999
Entrepreneurship education	I have attended at least one entrepreneurship course as an elective (/ as a compulsory part of my studies).	no reference
Program learning	<i>The courses and offerings I attended...</i> increased my understanding of the attitudes, values, and motivations of entrepreneurs.	Souitaris et al., 2007
Entrepreneurial culture	There is a favorable climate for becoming an entrepreneur at my university.	Franke & Lüthje, 2004; Geissler et al., 2010
SDGs	<i>My university enhances, facilitates, and supports...</i> the development of sustainable and green practices to mitigate climate change.	United Nations SDGs

### 3.2.2 Question types and answer scales

The questionnaire was created by the GUESSS research team due to which the instrument development process is not described further. The questionnaire consisted entirely of close-ended questions which enable the use of statistical analysis. In other words, all the questions were multiple-choice questions or required only a short numerical answer. Multiple choice question types can be divided into four fundamental levels of measurement scales: nominal, ordinal, interval, and ratio. A nominal scale is used for labeling variables into distinct classifications when there is no quantitative value or order included. In this survey, the nominal scale is used, for example, in questions about the respondents' field of study, gender, and career choice intentions. The ordinal scale enables determining a specific order of the variables instead of only naming them. Ordinal scale variables are the most used in this survey as explained later in this chapter. The interval scale offers, in addition to labels and order, a specific interval between each of its variable options. An interval scale is used to determine respondents' year of birth. The ratio scale, in turn, can accommodate the value of "zero" compared to the interval scale. The ratio scale is used in a few questions outside the scope of this study.

The questionnaire consisted mostly of descriptive statements to which respondents were instructed to choose a level of agreement on a 7-point Likert scale. The Likert scale is majorly used by researchers to gauge opinions and attitudes of respondents. The response options in this survey ranged from "strongly disagree" (1) to "strongly agree" (7) or "not at all" (1) to "very much" (7) depending on the question. All the statements are formed unilateral meaning there are no inverted questions. Pure positive formulation of questions has received some criticism from researchers as it may cause acquiescence biases by directing respondents to give answers mainly on the other end of the scale (Liñán & Chen, 2009). Therefore, the formulation of the statements sets some limitations to the study, but statistical techniques are used to confirm the reliability and validity of the survey.

All the central variables are rated through several correlating substatements. Existing research has confirmed that responses to multi-item scales are more valid, accurate, and reliable than responses to just one statement (Rushton et al., 1983). For example, entrepreneurial intentions are investigated through six items to which the respondents individually answer. The statements of all the used variables are presented in Chapter 4 and Appendix 1.

### 3.3 Process of analysis

#### 3.3.1 Cleaning the dataset

The data was received in a form of an Excel document from LUT University whose responsibility was to compile the collected data. Then, the data was carefully evaluated and reviewed. The questions were revised for inverted questions that resulted in being nonexistent in the data. Missing data were identified, which had been made visually easy by coding the missing data with a value of -99 or as empty cells. Respondents with insufficient answers, i.e., less than 75% of the questions were unanswered, were eliminated from the data. This resulted in the elimination of two respondents, one from each university.

To be better able to analyze the data, two dummy variables were created regarding respondents' career path intentions right after graduation and five years later. The responses were compressed into fewer options, which enables the analysis of the variable on a more distinct scale. The original response options included 10 choices: an employee in a small business (1), an employee in a medium-sized business (2), an employee in a large business (3), an employee in a non-profit organization (4), an employee in academia (5), an employee in public service (6), a founder (entrepreneur) working in my own business (7), a successor in my parents' / family's business (8), a successor in another business (9), and other / do not know yet (10). As a result, the options that described the desire to become an employee (1-6) were combined. Option 7, the intent to become a founder, was kept as an individual option while options 8 and 9 representing the desire to become a successor were combined. Option 10 (other/do not know yet) was kept as an individual choice of answer.

Analysis of the data was performed using a statistical software IBM SPSS Statistics 26. Before importing the data to the software, the excess variables not utilized in this study were deleted. In SPSS, before starting the actual analysis of the data, the variables were named, values were labeled, and missing data were marked.

#### 3.3.2 Tests of validity and reliability

Prior to testing the hypotheses, the construct validity of the variables had to be determined. Construct validity evaluates whether a measurement tool actually measures the intended construct. Therefore, items within one construct should correlate stronger with each other than with items of any other construct. Exploratory factor analysis (EFA) is performed to determine the degree to which the items of a construct that should be related to each other are in fact related. Consequently, EFA creates factors from a group of variables based on how they correlate with one another (Karjaluoto, 2007). According to Karjaluoto, factor analysis is mostly used for compressing information, hypothesis testing, and as pre-

analysis for other statistical tests. In this study, the main purpose of performing factor analysis is to determine how the factors generated by factor analysis compare to measurement instruments created by the research team.

All key variables except participation in entrepreneurship education are included in the factor analysis. Entrepreneurship education is left out due to the nominal type of questions. All the other variables are assessed using the Likert scale, which makes the variables suitable for factor analysis. Factor analysis is performed by using the Principal axis factoring method and Promax as a rotation method. Factor analysis is performed several times with a different number of factors to extract. The first round of analysis is performed with the original number of variables, which was seven (see Appendix 2). Because the first round resulted in low Eigenvalues in three factors, the analysis continues until all the factors reached Eigenvalue  $> 1$ . Because of the large number of items, the contextual and cognitive variables were tested also separately with a different number of factors to extract. Eventually, the number of factors is determined based on Eigenvalue  $> 1$ , and all the items are tested in a single analysis. Based on the extracted factors, sum variables are formed, and no single items are removed.

The data is also tested for common method variance to explain whether the correlations between measures are due to actual correlations between the constructs or whether the correlations are created by the measurement instrument or the measurement process. Variance created by the measurement instrument might be due to, for example, that respondents prefer to answer only on the other end of the scale. Common method variance is tested by using Harman's single factor test. All the items are loaded into one common factor, which reveals the variance that a single factor explains. If the total variance is less than 50%, it suggests that common method bias does not affect the data. Harman's single factor test has received some criticism from scholars, but it is commonly used due to its simplicity.

After verifying the validity of the variables, the variables must be tested for reliability, too. As mentioned above, the ordinal scale variables consisted of multiple items, which is claimed to increase the reliability of the responses (Rushton et al., 1983). A thematic relationship between all the items is assumed in order for the items to measure the same subject. To ensure the internal consistency of the answers, a coefficient of reliability is computed using Cronbach's alpha. Cronbach's alpha is calculated for the sum variables created based on the factor analysis. Cronbach's alpha is the most popular coefficient of reliability, and it is especially suited for behavioral studies.

The possible range of values is defined between 0 and 1 where the value 0 signifies no internal consistency at all and value 1 absolute consistency. Generally, a value  $\geq 0.7$  is considered acceptable, which is also sought in this study. A value close to one is not necessarily worth pursuing as there might be redundant items

in that case (Schmitt, 1996). An appropriate value of Cronbach's alpha allows for further analysis of the entire construct.

### **3.3.3 Descriptive statistics**

To begin the analysis of the results, the data were first analyzed by using descriptive statistics to demonstrate and summarize data findings in a meaningful way as well as to identify initial patterns in the data. Descriptive statistics consists of two categories of measures: measures of central tendency and measures of variability. Measures of central tendency are used to describe the center of the data and the measures of variability, in turn, describe the dispersion of data. In this study, mean responses are determined alongside standard deviations. In addition to obtaining a general overview of the data, determining mean responses allows for a comparison of the responses between different groups of respondents. Therefore, descriptive statistics play an important role in this research in which students' perceptions are of great interest.

Descriptive statistics were also used to demonstrate the respondents' background and demographics. The respondents were analyzed by gender, year of birth, university, and level of studies as well as the main field of studies. Also, the respondents' career path intentions were determined right after graduation and five years later. Additionally, the number of nascent and active entrepreneurs was defined.

### **3.3.4 Testing the hypotheses**

In order to test the proposed hypotheses, a correlation analysis is performed. The correlational analysis aims to determine the relationship between variables. If the correlation is weak, there is no dependency between the variables. Likewise, if the correlation is strong the variables are dependent on each other. The value of correlation can be anything between -1 and 1 where the extremes describe absolute dependency between the variables. Positive values describe positive correlation, meaning that if one variable increases, the other variable increases as well. A negative correlation describes a relationship in which one variable increases as the other decreases.

The correlations are determined by calculating the Pearson correlation coefficient. It is the most common correlation coefficient, and it is used to measure linear relationships (Gravetter & Forzano, 2016). Even though correlation analysis cannot explain the relationship between the variables, hypotheses often include an assumption of some variables acting as predictor variables and the other variables as criterion variables (Gravetter & Forzano, 2016). However, correlation analysis does not provide information about which variable affects which, but it is up to the researcher to determine.

Because participation in entrepreneurship education is surveyed through a nominal type of variables, it is easier to measure the relationship of the variable to cognitive variables by comparing means. Therefore, a T-test is performed to compare the means of different groups of students based on participation in entrepreneurship education. A T-test is the most popular test used to compare means between two independent samples. First, the equality of variances is analyzed through Levene's test statistic. If Levene's test results in a value of sig > .05, equal variance is assumed, which determines how the results will be interpreted. As a result of the T-test, test statistics and significance levels will be reported.

To further test the hypotheses, regression analysis is performed. Regression analysis has many similarities with correlation analysis but unlike correlation analysis, regression analysis takes into account the combined effect of the independent variables on the dependent variable. Linear regression analysis is performed for each dependent variable separately. Adjusted R square is reported to describe how well the contextual variables explain the cognitive variable in question. Standardized Beta coefficients are used in the comparison of the variables. For the effect to be significant the following criteria must be met: Sig. < 0.01 and t > 2.



## 4 RESULTS

In this section, the results of the statistical analysis are presented. First, descriptive statistics are presented starting from the respondents' background and demographics. Then, the item statistics are described for cognitive and context variables as they are organized in the questionnaire. In the second part of the chapter, the results of factor analysis are presented along with values of Cronbach's alpha. The final part of the chapter presents the adjustment of the hypotheses and the results of hypothesis testing.

### 4.1 Descriptive statistics

#### 4.1.1 Participants' background and demographics

The data was collected in HEIs in Jyväskylä. A total of 190 responses were collected of which two were eliminated due to insufficient answers. 60.5% of the respondents were students at the University of Jyväskylä and 39.5% at Jyväskylä University of Applied Sciences. Most of the respondents were undergraduate (Bachelor level) students (46.8%) or graduate (Master level) students (34%) (Table 2). Students completing a PhD degree accounted for 18% of the respondents while .5% of the respondents informed their level of studies to be "other" (e.g., MBA).

Women were more active in responding than men, with 55.9% and 40.4% shares, respectively. 3.2% of the respondents recognized themselves as "other" in terms of gender and .5% left unanswered. According to recent statistics, 57% of Finnish graduates from HEIs are women (Official Statistics of Finland, 2021). Thus, the data represents well the distribution of gender in Finnish HEIs. In terms of age, a vast majority of the respondents (61.2%) were 19-29 years old. 37.3% of the respondents were 30 years old or older and 1.5% did not report their age. The median age was 27 years. See more detailed information in Table 2.

As to the distribution of the fields of study, a majority of the respondents (35.7%) were business, management, and economics students. The next most represented fields of study were computer science/IT (14.9%) and social sciences (14.4%). About one-tenth of the respondents were studying human medicine or health sciences (10.1%) as well as arts and humanities (9.6%). The least represented fields include natural science/mathematics (6.9%) and engineering (4.3%). 4.3% of the respondents left unanswered the question or they were studying something else.

TABLE 2. Descriptive statistics of all the respondents (n=188).

		N	%
Gender	Male	76	40.4
	Female	105	55.9
	Other	6	3.2
	No response	1	0.5
Age	19-24	59	31.4
	25-29	56	29.8
	30-35	37	19.7
	36 or more	33	17.6
	No response	3	1.5
Level of study	Undergraduate (Bachelor level)	88	46.8
	Graduate (Master level)	64	34.0
	PhD	35	18.6
	Other	1	0.5
	No response	0	0
Field of study	Arts / Humanities / Science of art	18	9.6
	Business / Management / Economics	67	35.7
	Computer sciences / IT	28	14.9
	Engineering	8	4.3
	Human medicine / Health sciences	19	10.1
	Natural sciences / Mathematics	13	6.9
	Social sciences	27	14.4
	Other / No response	8	4.3
Total		188	100%

*Participation in entrepreneurship education.* Because the target of this study is to collect information about entrepreneurship education in local HEIs, it is of interest to differentiate the demographics of those students who have taken part in entrepreneurship education from those who have not. There is a significant difference in the percentage of students who have participated in entrepreneurship courses between JYU and JAMK (Table 3). A slightly larger proportion of men have participated in EE compared to women (64.5% and 57.1% respectively). In the younger age groups, a larger proportion has attended EE compared to the older age groups. A similar pattern is seen regarding the level of studies as undergraduate students have been more active in participation in EE compared to graduate and PhD level students. Regarding the field of studies, the largest relative share of students who have participated in EE is business, management, and economics students (80.6%). Also, computer science and IT students have been active in taking part in EE (75%). The fields of studies with the smallest share of students who have participated in EE include engineering (12.5%), arts, humanities, and science of art (22.2%), and social sciences (22.2%). Most of active as well as nascent entrepreneurs have participated in EE during their studies.

TABLE 3. Descriptive statistics based on the participation in entrepreneurship education.

		Has attended EE	Has not attended EE
		%	%
University	JYU	44.7	55.3
	JAMK	82.4	17.6
Gender	Male	64.5	35.5
	Female	57.1	42.9
Age	19-24	67.8	32.8
	25-29	67.9	32.1
	30-35	51.4	48.6
	36 or more	36.4	63.6
Level of study	Undergraduate (Bachelor level)	73.9	26.1
	Graduate (Master level)	54.7	45.3
	PhD	34.3	65.7
Field of study	Arts / Humanities / Science of art	22.2	77.8
	Business / Management / Economics	80.6	19.4
	Computer sciences / IT	75.0	25.0
	Engineering	12.5	87.5
	Human medicine / Health sciences	47.4	52.6
	Natural sciences / Mathematics	38.5	61.5
	Social sciences	22.2	77.8
	Other / No response	75.0	25.0
Entrepreneurs	Active	52.4	47.6
	Nascent	63.6	36.4

*Career choice intentions.* Respondents were asked about their career choice intentions right after graduation and five years later. Most of the respondents plan to be employees right after graduation (66.5%) as well as five years after completion of studies (52.1%). The number of respondents planning to become entrepreneurs is higher five years after completion of studies (21.3%) than right after graduation (11.2%). Only 2.7% of the respondents plan to become successors right after graduation and 5.3% five years later. 19.7% of the respondents did not know yet which career path they would pursue right after graduation, or they had other plans outside of the given response options. Five years after the completion of the students the corresponding share of responses was 21.3%.

In more detail, the most preferred career choice option right after graduation was to become an employee in academia (19.7%) (Figure 2). Respondents with no clear career path plans accounted for an identical share of responses (19.7%). The next most popular career choice was to become an employee in a medium-sized business (14.4%). Being a founder in their own business was the intended career

choice for 11.2% of the respondents. A similar share of respondents desired to become an employee in a small business (11.2%). Being an employee in a large business was alluring to 10.6% of the respondents. The least favorable options included an employee in a non-profit organization (2.1%), a successor in a family business (1.6%), and a successor in another business (1.1%).

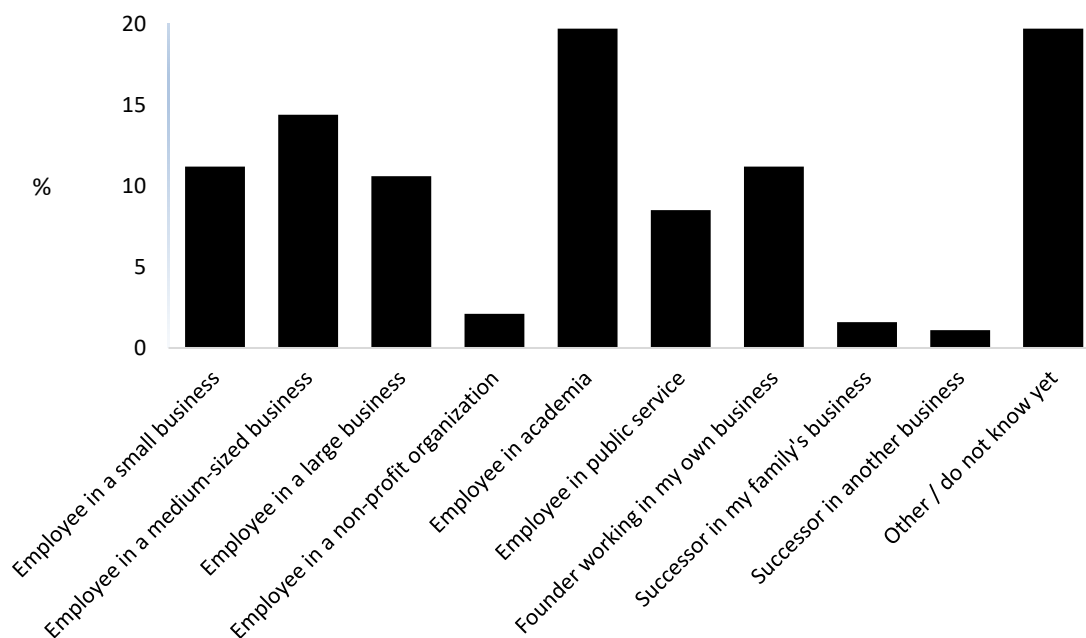


FIGURE 2. Career choice intentions of the respondents right after graduation.

Five years later the intended career paths look different (Figure 3). A single most popular option was to become a founder of one's own business (21.3%). At the same time, a similar share of respondents did not know yet which career path they would like to choose (21.3%). Being an employee in academia maintains its popularity as 15.4% of the respondents chose it as their intended career path also five years later. The next most popular choices included being an employee in a large business (11.2%), in public service (7.4%), in a medium-sized business (6.9%), and in a small business (6.4%). The least favorable options were similar to the ones right after graduation: being an employee in a non-profit organization (4.8%), a successor in another business (3.2%), and a successor in a family business (2.1%).

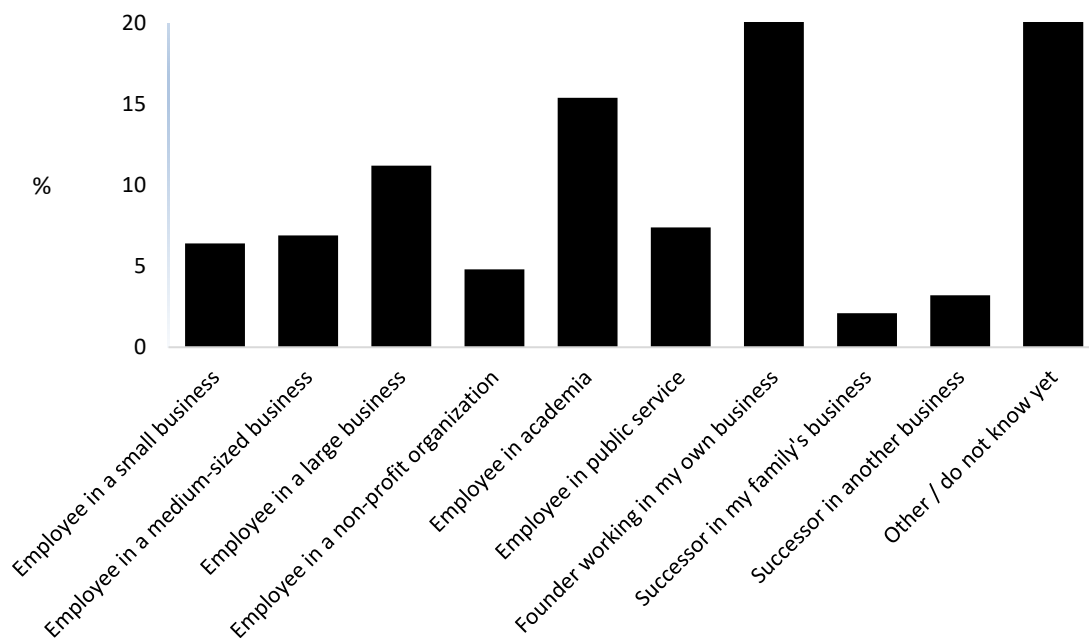


FIGURE 3. Career choice intentions of the respondents five years after the completion of studies.

*Entrepreneurial activities.* The respondents were asked about their current entrepreneurial activities. Active entrepreneurs were recognized by a question “Are you already running your own business / are you already self-employed?”. A total of 21 respondents (11.2%) answered affirmatively (Table 4). Nascent entrepreneurship was inquired by a question “Are you currently trying to start your own business / to become self-employed?”. 22 respondents (11.7%) recognized themselves as nascent entrepreneurs. There was some overlap in the responses due to which the combined number of active and nascent entrepreneurs was 37 (19.7% of the total respondents). Because active and nascent entrepreneurs were instructed to skip the fourth section of the questionnaire about their entrepreneurial characteristics they are not included in the further analysis of the relationship between university and students’ cognition.

TABLE 4. Number of nascent and active entrepreneurs of the respondents.

	%	N	%	N	%	N
	Total	Total	Male	Male	Female	Female
Active entrepreneurs	11.2	21	57.1	12	42.9	9
Nascent entrepreneurs	11.7	22	68.2	15	31.8	7
Combined	19.7	37	56.8	21	43.2	16

### 4.1.2 Cognitive factors

The selected cognitive factors are divided into three question batteries in the survey: entrepreneurial intentions, attitudes toward entrepreneurship, and entrepreneurial self-efficacy. All the variables are measured on a 7-point Likert scale. The item statistics are presented next in a similar order as the variables are constructed in the questionnaire.

Respondents' entrepreneurial intentions are surveyed through six items. The mean responses vary on both sides of the three (Table 5). The highest mean response (3.07) is achieved through item 5 describing the thought process about starting a business. In comparison, more definitive items such as item 3 (*I will make every effort to start and run my own business*) ranked lower (2.53).

The items measuring attitude toward entrepreneurship are very similar to the items measuring entrepreneurial intentions. The mean responses are a bit higher compared to entrepreneurial intentions ranging from 2.91 to 3.83 (Table 5). Similar to entrepreneurial intentions, the more definitive items ranked lower compared to softer and more general statements. For example, item 5 (*Among various options, I would rather become an entrepreneur*) reached a mean of 2.91 while item 3 (*If I had the opportunity and resources, I would become an entrepreneur.*) ranked significantly higher with a mean of 3.83.

Entrepreneurial self-efficacy is measured through seven items that describe the respondents' competencies in entrepreneurial tasks. The mean responses range from 3.59 to 4.68 (Table 5). Items 4 and 5 expressing communicating and networking skills are the only items that achieved a mean above 4. The lowest-ranked items include items 2 and 3 which describe skills related to creating and managing innovations (Table 5).

TABLE 5. Item statistics of entrepreneurial intentions (EI), attitude toward entrepreneurship (ATE), and entrepreneurial self-efficacy (ESE).

Instruction	Item	Mean	Std. Deviation
<i>Please indicate your level of agreement with the following statements (1=strongly disagree, 7=strongly agree). Entrepreneur refers to someone who</i>	EI 1 - I am ready to do anything to be an entrepreneur.	2.56	1.636
	EI 2 - My professional goal is to become an entrepreneur.	2.74	1.813
	EI 3 - I will make every effort to start and run my own business.	2.53	1.743
	EI 4 - I am determined to create a business in the future.	2.81	1.906
	EI 5 - I have very seriously thought of starting a business.	3.07	1.982
	EI 6 - I have a strong intention to start a business someday.	2.91	1.940

<i>runs his or her own business.</i>	ATE 1 - Being an entrepreneur implies more advantages than disadvantages to me.	3.26	1.776
	ATE 2 - A career as an entrepreneur is attractive to me.	3.26	1.903
	ATE 3 - If I had the opportunity and resources, I would become an entrepreneur.	3.83	2.134
	ATE 4 - Being an entrepreneur would entail great satisfaction for me.	3.38	1.993
	ATE 5 - Among various options, I would rather become an entrepreneur.	2.91	1.885
<i>Please indicate your level of competence in performing the following tasks (1=very low competence, 7=very high competence).</i>	ESE 1 - Identifying new business opportunities	3.78	1.617
	ESE 2 - Creating new products and services	3.59	1.626
	ESE 3 - Managing innovation within a business	3.56	1.660
	ESE 4 - Being a leader and communicator	4.68	1.663
	ESE 5 - Building up a professional network	4.03	1.564
	ESE 6 - Commercializing a new idea or development	3.63	1.699
	ESE 7 - Successfully managing a business	3.64	1.772
<i>Total responses N</i>			150-151

### 4.1.3 Context factors

In the questionnaire, university-related contextual factors are divided into five question batteries: entrepreneurship education, entrepreneurial climate, program learning, equality and diversity, and innovation and collaboration. In this paragraph, the item statistics are presented including means and standard deviations as well as relative shares regarding the participation in entrepreneurship education.

Students' participation in entrepreneurship education is examined through four dichotomic variables. A slight majority of the respondents (59.6%) have taken part in at least one entrepreneurship course during their studies. Most of those students (33.5%) have attended an entrepreneurship course as a compulsory part of their studies (Table 6). 25.5% have chosen to take an entrepreneurship course as an elective and 10.1% are studying in a specific program on entrepreneurship. Multiple answers were possible, which creates overlap in the answers.

TABLE 6. Item statistics of entrepreneurship education (EE).

<i>Please indicate which of the following applies to you (multiple answers possible).</i>	N	%
EE 1 - I have not attended a course on entrepreneurship so far.	76	40.4
EE 2 - I have attended at least one entrepreneurship course as elective.	32	17.0
EE 3 - I have attended at least one entrepreneurship course as a compulsory part of my studies.	55	29.3
EE 4 - I am studying in a specific program on entrepreneurship.	19	10.1
<i>Total responses N</i>		188

In the context of taking part in entrepreneurship education, there was also a fifth response option: "I chose to study at this university mainly because of its strong

entrepreneurial reputation.” The variable was not included in the analysis of entrepreneurship education as it does not describe the attendance in the education. However, important information on the entrepreneurial reputation of the universities and its influence on students’ choice of place of study can be drawn from the question. The percentage of students who had chosen their university based on its entrepreneurial reputation was 5.3% in total. More specifically, 2.7% of the respondents studying at JAMK and 7.0% studying at JYU claim to have chosen their university based on its entrepreneurial reputation

The rest of the contextual variables are measured on a 7-point Likert scale and mean responses and standard deviations are reported. First, the university’s entrepreneurial climate was measured through three statements. Mean responses vary between 4.20 and 4.48, which indicates that students perceive universities’ entrepreneurial climate positively (Table 7).

Program learning variable measured how well the courses the students had attended had increased their understanding and abilities. The variable was researched through five items and the mean responses ranged around four (Table 4). Items 4 and 5 describing the ability to develop networks and to identify opportunities reached the highest means (4.43 and 4.23, respectively).

The items relating to SDGs were divided into two question batteries. The first question battery consisted of items measuring equality and they were ranked the highest among all contextual variables. The first item “*My university ensures that all students have equal access to affordable and quality education*” reached a mean of 6.16 which is exceptionally high on a scale from 1 to 7 (Table 7). Also, the other two items reached means of 5.48 and 5.45, which shows that students believe equality is achieved in their universities.

Another question battery consisted of items measuring development and collaboration. It describes the fulfillment of three SDGs (innovation, work, and sustainability) in the universities, and it was researched through three items. The items are all ranked high as the means vary between 4.52 and 5.46 (Table 7). Therefore, students feel that the university supports the development of various issues as well as collaboration with local authorities and firms.

TABLE 7. Item statistics of entrepreneurial climate (EC), program learning (PL), and social development goals (SDG)

Instruction	Items	Mean	Std. Deviation
<i>Please indicate the extent to which you agree with the following statements</i>	EC 1 – The atmosphere at my university inspires me to develop ideas for new business.	4.20	1.654
	EC 2 – There is a favorable climate for becoming an entrepreneur at my university.	4.36	1.614



<i>about the university environment (1=not at all, 7=very much).</i>	EC 3 – At my university, students are encouraged to engage in entrepreneurial activities.	4.48	1.570
<i>The courses and offerings I attended...</i>	PL 1 – increased my understanding of the attitudes, values, and motivations of entrepreneurs.	3.98	1.818
	PL 2 – increased my understanding of the actions someone has to take to start a business.	3.87	1.822
	PL 3 – enhanced my practical management skills to start a business.	3.72	1.777
	PL 4 – enhanced my ability to develop networks.	4.43	1.661
	PL 5 – enhanced my ability to identify an opportunity.	4.23	1.644
<i>My university ensures that all students (irrespective of gender, age, ethnicity, religion, disability, or socio-economic status) ...</i>	SDG 1 – have equal access to affordable and quality education.	6.16	1.118
	SDG 2 – have equal participation, representation, and voice in the university’s decision-making.	5.48	1.388
	SDG 3 – acquire the knowledge and skills needed to promote sustainable development.	5.45	1.388
<i>My university enhances, facilitates, and supports...</i>	SDG 4 – the development of research, technology, innovation, and entrepreneurship.	5.46	1.376
	SDG 5 – the collaboration with local authorities/firms to provide employment for all students.	4.52	1.625
	SDG 6 – the development of sustainable and green practices to mitigate climate change	4.95	1.443
<i>Total responses N</i>			<i>186-188</i>

In addition, it was of interest to find out whether the type of education the students had participated in influenced the learning outcomes. Variable program learning measured entrepreneurial learning outcomes regarding all the courses students had completed instead of only measuring learning outcomes from entrepreneurship education. Students who are studying in a specific program on entrepreneurship reported the highest program learning regarding all of their studies (5.52) (Table 8). In comparison, students who had not taken part in entrepreneurship education reported the lowest program learning (3.37). There was no significant difference between the students who had participated in entrepreneurship courses either as elective or compulsory (4.57 and 4.26, respectively).

TABLE 8. Mean responses of program learning based on the participation in entrepreneurship education.

	Mean	Std. Deviation	N
I have not attended a course on entrepreneurship so far	3.37	1.461	75
I have attended at least one entrepreneurship course as elective (and no compulsory courses)	4.57	1.231	36
I have attended at least one entrepreneurship course as compulsory (and no elective courses)	4.26	1.314	51
I am studying in a specific program on entrepreneurship	5.52	1.341	19

## 4.2 Factor analysis

Prior to analyzing the results of the factor analysis, the suitability of variables for factor analysis is determined through communalities. Generally, communalities of  $>.3$  allow for the variables to be used in factor analysis (Karjaluoto, 2007). In this data, communalities vary between .456 and .867 due to which all the variables will be included in further analysis (Table 9).

A total of 32 variables are included in the factor analysis. In the survey, they are divided into seven separate factors: entrepreneurial climate, program learning, equality, development and collaboration, entrepreneurial intention, attitude toward entrepreneurship, and entrepreneurial self-efficacy on which the theoretical framework is based on. As a result of factor analysis, the variables are suppressed into four factors (Table 9). The number of factors is determined based on the initial Eigenvalue  $> 1$ . Prior to rotation, the first factor explains 41.97% of the total variance, the second factor for 14.98%, the third factor for 6.32%, and the fourth factor for 3.82%. Cumulatively, factor solutions explain 67.09% of the variance. Thus, 32,91% of the information has been lost as a result of the factor analysis.

TABLE 9. Total variance explained.

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	13.714	42.856	42.856	13.431	41.972	41.972	11.603
2	5.139	16.059	58.916	4.793	14.979	56.950	9.242
3	2.373	7.417	66.332	2.021	6.316	63.266	8.399
4	1.606	5.018	71.350	1.223	3.821	67.088	3.926

Extraction Method: Principal Axis Factoring.

The rotated factor matrix (Table 10) illustrates the constructs of the four identified factors. The factors are renamed based on the highest factor loadings and the original variable names. The first factor consists of 11 variables that were used in the survey to measure entrepreneurial intentions and attitudes toward entrepreneurship. Because all the variables in question measure the interest in becoming an entrepreneur, the first factor is retained as entrepreneurial intentions.

The second factor consists of 11 variables that were originally used to measure program learning, entrepreneurial climate, and SDGs regarding development

and collaboration. Therefore, the factor describes both learning effects and environmental factors in the university context. The factor is renamed as entrepreneurial university environment.

The third factor includes all the seven variables describing entrepreneurial self-efficacy based on the respondent's perceived skills due to which the factor retains its original name, entrepreneurial self-efficacy. The fourth factor consists of the three variables describing equality in the universities. Therefore, the final factor also retains its original name as equality.

TABLE 10. Rotated factor matrix (values > .3 are bolded).

Variable	Factor				Communality
	1	2	3	4	
ATE 5 - Among various options, I would rather become an entrepreneur.	<b>.965</b>	-.004	-.067	.020	.867
EI 2 - My professional goal is to become an entrepreneur.	<b>.959</b>	-.009	-.064	-.012	.849
ATE 4 - Being an entrepreneur would entail great satisfaction for me.	<b>.938</b>	-.033	-.039	.125	.850
ATE 2 - A career as an entrepreneur is attractive to me.	<b>.932</b>	-.045	-.017	.047	.828
EI 4 - I am determined to create a business in the future.	<b>.923</b>	.019	-.004	-.046	.857
EI 3 - I will make every effort to start and run my own business.	<b>.914</b>	.112	-.096	-.071	.823
EI 6 - I have a strong intention to start a business someday.	<b>.912</b>	-.091	.071	.042	.848
ATE 3 - If I had the opportunity and resources, I would become an entrepreneur.	<b>.830</b>	-.143	.095	.096	.706
EI 1 - I am ready to do anything to be an entrepreneur.	<b>.822</b>	.123	-.064	-.021	.706
ATE 1 - Being an entrepreneur implies more advantages than disadvantages to me.	<b>.777</b>	.060	.023	-.003	.667
EI 5 - I have very seriously thought of starting a business.	<b>.777</b>	-.131	.178	.053	.702
PL 3 - enhanced my practical management skills to start a business.	.075	<b>.919</b>	-.003	-.231	.752
PL 2 - increased my understanding of the actions someone has to take to start a business.	.176	<b>.849</b>	-.129	-.143	.662
EC 2 - There is a favorable climate for becoming an entrepreneur at my university.	-.137	<b>.831</b>	.062	.042	.698
EC 3 - At my university, students are encouraged to engage in entrepreneurial activities.	-.189	<b>.822</b>	-.013	.048	.615
PL 1 - increased my understanding of the attitudes, values, and motivations of entrepreneurs.	.280	<b>.789</b>	-.161	-.018	.717
PL 5 - enhanced my ability to identify an opportunity.	.009	<b>.768</b>	.104	-.051	.653
EC 1 - The atmosphere at my university inspires me to develop ideas for new business.	.047	<b>.658</b>	-.018	.166	.579
PL 4 - enhanced my ability to develop networks.	-.168	<b>.609</b>	.178	.093	.490
D&C 1 - the development of research, technology, innovation, and entrepreneurship.	-.100	<b>.504</b>	.117	.276	.498

D&C 2 – the collaboration with local authorities/firms to provide employment for all students.	.063	<b>.445</b>	.015	<b>.353</b>	.512
D&C 3 – the development of sustainable and green practices to mitigate climate change	-.115	<b>.418</b>	.003	<b>.400</b>	.460
ESE 5 - Building up a professional network	-.183	.032	<b>.847</b>	.065	.630
ESE 4 - Being a leader and communicator	-.144	-.099	<b>.846</b>	.059	.555
ESE 3 – Managing innovation within a business	.130	.071	<b>.764</b>	-.107	.750
ESE 1 - Identifying new business opportunities	.214	.037	<b>.667</b>	-.037	.669
ESE 7 - Successfully managing a business	.171	.033	<b>.657</b>	-.065	.595
ESE 6- Commercializing a new idea or development	.212	.146	<b>.591</b>	-.017	.657
ESE 2 - Creating new products and services	.277	.014	<b>.579</b>		.588
EQ 2 – have equal participation, representation, and voice in the university’s decision-making.	.144	-.041	-.007	<b>.813</b>	.665
EQ 1 – have equal access to affordable and quality education.	.061	-.028	.008	<b>.679</b>	.456
EQ 3 – acquire the knowledge and skills needed to promote sustainable development.	.020	.185	-.056	<b>.656</b>	.565

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

Rotation converged in 7 iterations.

Harman’s single factor test is performed to measure the common method variance. Single factor explains 41.29% of the variance from which it can be assumed that common method bias does not affect the data.

Cronbach’s alpha was calculated for factors generated as the result of factor analysis. Calculation of Cronbach’s alpha resulted in a very high level of internal consistency in all the core variables. The first factor, entrepreneurial intentions, reached the highest value,  $\alpha = .975$ . The second factor, entrepreneurial environment, reached a value of  $\alpha = .929$ . Entrepreneurial self-efficacy resulted in a value of  $\alpha = .916$  and equality and diversity  $\alpha = .799$ .

### 4.3 Testing the hypotheses

Hypotheses are primarily tested using correlation analysis and regression analysis. Because participation in entrepreneurship education is researched through several dichotomic variables, hypothesis 1 is tested by comparing means. A T-test is used to determine the statistical significance of the results. Prior to testing the hypotheses, the hypotheses need to be adjusted due to the results of the factor analysis.

#### 4.3.1 Adjusting the hypotheses

Because factor analysis resulted in different kinds of factors than which the theory was based on, the hypotheses need to be adjusted. Hypotheses 2 and 3 are

compressed into a single hypothesis that is renamed (Table 11). Also, hypothesis 4 is renamed and renumbered and the variable “attitude toward entrepreneurship” is removed from all the hypotheses.

TABLE 11. Adjustment of the hypotheses.

Original hypothesis	Adjusted hypothesis
<i>H1.</i> Participation in entrepreneurship education increases students’ entrepreneurial intentions (H1a), attitude toward entrepreneurship (H1b), and entrepreneurial self-efficacy (H1c).	<i>H1.</i> Participation in entrepreneurship education increases students’ entrepreneurial intentions (H1a), and entrepreneurial self-efficacy (H1b).
<i>H2.</i> Higher program learning increases students’ entrepreneurial intentions (H2a), attitude toward entrepreneurship (H2b), and entrepreneurial self-efficacy (H2c).	<i>H2.</i> Entrepreneurial university environment increases students’ entrepreneurial intentions (H2a), and entrepreneurial self-efficacy (H2b).
<i>H3.</i> Entrepreneurial climate in a university increases students’ entrepreneurial intentions (H3a), attitude toward entrepreneurship (H3b), and entrepreneurial self-efficacy (H3c).	<i>H3.</i> Equality in a university increases students’ entrepreneurial intentions (H3a), and entrepreneurial self-efficacy (H3b).

Due to the change in variables, the research model must be adjusted too (see Figure 4).

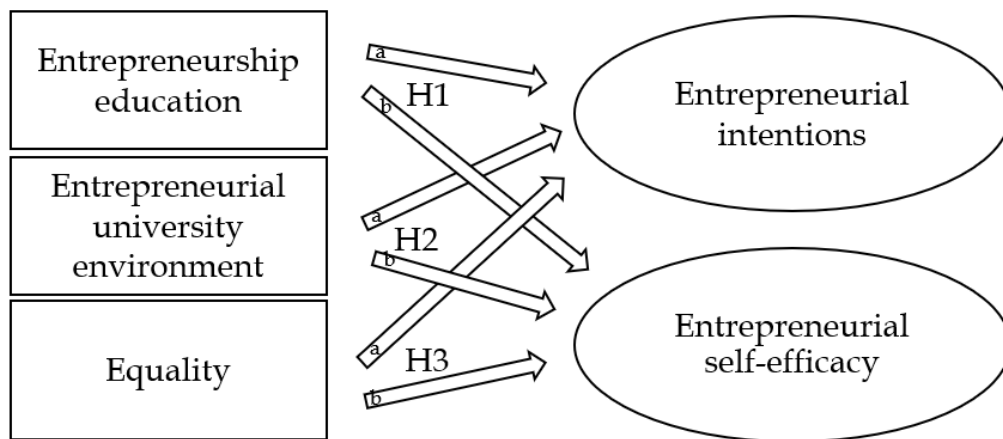


FIGURE 4. The adjusted research model.

### 4.3.2 T-test

*Hypothesis 1: Participation in entrepreneurship education increases students' entrepreneurial intentions (H1a) and entrepreneurial self-efficacy (H1b).* Hypothesis 1 is tested by comparing means of responses between students who have participated in entrepreneurship education and those who have not. In the first part of the hypothesis (H1a), the influence of entrepreneurship education is tested on the sum variable of entrepreneurial intentions as well as on students' career path intentions. The results are consistent regardless of which variable is used. Entrepreneurial intentions are higher for those who have attended entrepreneurship education compared to those who have not regardless of the type of education (elective/compulsory/entrepreneurship program, Sig < .01) (Table 12). Entrepreneurial intentions are the highest (4.32) for those who are studying in a specific entrepreneurship program. In comparison, those who have not attended a course on entrepreneurship have the lowest entrepreneurial intentions (2.27). The difference in entrepreneurial intentions is the most significant between those who have attended any type of entrepreneurship education in their studies and those who have not,  $t(143.99) = -5.00$ , sig < .001.

TABLE 12. Mean responses and standard deviations of entrepreneurial intentions by different groups of respondents.

	Mean	Std. Deviation	Difference of means	N
I have not attended a course on entrepreneurship so far.				
no	3.52	1.707	1.25***	91
yes	2.27	1.351		60
I have attended at least one entrepreneurship course as elective.				
no	2.79	1.634	1.00**	115
yes	3.79	1.645		36
I have attended at least one entrepreneurship course as compulsory part of my studies.				
no	2.73	1.591	0.82**	97
yes	3.55	1.741		54
I am studying in a specific program on entrepreneurship.				
no	2.91	1.650	1.41**	139
yes	4.32	1.614		12

\*\*\*significant at the 0.001 level

\*\*significant at the 0.01 level

\*significant at the 0.05 level

The relation between entrepreneurship education and students' entrepreneurial intentions is also tested by using students' career path intentions as an outcome variable. The test is performed by comparing students' career path intentions (employee/founder/successor) right after graduation and five years later based

on participation in entrepreneurship education. Becoming an employee is the most popular career option regardless of whether a student has taken part in entrepreneurship education or not (Table 13). The greatest relative share of intended founders and successors are studying in a specific entrepreneurship program. However, the number of intended founders who have attended at least one entrepreneurship course as an elective is very close to the number of founders studying in a specific entrepreneurship program (20.8% and 21.1% respectively). Five years later the gap increases as 42.1% of those who are studying in a specific entrepreneurship program intend to become founders while of those who have attended at least one entrepreneurship course as an elective 31.3% plan to start a company.

Those who have attended at least one compulsory entrepreneurship course have fewer intentions to become founders right after graduation compared to those who have attended at least one elective course (9.5% and 20.8% respectively) (Table 13). However, the gap diminishes when observing the results five years after graduation. Surprisingly, the highest relative share of intended employees right after graduation is studying in a specific entrepreneurship program (73.7%). However, the number of intended employees decreases most in the group in question five years later. The number of students intending to become successors is low in every group, but it is the highest in students studying in an entrepreneurship program five years after graduation (10.5%). Because of the possibility of multiple answers, there is some overlap in the responses and no direct conclusions can be drawn from the influence of entrepreneurship education.

TABLE 13. Influence of entrepreneurship education on career intentions.

	Have not attended a course on entrepreneurship		Have attended at least one elective entrepreneurship course		Have attended at least one compulsory entrepreneurship course		Studying in a specific program on entrepreneurship	
	Directly	5 years	Directly	5 years	Directly	5 years	Directly	5 years
Employee	71.1	64.5	64.6	41.7	63.5	41.3	73.7	36.8
Founder	7.9	10.5	20.8	31.3	9.5	28.3	21.1	42.1
Successor	2.6	3.9	0.0	6.3	3.2	6.3	5.3	10.5
Other	18.4	21.1	14.6	20.8	23.8	23.8	0.0	10.5
Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

The second part of the first hypothesis (*H1b. Participation in entrepreneurship education increases students' entrepreneurial self-efficacy*) is tested by comparing means of the sum variable of entrepreneurial self-efficacy based on participation in entrepreneurship education. Entrepreneurial self-efficacy is significantly higher for those who have participated in entrepreneurship education compared to those who have not,  $t(149) = -3.442$ , sig.  $<.001$  (Table 14). Entrepreneurial self-efficacy is the highest among students studying in a specific program on entrepreneur-

ship (4.76) and lowest among students who have not participated in entrepreneurship education (3.40). Students who have attended at least one entrepreneurship course as an elective have a bit higher level of entrepreneurial self-efficacy (4.20) compared to students who have attended at least one compulsory course (4.11).

TABLE 14. Influence of participation in entrepreneurship education on entrepreneurial self-efficacy.

	Mean	Std. Deviation	Difference of means	N
I have not attended a course on entrepreneurship so far.				
no	4.14	1.268	0.74***	91
yes	3.40	1.345		60
I have attended at least one entrepreneurship course as elective.				
no	3.73	1.379	0.47*	115
yes	4.20	1.178		36
I have attended at least one entrepreneurship course as compulsory part of my studies.				
no	3.70	1.362	0.41	97
yes	4.11	1.283		54
I am studying in a specific program on entrepreneurship.				
no	3.76	1.343	1.00**	139
yes	4.76	1.027		12

\*\*\*significant at the 0.001 level

\*\*significant at the 0.01 level

\*significant at the 0.05 level

Based on the analysis presented above, Hypothesis 1: *Participation in entrepreneurship education increases students' entrepreneurial intentions (H1a) and entrepreneurial self-efficacy (H1b)* is supported.

### 4.3.3 Correlation analysis

Correlation analysis is used in preliminary testing of hypothesis two: *Entrepreneurial environment increases students' entrepreneurial intentions (H2a), and entrepreneurial self-efficacy (H2b)*, and hypothesis three: *Equality in a university increases students' entrepreneurial intentions (H3a), and entrepreneurial self-efficacy (H3b)*.

According to Pearson's correlation coefficient, a positive correlation is found between the sum variable of the entrepreneurial university environment and students' entrepreneurial intentions ( $r = .393$ ) as well as students' entrepreneurial self-efficacy ( $r = .510$ ) (Table 15). Therefore, the more entrepreneurial students perceive their university to be, the more entrepreneurial intentions and self-efficacy they have.



For hypothesis three, there is a weak correlation between the perceived equality and diversity in university and students' entrepreneurial intentions ( $r = .178$ ,  $\text{sig} = .029$ ) as well as entrepreneurial self-efficacy ( $r = .194$ ,  $\text{sig} = .017$ ) (Table 15). Therefore, a higher level of equality in university is somewhat linked to an increase in entrepreneurial intentions and self-efficacy.

TABLE 15. Correlations between the context and the cognitive variables.

	Entrepre- neurial intentions	Entrepre- neurial self-efficacy	Entrepreneurial university environment	Equality
Entrepreneurial intentions		.597***	.393***	.178*
Entrepreneurial self-efficacy	.597***		.510***	.194*
Entrepreneurial university environment	.393***	.510***		.515***
Equality	.178*	.194*	.515***	

\*\*\*Correlation is significant at the 0.001 level

\*\* Correlation is significant at the 0.01 level

\* Correlation is significant at the 0.05 level

#### 4.3.4 Regression analysis

Regression analysis is performed to further consolidate the findings. First, it is analyzed how the entrepreneurial university environment and equality explain students' entrepreneurial intentions. According to variance analysis, Anova, the data is suitable for regression analysis ( $\text{Sig.} = .000$ ). Adjusted R square achieves a value of .144 meaning that together the two factors explain 14.4% of the students' entrepreneurial intentions. The entrepreneurial environment has a greater effect on the dependent variable compared to equality. Contrary to the results of the correlation analysis, equality does not have a significant influence on students' entrepreneurial intentions according to regression analysis ( $\text{Sig.} = .693$ ,  $t < 2$ ) (Table 16). In addition, the beta coefficient of equality and diversity is negative which is inconsistent with the corresponding correlation coefficient ( $r = .178$ ).

Finally, it is analyzed how the two independent factors explain students' entrepreneurial self-efficacy. Adjusted R square reaches a value of .257 meaning that the factors explain 25.7% of the students' entrepreneurial self-efficacy. The results are similar to the results of entrepreneurial intentions. Entrepreneurial environment explains most of the effect on students' entrepreneurial self-efficacy ( $\text{sig} < .001$ ,  $t > 2$ ) and equality does not have a significant influence ( $\text{sig} = .247$ ,  $t < 2$ ) (Table 16). Similarly, the beta coefficient of equality is negative contrary to the correlation coefficient ( $r = .194$ ).

TABLE 16. Regression results of antecedents of students' entrepreneurial intentions and entrepreneurial self-efficacy.

Independent Variables	Dependent Variables			
	Entrepreneurial intentions		Entrepreneurial self-efficacy	
	Standardized Co-efficients (Beta)	t-value	Standardized Co-efficients (Beta)	t-value
Entrepreneurial university environment	.412***	4.649	.560***	6.782
Equality	-.035	-.396	-.096	-1.162
R <sup>2</sup>	.156		.267	
Adjusted R <sup>2</sup>	.144		.257	

\*\*\* Significant at the 0.001 level

\*\* Significant at the 0.01 level

\* Significant at the 0.05 level

Based on the results of correlation and regression analysis, Hypothesis 2: *Entrepreneurial environment increases students' entrepreneurial intentions (H2a), and entrepreneurial self-efficacy (H2b)* is supported.

Despite of the weak correlation, as a result of regression analysis, Hypothesis 3: *Equality in a university increases students' entrepreneurial intentions (H3a), and entrepreneurial self-efficacy (H3b)* is rejected.

## 5 DISCUSSION AND CONCLUSIONS

In this final chapter, the results of this study are evaluated in relation to reviewed literature. First, the main findings are discussed, and the research questions are answered. Second, both theoretical and practical contributions of the study are presented regarding different parties. Furthermore, the study is evaluated regarding its reliability and validity as well as limitations. Finally, future research implications are presented.

### 5.1 Main findings

This study aims to provide valuable knowledge about entrepreneurial climate and entrepreneurship education in local HEIs in Jyväskylä from students' perspectives. The development of the research design mostly relies upon the previous publications of the GUESSS research project and the existing systematic reviews about the impact of entrepreneurship education. Leiva's et al. (2021) research about students' entrepreneurial intentions served as a basis for the hypothesis drafting. Leiva's work was supplemented with points derived from Nabi's et al. (2017) systematic review. According to the review, there are far less studies about the relationship between entrepreneurship education and subjective impact indicators other than entrepreneurial intentions. For this reason, attitude toward entrepreneurship and entrepreneurial self-efficacy were added to the research design as outcome variables. However, the attitude variable resulted in correlating with the entrepreneurial intentions variable to the extent that the variables were compressed into a single variable. As this study is of interest to the university personnel, all the collected university-related contextual variables were included in the research design. The inclusion of variables relating to the United Nations' SDGs is novel and it gives us valuable insights into how the sustainability and responsibility work in universities appear to students and whether it is connected to students' cognitive characteristics.

In order to contribute to the interest of the local HEIs and the existing literature, two research questions were addressed: (1) *How do students perceive their university from an entrepreneurial perspective?* and (2) *Do university context factors increase students' entrepreneurial intentions, attitudes, and self-efficacy?* The research questions along with proposed hypotheses are discussed based on the empirical findings of the survey research in the following paragraphs.

#### 5.1.1 Entrepreneurship education

*Demographics.* To gain information about entrepreneurship education in local HEIs, it is of interest to differentiate the demographics of the students who have

participated in entrepreneurship education from those who have not. First, the number of students who have taken part in entrepreneurship education is significantly higher among undergraduate students compared to graduate or PhD students. The same pattern is also seen regarding the age of the respondents as a larger share of younger students have participated in entrepreneurship education compared to older students. This indicates that either there are more entrepreneurship courses available today compared to before or the interest in entrepreneurship education has increased. Although entrepreneurship education has a relatively long history, its popularity has grown significantly in recent years and it most likely will continue to grow further. The increased interest is in line with the ongoing, global development of entrepreneurship education.

Furthermore, males have been more active in participation in entrepreneurship education compared to females. Also, a larger share of nascent and active entrepreneurs are men. Entrepreneurship has traditionally been a male-typical career (Bae et al., 2014) and men have been found to have more entrepreneurial intentions compared to women (Zhao et al., 2005). Although a slight majority of graduates from Finnish HEIs are women (Official Statistics of Finland, 2021), entrepreneurship still attracts more men than women. This can be at least partly explained by the fact that women have often limited their career aspirations due to the lack of perceived capabilities (Bandura, 1992). For this reason, it would be especially important for women to participate in entrepreneurship education as it could strengthen their skills and perceived self-efficacy. Entrepreneurship education has even been referred to as an “equalizer” between men and women by Wilson et al. (2007). As equality is one of the sustainable development goals pursued by both the society and the university, it is important to promote equality also in participation in entrepreneurship education. This will lead to an increased number of female entrepreneurs in the future, which will in turn promote gender equality further.

There are large differences in the number of students participating in entrepreneurship education between different fields of study. A clear majority of business and IT students have participated in entrepreneurship education while in other fields the participants in entrepreneurship education are a minority. Although most future entrepreneurs will most likely come from the fields of business and IT, students in other fields could benefit from entrepreneurship education, too. As entrepreneurial characteristics are increasingly sought from employees as well, entrepreneurship education could provide students important skills regardless of their fields of study. At its best, entrepreneurship education could promote students’ learning about themselves (Souitaris et al., 2007), which can, for example, clarify career path intentions as discussed later in this chapter.

*Entrepreneurial intentions and entrepreneurial self-efficacy.* The first hypothesis was formed to determine whether participation in entrepreneurship education is connected to students’ entrepreneurial intentions and entrepreneurial self-efficacy.

Students who have taken part in entrepreneurship education resulted to have more entrepreneurial intentions and a higher level of entrepreneurial self-efficacy. However, it cannot be explicitly claimed that participation in entrepreneurship education increases students' entrepreneurial intentions and self-efficacy. The results may also be explained by self-selection bias which means that the students enrolling in entrepreneurship programs tend to want to become entrepreneurs in the first place (Kolvereid & Moen, 1997). Indeed, the entrepreneurial intentions and self-efficacy were the highest for the students studying in a specific program on entrepreneurship. To overcome this possible bias the data should have been controlled for pre-education intentions, which was unfortunately not possible in this research. However, the findings are parallel with existing research as most of the previous research has noted positive relationships between EE and EI as well as EE and ESE (e.g., Bae et al., 2014; Boukamcha, 2015; Martin et al., 2013).

*Career path intentions.* The connection of participation in entrepreneurship education was also examined in relation to students' career path intentions. The findings are similar to those in relation to entrepreneurial intentions as the largest relative share of students intending to become founders are studying in a specific program on entrepreneurship. The number of intended founders differs greatly between the students who have attended entrepreneurship education as an elective part of their studies versus compulsory (20.8% and 9.5%, respectively). That can most likely be explained by the self-selection bias presented by Kolvereid and Moen (1997). Students who are interested in entrepreneurship will more likely choose entrepreneurship courses as electives compared to those who are not. In contrast, students cannot affect their compulsory courses due to which there are most likely more students who are not interested in entrepreneurship in compulsory courses compared to elective courses. However, the gap diminishes five years after graduation from which it can be concluded that students who do not consider becoming an entrepreneur as a primary career choice right after graduation do not exclude the option later in their career. Also, commonly students want to start their careers as employees to gain experience in the field before becoming entrepreneurs (Wennberg et al., 2011), which explains why the number of intended founders is greater five years after completion of studies regardless of the type of entrepreneurship education the students have participated in.

What was interesting about the findings of the career path intentions, is that 100% of the students studying in a specific program on entrepreneurship know which career path they want to pursue after graduation. In other groups of students, the share of students who do not know what they plan on doing after graduation varies between 15 and 24%. The findings suggest that studying in an entrepreneurship program is linked to increased self-knowledge and thus, to clear career plans. This is parallel to what Souitaris et al. (2007) stated in their paper about

how entrepreneurship education can increase students' learning about themselves and what they like. The occurrence may also be due to self-selection bias, i.e., students who have clear career plans choose to and are accepted to study in entrepreneurship programs. Another surprising finding was that the most popular career path choice among all students right after graduation was to become an employee in academia. In Finland's national report of the GUESS data employee in academia was among the least favorite career options (Lahikainen & Pihkala, 2021). The result indicates that something in JYU and JAMK encourages students to seek careers in academia. Perhaps the teaching is more academic-oriented or there are more employment opportunities in academia.

*Entrepreneurial reputation.* A small minority of students responded to having chosen their university based on its strong entrepreneurial reputation. In general, JAMK has had a strong entrepreneurial reputation among the universities of applied science. There is a wide range of entrepreneurship courses available, and several initiatives related to entrepreneurship have been carried out in the recent years (JAMK, n.d.). However, only 2.7% of the respondents studying at JAMK reported that they chose their place of study based on the university's entrepreneurial reputation while the corresponding share was 7.0% in JYU. Although the percentages are low, the results indicate that JYU has raised its reputation as an entrepreneurial higher education institution alongside JAMK.

### **5.1.2 Entrepreneurial university environment**

Second, the university's context was studied from the perspective of the entrepreneurial environment which consists of the original variables of program learning, entrepreneurial climate, and the degree of SDGs related to innovation, work, and sustainability. Parallel to the second hypothesis, the results indicate that the more entrepreneurial the environment in a university is, the more entrepreneurial intentions and self-efficacy students possess. Again, it cannot be claimed that an entrepreneurial environment directly increases students' entrepreneurial intentions and self-efficacy as the causality of the relationship might work in the other direction as well. It is possible, that students who are entrepreneurial perceive their university as more entrepreneurial and their learning effects from courses are better. In fact, students who are studying in a specific program on entrepreneurship reported the highest program learning results among all students. Students who had attended at least one elective entrepreneurship course and no compulsory courses reported a bit higher program learning compared to those who had attended at least one compulsory course and no elective courses. This finding is contradictory to Hytti et al. (2010) study which states that students with intrinsic motivation report lower learning outcomes from entrepreneurial courses compared to students with extrinsic motivation. The authors claimed that students with intrinsic motivation expected more from the courses and therefore they were not as satisfied as their peers who had lower expectations. It can be assumed that students who attend elective courses are more intrinsically

motivated than the students attending compulsory courses because elective courses are chosen of one's own free will. As a counterargument to Hytti et al. study, it can be claimed that students with intrinsic motivation are willing to work harder on the courses and therefore they achieve better learning outcomes.

The original variable program learning measured entrepreneurial learning outcomes from all the courses the students had attended instead of only from entrepreneurship courses. Students who had not taken part in entrepreneurship education at all reported program learning of 3.37, which means that entrepreneurial learning outcomes can also be achieved from other courses to some extent. In addition to practical skills related to entrepreneurship, the program learning variable included items measuring abilities to develop networks and to identify opportunities. These are important skills for everyone in today's working life due to which it is important that they are taught in other courses as well.

### 5.1.3 Sustainable development goals

Finally, the university context was assessed from a perspective of SDGs related to quality education, inequality, gender, and sustainability. As a whole, the variable measures equality from different angles. The respondents assessed their universities as highly equal as the variable mean response was close to six. The sustainability and responsibility work at JYU and JAMK has therefore been successful regarding equality. Nevertheless, equality is not connected to students' entrepreneurial intentions or entrepreneurial self-efficacy. Although the results are not statistically significant, there is some discrepancy in the results as the beta coefficients resulted in negative values while the corresponding correlation coefficients were positive. Further research would be needed to determine whether equality could influence entrepreneurial intentions and entrepreneurial self-efficacy after all and whether the influence would be positive or negative.

Even though the respondents rated their universities as highly equal, equality is not fully achieved regarding entrepreneurship. As discussed earlier, males participate in entrepreneurship education more often than women and there are more male student entrepreneurs than their female counterparts. This indicates that female students opt-out from entrepreneurial activities more often than males. Although gender differences are not the main focus of this study, the findings provide valuable knowledge about how female students should be encouraged to participate in entrepreneurship education.

### 5.1.4 Summary

As an answer to the first research question, (*How do students perceive their university from an entrepreneurial perspective?*) students view their university in a positive way. All the items measuring the university context were reviewed above 3.7 on

a 7-point Likert scale. Equality and development were viewed the most positively as the mean responses exceeded the value of 5. In contrast, the lowest values were given to the items measuring how well the courses have increased students' understanding of actions relating to becoming an entrepreneur. However, these items have the highest factor loadings for the second factor, which means that they have the strongest effect on students' entrepreneurial intentions and entrepreneurial self-efficacy.

As for the second research question, (*Do university context factors increase students' entrepreneurial intentions, attitudes, and self-efficacy?*) the answer is more ambiguous. The relationship between the most university context factors and entrepreneurial intentions as well as entrepreneurial self-efficacy is noticeable, but the causality of the relationship cannot be determined. However, the relationship is positive, which means that the university context can influence students' entrepreneurial intentions and self-efficacy. The findings are parallel with existing literature, as most of the research report positive influences (e.g., Bergmann et al., 2016; Leiva et al., 2021; Schwarz et al., 2009; Turker & Sonmez, 2009).

## 5.2 Contributions

### 5.2.1 Theoretical contributions

Even though the influence of entrepreneurship education on students' entrepreneurial intentions has been widely researched, this thesis provides novel perspectives of the university's influence on students' cognitions. First of all, the achievement of SDGs in universities and its influence on students has not been previously researched as such. Since sustainability and responsibility work relies mostly on SDGs nowadays, it is reasonable to measure the success of the work in relation to SDGs. Using SDGs as a measurement tool also provides new perspectives to the university environment. SDGs related to innovation, work, and sustainability resulted in being connected to students' entrepreneurial intentions and self-efficacy. However, the items received relatively low factor loadings and thus, their effect is not as significant as the effect of the other items of the same factor. On the other hand, SDGs related to education, gender, inequality, and sustainability were not connected to entrepreneurial intentions or self-efficacy. To consolidate the findings, the relationship should be researched in a larger research sample.

Also, self-efficacy has mostly been used as a predictor variable for entrepreneurial intentions in prior research (Nabi et al., 2017). In this study, self-efficacy is used as an outcome variable to find out how a university's context is linked to other variables in addition to entrepreneurial intentions. Based on this study, the



results are parallel for both entrepreneurial self-efficacy and entrepreneurial intentions. Therefore, entrepreneurial intentions could be used as a single outcome variable as self-efficacy did not provide any differing findings.

### 5.2.2 Practical contributions

This thesis has practical contributions to university management and teachers. First, teachers can evaluate their current teaching methodology based on the learning outcomes reported by the students. When comparing mean responses of reported program learning and perceived entrepreneurial self-efficacy, the results are close to each other. Judging from this, students' competence in performing entrepreneurial tasks is likely derived from education in large part. However, teaching can be further developed to increase the learning outcomes even more. The results show that there could be a greater focus on teaching practical skills related to starting a business. In contrast, the ability to develop networks and to identify opportunities achieved the highest means of all the items measuring program learning from which it can be concluded that the teaching focuses on network development and opportunity identification at the moment. Although those are essential skills to have in order to become an entrepreneur, universities cannot overlook the importance and need to teach practical skills as well especially when they have the strongest influence on students' entrepreneurial intentions and self-efficacy.

For university management, this thesis provides valuable knowledge of how students perceive their universities. Sustainability and responsibility work is especially important in today's world as we are facing a growing number of environmental and social challenges. Universities have an important role in being pioneers and innovation developers toward a more sustainable way of life. For this reason, it is important for universities to revise at times how their work is perceived. Fortunately for the university management, the sustainability and responsibility work has been carried out successfully at least in the minds of students. A target for development could be supporting collaboration with local firms to provide employment for students as it was rated the lowest of all the items related to SDGs. Indeed, competition for internships and jobs equivalent to education is fierce, which can explain why students are hoping to get support from their universities.

The students' interest in entrepreneurship education is growing as could be concluded from the results. It is important to maintain the interest by continually developing the course offerings and by providing learning opportunities for students with different levels of prior knowledge. Entrepreneurship education should be easily accessible for all students in different faculties. Schwarz et al. (2009) have argued that "developing entrepreneurial skills as crucial life capacities should be the main target of all university faculties." To make participation easier, entrepreneurship education could be integrated into major studies.

Schwarz et al. suggest that successful entrepreneurs should be invited to the lectures to act as role models and to make entrepreneurship education more easily approached for all the students. Especially women need to be encouraged to participate in entrepreneurial activities since it will increase equality in the long term.

### 5.3 Evaluation of the research

This study utilizes data collected as a part of a global research project GUESSS, due to which it was not possible to affect the operationalization of the survey and the collection of the data. Therefore, the reliability and validity of the research were already determined before initiating this thesis project. Because the research had been conducted by a professional research team, high reliability and validity of the measures were expected. However, the data were tested to ensure the reliability and validity of this study sample. By testing the data for validity, it is ensured that the research measures what it was intended to measure. Reliability, in turn, describes how reproducible the research is in another context.

Exploratory factor analysis was performed to determine the construct validity of the measures. In other words, it was tested whether items within one construct correlated more with each other than with items of any other construct. Unexpectedly, there was a lot of cross-correlation between the measures. As a result, the number of factors was suppressed from seven to four factors. The final number of factors was decided based on the initial Eigenvalues  $> 1$ . Also, the four-factor model resulted in factors that were easily differentiated from each other compared to factor models of 5 to 7 factors (see Appendix 2 for seven-factor model). As a result, the original scale lacks construct validity since the factor analysis did not result in a similar number of factors. However, the two instruments measuring the achievement of SDGs did not seem to be validated, which explains partly the lack of construct validity. Also, the items measuring entrepreneurial intentions and attitude toward entrepreneurship were very similar and they were organized as one question battery in the questionnaire. Although attitudes and intentions share similar features, the two variables should be differentiated from each other. Generally, attitude acts as a predictor of intentions, which indicates the variables to be distinctive. In order to increase the construct validity of the survey, the measures related to intentions and attitudes as well as SDGs should be re-operationalized.

The reliability of the measures was tested by computing Cronbach's alpha for the sum variables generated by the factor analysis. Internal consistency of the variables was mostly excellent as three of the four variables achieved a value  $> .9$ . The lowest value also exceeded  $.7$  which is considered an acceptable level. A high

level of internal consistency indicates that the items within one construct measure the same topic. Therefore, the measurement instrument used in the study are consistent, but they share similarities with each other.

## 5.4 Limitations of the study

As most of the research, also this study is subject to several limitations. First of all, the number of respondents is relatively low when comparing it to the number of students at JYU and JAMK. The survey was indicated to all the students regardless of their field of study, participation in entrepreneurship education or entrepreneurial activities, or level of study. In a total of 190 responses were collected while there are about 15,000 students studying at JYU and about 8,500 at JAMK. While the sample size is large enough to perform statistical analysis without any issues, it is questionable how well the data represent the entire student population. Especially when the data is examined in relation to a certain group of students, the sample size is further decreased. However, this study provides insights into students' opinions and experiences, but the results should not be considered a definite illustration of the total student population.

Another major limitation of this study is related to the lack of moderating factors. It is impossible to determine whether the differences between students are caused by the university and education or whether they are outcomes of something else. In particular, the self-selection bias presented by Kolvereid & Moen (1997) is a possible disturbing factor. The data are not controlled for pre-education entrepreneurial intentions, attitudes, or self-efficacy. Therefore, it is not possible to claim that the university context factors have increased students' cognitive factors as students might have had entrepreneurial intentions and a high level of self-efficacy already prior higher education. At least it is certain that university does not have a negative influence on students' cognitive factors according to this study. Also, the sample may be subject to self-selection bias as people who are interested in entrepreneurship could have more often decided to respond to the survey compared to those who are not.

Other possible influencing factors not controlled in this study include family background and culture. For example, Palmer et al. (2021) discovered in their study that family entrepreneurship was connected to higher scores in entrepreneurial intentions and its antecedents. Thus, the higher intentions and self-efficacy might be due to family background instead of the university's influence. Previous research has also recognized culture as a moderating factor in student entrepreneurship. However, most studies have focused on a single culture only due to which the effect of culture has been rarely tested.

Another shortcoming of this study is that it does not take into consideration different types of education. There are several types of entrepreneurship education as discussed in the second chapter of this thesis. In addition, program learning variable did not only inquire about learning outcomes from entrepreneurship courses but from all the courses the students have attended during their studies. This does not allow to derive information about how students perceive a specific type of education as the variable represents learning outcomes in general.

This study is also subject to limitations caused by the analysis process. Manual processing of the data may expose the data to errors caused by the researcher. Also, this study is cross-sectional, so it describes only the situation of the data collection moment. Longitudinal research would be required in order to gain information on how the situation changes over time. The construct validity of the used measures was quite poor as the original scale did not work the way it was intended. This resulted in changes in the research model so that the analysis could be completed.

## 5.5 Future research

This study provides insights into the relationship between university context factors and students' cognition at one point in time. To gain a more comprehensive understanding of the subject, longitudinal research is required. Also, several influencing factors should be moderated. For example, the sample should be moderated for pre-education entrepreneurial intentions as well as for previous entrepreneurial training and entrepreneurial exposure such as family entrepreneurship. The use of moderating factors would facilitate the determination of causal relationships as the other potential influencing factors would be excluded.

Longitudinal research would allow the observation of how the students' entrepreneurial intentions and other cognitive characteristics change during one's studies. In addition, it would provide information about how students' perceptions of their university changes over time. This would provide valuable knowledge about how students develop during their studies and how the university could support their development.

Furthermore, longitudinal research would allow the measurement of how intention becomes behavior. Although the intention-behavior relationship has previously been researched, there is little if not at all research regarding how students' entrepreneurial intentions turn into entrepreneurial behavior. The results would consolidate the findings of other research that use intention as a predictor of behavior.

This study inspected entrepreneurial education and learning outcomes on a general level. However, previous research has stated that the type of entrepreneurial education influences the learning outcomes (e.g., Bae et al., 2014; Hahn et al., 2020). Therefore, in addition to differentiating the courses according to the compulsion or optionality of the courses, they should also be differentiated according to the teaching methods used. Also, the teacher's characteristics such as enthusiasm and passion toward the taught subject should be taken into account. This would allow teachers to further develop their teaching in a way it would benefit the students even more. Qualitative research could be used to deepen the knowledge about how students perceive different types of teaching and teachers.

Research about SDGs in a university setting is novel and further research is required. Existing research about SDGs mainly focuses on how different parties can promote the achievement of SDGs but it is also important to research the subject from a reverse perspective, i.e., how an environment that promotes SDGs can influence the people around. There was a relatively small sample in this study due to which research with a larger sample is required to achieve more generalizable results. Also, the measurement instruments need to be improved to better represent different SDGs in a university setting.

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## APPENDIX 1

### The questionnaire

For ALL students

#### 1 Your Studies

1	Please select your university.	<i>Drop-down list provided by country teams (incl. "Other")</i>
2	On what level are you studying? <i>(single answer)</i>	<ul style="list-style-type: none"> <li>• Undergraduate (Bachelor level)</li> <li>• Graduate (Master level)</li> <li>• PhD</li> <li>• Other (e.g., MBA)</li> </ul>
3	What is your main field of study? <i>(single answer)</i>	<ul style="list-style-type: none"> <li>• Arts / Humanities (e.g., cultural studies, history, linguistics, philosophy, religion)</li> <li>• Business / Management</li> <li>• Computer sciences / IT</li> <li>• Economics</li> <li>• Engineering (incl. architecture)</li> <li>• Human medicine / health sciences</li> <li>• Law</li> <li>• Mathematics</li> <li>• Natural sciences</li> <li>• Science of art (e.g., art, design, dramatics, music)</li> <li>• Social sciences (e.g., psychology, politics, education)</li> <li>• Other</li> </ul>

Study fields from Destatis 2015 (adapted)

## 2 Your Career Choice Intentions

*Which career path do you intend to pursue right after completion of your studies?*

*Which career path do you intend to pursue 5 years later?*

	I want to be...	Right after studies	5 years later
1	an employee in a small business (1-49 employees)		
2	an employee in a medium-sized business (50-249 employees)		
3	an employee in a large business (250 or more employees)		
4	an employee in a non-profit organization		
5	an employee in academia (academic career path)		
6	an employee in public service		
7	a founder (entrepreneur) working in my own business		
8	a successor in my parents'/family's business		
9	a successor in another business		
10	Other / do not know yet		

11	Are you currently trying to start your own business / to become self-employed?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
12	Are you already running your own business / are you already self-employed?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>

*Career choice intentions / nascent & active entrepreneurship (no reference)*

*Please indicate the extent to which you agree with the following statements (1=not at all, 7=very much).*

1	I am willing to take risks when choosing a job or a company to work for.
2	I prefer a low risk/high security job over a job that offers high risks and high rewards.
3	I view risk on a job as a situation to be avoided at all costs.

*Willingness to take risks; adapted from Gomez-Mejia & Balkin (1989)*

### 3 Your University

Please indicate the extent to which you agree with the following statements about the university environment (1=not at all, 7=very much).

1	The atmosphere at my university inspires me to develop ideas for new businesses.
2	There is a favorable climate for becoming an entrepreneur at my university.
3	At my university, students are encouraged to engage in entrepreneurial activities.

University environment (Franke & Lüthje 2004; Geissler, 2013)

Please indicate the extent to which you agree with the following statements about your studies (1=not at all, 7=very much). The courses and offerings I attended...

1	increased my understanding of the attitudes, values, and motivations of entrepreneurs.
2	increased my understanding of the actions someone has to take to start a business.
3	enhanced my practical management skills to start a business.
4	enhanced my ability to develop networks.
5	enhanced my ability to identify an opportunity.

Program learning (Souitaris et al. 2007)

Please indicate which of the following applies to you (multiple answers possible).

1	I have not attended a course on entrepreneurship so far.
2	I have attended at least one entrepreneurship course as elective.
3	I have attended at least one entrepreneurship course as compulsory part of my studies.
4	I am studying in a specific program on entrepreneurship.
5	I chose to study at this university mainly because of its strong entrepreneurial reputation.

Entrepreneurship education (no reference)

Please indicate the extent to which you agree with the following statements (1=not at all, 7=very much).

My university ensures that all students (irrespective of gender, age, ethnicity, religion, disability, or socio-economic status)...

1	have equal access to affordable and quality education.
2	have equal participation, representation, and voice in the university's decision-making.
3	acquire the knowledge and skills needed to promote sustainable development.

My university enhances, facilitates, and supports...

4	the development of research, technology, innovation, and entrepreneurship.
5	the collaboration with local authorities/firms to provide employment for all students.
6	the development of sustainable and green practices to mitigate climate change.

United Nations SDGs 4 (education), 5 (gender), 10 (inequality), 9 (innovation), 8 (work), and 11 (sustainability)

*NASCENT (Q2.11=YES) and ACTIVE founders (Q2.12=YES) skip to question 5*

## 4 You and Entrepreneurship

### 4.1 General thoughts

*Please indicate your level of agreement with the following statements (1=strongly disagree, 7=strongly agree). Entrepreneur refers to someone who runs his or her own business.*

1	I am ready to do anything to be an entrepreneur.
2	My professional goal is to become an entrepreneur.
3	I will make every effort to start and run my own business.
4	I am determined to create a business in the future.
5	I have very seriously thought of starting a business.
6	I have the strong intention to start a business someday.
7	Being an entrepreneur implies more advantages than disadvantages to me.
8	A career as entrepreneur is attractive for me.
9	If I had the opportunity and resources, I would become an entrepreneur.
10	Being an entrepreneur would entail great satisfactions for me.
11	Among various options, I would rather become an entrepreneur.

*Linan & Chen 2009: intention (1-6), attitude (7-11)*

### 4.2 Your skills

*Please indicate your level of competence in performing the following tasks (1=very low competence, 7=very high competence).*

1	Identifying new business opportunities
2	Creating new products and services
3	Managing innovation within a business
4	Being a leader and communicator
5	Building up a professional network
6	Commercializing a new idea or development
7	Successfully managing a business

*Entrepreneurial self-efficacy (cf. Zhao et al. 2005; Chen 1998; George & Zhou 2001; Denoble 1999)*

*Please indicate your level of agreement with the following statements (1=strongly disagree, 7=strongly agree).*

1	I am usually able to protect my personal interests.
2	When I make plans, I am almost certain to make them work.
3	I can pretty much determine what will happen in my life.

*Locus of control (Levenson 1973)*

## 5 Your (Family) Environment

1	Are your parents self-employed? <i>(single answer)</i>	<ul style="list-style-type: none"> <li>• No</li> <li>• Yes, father</li> <li>• Yes, mother</li> <li>• Yes, both</li> </ul>
2	Are your parents majority owners of a business? <i>(single answer)</i>	<ul style="list-style-type: none"> <li>• No</li> <li>• Yes, father</li> <li>• Yes, mother</li> <li>• Yes, both</li> </ul>

*If you would pursue a career as an entrepreneur, how would people in your environment react (1=very negatively, 7=very positively)?*

1	Your close family
2	Your friends
3	Your fellow students

Subjective norms, from Linan & Chen (2009)

## 6 Personal Information

*Please indicate your level of agreement with the following items (1=strongly disagree, 7=strongly agree).*

1	In most ways my life is close to my ideal.
2	The conditions of my life are excellent.
3	I am satisfied with my life.
4	So far, I have gotten the important things I want in life.
5	If I could live my life over, I would change almost nothing.

Diener et al. (1985): Subjective well-being

1	What is your year of birth?	<i>Drop-down, 2004-1964 (incl. „Earlier“)</i>
2	Your gender? <i>(single answer)</i>	<ul style="list-style-type: none"> <li>• Male</li> <li>• Female</li> <li>• Other</li> </ul>
3	Your marital status? <i>(single answer)</i>	<ul style="list-style-type: none"> <li>• Single</li> <li>• Married</li> <li>• Other</li> </ul>
4	Your nationality?	<i>Drop-down, 6 choices from teams (incl. “Other”)</i>



For **ACTIVE** entrepreneurs only (Q2.12=YES)

## 7 Your Own Business

You previously said that you are already running your own business. If you are running more than one business, please refer to the most important one in the following.

### 7.1 General information

1	In what year did you establish your business?	Drop-down, 2021-1991 (incl. "Earlier")
2	How many employees do you have today (full time equivalents)? Please enter a valid number (e.g., 5).	Free text field for numbers
3	What is your ownership share in your business?	<ul style="list-style-type: none"> <li>• 0-49% (minority owner)</li> <li>• 50%</li> <li>• 51-100% (majority owner)</li> </ul>
4	Do you want this business to become your main occupation after graduation?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• Do not know yet</li> </ul>
5	Have you created your business largely because of the implications of the COVID-19 pandemic?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
6	Have you created another business before?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>

In which economic sector is your business mainly active in?

1	Advertising / Design / Marketing
2	Architecture and Engineering
3	Construction
4	Consulting (HR, law, management, tax)
5	Education and training
6	Financial services (incl. banking, insurance, investment, real estate)
7	Human health and social work activities
8	Information technology (IT) and communication (incl. software & IT services)
9	Manufacturing
10	Tourism and leisure
11	Trade (wholesale/retail)
12	Other services (e.g., transportation)
13	Other

Industry sectors, based on NACE

### 7.2 The entrepreneurial team

1	How many co-owners (next to yourself) does your business have?	0	1	2	3	>3
If Q7.2.1 is answered with 1 or more						
X1	How many co-owners are female?	0	1	2	3	>3
X2	How many co-owners are relatives of you?	0	1	2	3	>3
X3	How many co-owners are fellow students of you?	0	1	2	3	>3

Entrepreneurial team; see Chandler et al. 2005, Ruef et al. 2003

### 7.3 Your motivations and goals

Please indicate your level of agreement with the following statements.

**I created my firm in order...** (1=strongly disagree, 7=strongly agree)

1	to make money and become rich.
2	to advance my career in the business world.
3	to solve a specific problem for a group of people that I strongly identify with (e.g., friends, colleagues, club, community).
4	to play a proactive role in shaping the activities of a group of people that I strongly identify with (e.g., friends, colleagues, club, community).
5	to solve a societal problem that private businesses usually fail to address (such as social injustice, environmental protection).
6	to play a proactive role in changing how the world operates.

**As a firm founder, it is very important to me...** (1=strongly disagree, 7=strongly agree)

1	to operate my firm on the basis of solid management practices.
2	to have thoroughly analyzed the financial prospects of my business.
3	to provide a product/service that is useful to a group of people that I strongly identify with (e.g., friends, colleagues, club, community).
4	to be able to express to my customers that I fundamentally share their views, interests and values.
5	to be a highly responsible citizen of our world.
6	to make the world a "better place" (e.g., by pursuing social justice, protecting the environment).

**When managing my firm, it is very important to me...** (1=strongly disagree, 7=strongly agree)

1	to have a strong focus on what my firm can achieve vis-à-vis the competition.
2	to establish a strong competitive advantage and significantly outperform other firms in my domain.
3	to have a strong focus on the group of people that I strongly identify with (e.g., friends, colleagues, club, community).
4	to support and advance the group of people that I strongly identify with (e.g., friends, colleagues, club, community).
5	to have a strong focus on what the firm is able to achieve for society-at-large.
6	to convince others that private firms are indeed able to address the type of societal challenges that my firm addresses (e.g., social justice, environmental protection).

Founder social identity, Sieger et al. (2016)

#### 7.4 Your experiences as an entrepreneur

Please indicate your level of agreement with the following statements about your work as an entrepreneur (1=strongly disagree, 7=strongly agree).

1	I seem to be in a hurry and racing against the clock.
2	I find myself continuing work after my co-workers have called it quits.
3	I stay busy and keep my irons in the fire.
4	I spend more time working than socializing with friends, on hobbies, or on leisure activities.
5	I find myself doing two or three things at one time such as eating lunch and writing a memo, while talking on the phone.
6	It's important for me to work hard even when I don't enjoy what I'm doing.
7	I often feel that there's something inside me that drives me to work hard.
8	I feel obliged to work hard, even when it's not enjoyable.
9	I feel guilty when I take time off work.
10	It is hard for me to relax when I'm not working.

DUWAS – Workaholism (Schaufeli et al., 2009); work excessively (1-5) and work compulsively (6-10)

#### 7.5 Your behavior as an entrepreneur

Please indicate your level of agreement with the following statements (1=strongly disagree, 7=strongly agree).

1	I tend to manipulate others to get my way.
2	I have used deceit or lied to get my way.
3	I have used flattery to get my way.
4	I tend to exploit others towards my own end.
5	I tend to lack remorse.
6	I tend to be unconcerned with the morality of my actions.
7	I tend to be callous or insensitive.
8	I tend to be cynical.
9	I tend to want others to admire me.
10	I tend to want others to pay attention to me.
11	I tend to seek prestige or status.
12	I tend to expect special favors from others.

Jonason & Webster, 2010: Machiavellism 1-4, Psychopathy 5-8, Narcissism 9-12.

#### 7.6 Your new venture

How do you rate the performance of your company compared to your competitors since its establishment in the following dimensions (1=much worse, 7=much better)?

1	Sales growth
2	Market share growth
3	Profit growth
4	Job creation
5	Innovativeness

Firm performance, see Dess & Robertson 1984, Eddleston et al. 2008

### 7.7 Your family's support

Please indicate your level of agreement with the following statements (1=strongly disagree, 7=strongly agree).

1	When I have a problem at work, members of my family express concern.
2	When I am frustrated by my business, someone in my family tries to understand.
3	Members of my family are interested in my business.
4	When I talk with them about my business, family members do not really listen.

Family-to-Business Support: Emotional Support, see Eddleston & Powell (2012)

Please indicate your level of agreement with the following statements (1=strongly disagree, 7=strongly agree).

1	Family members often contribute to my business without expecting to be paid.
2	I can count on my family members to fill in for me and/or my employees if needed.
3	My family gives me useful feedback about my ideas concerning my business.
4	Family members often go above and beyond what is normally expected in order to help my business succeed.
5	Members of my family often help me with my business.

Family-to-Business Support: Instrumental Support, see Eddleston & Powell (2012)

For NASCENT entrepreneurs only (Q2.11=YES and Q2.12=NO)

## 8 Your Planned Own Business

You previously said that you are currently trying to start a new business. For the questions below, please refer to that specific business.

### 8.1 General information

1	When do you plan to complete the founding process (i.e., to actually found your business)?	<ul style="list-style-type: none"> <li>• During my studies</li> <li>• Right after my studies</li> <li>• Up to 2 years after completing my studies</li> <li>• Do not know yet</li> </ul>
2	Do you want this business to become your main occupation after graduation?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• Do not know yet</li> </ul>
3	Have you created another business before?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
4	How did this start-up project emerge?	<ul style="list-style-type: none"> <li>• From a university course</li> <li>• In another form related to the university</li> <li>• Largely independent from the university</li> </ul>
5	Do you plan to create this business largely because of the implications of the COVID-19 pandemic?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
6	If you had to decide between the two following alternatives: What is more important to you? (single answer)	<ul style="list-style-type: none"> <li>• Increasing the value of this business as much as possible</li> <li>• Maintaining maximum ownership and control of this business</li> </ul>

In which economic sector will your business be mainly active in?

1	Advertising / Design / Marketing
2	Architecture and Engineering
3	Construction
4	Consulting (HR, law, management, tax)
5	Education and training
6	Financial services (incl. banking, insurance, investment, real estate)
7	Human health and social work activities
8	Information technology (IT) and communication (incl. software & IT services)
9	Manufacturing
10	Tourism and leisure
11	Trade (wholesale/retail)
12	Other services (e.g., transportation)
13	Other

Industry sector, based on NACE

## 8.2 Your activities

*Which of the following activities have you (or somebody else from the founding team, if existing) already carried out in order to start your own business (multiple answers possible)?*

1	Discussed product or business idea with potential customers
2	Collected information about markets or competitors
3	Written a business plan
4	Started product/service development
5	Started marketing or promotion efforts
6	Purchased material, equipment or machinery for the business
7	Attempted to obtain external funding
8	Applied for a patent, copyright, or trademark
9	Registered the business
10	Sold product or service
11	Nothing of the above done so far

Gestation activities, see GEM/PSED

## 8.3 Founding details

1	Are you trying to start this business on your own or with co-founders?	<ul style="list-style-type: none"> <li>• On my own (0 co-founders)</li> <li>• With 1 co-founder</li> <li>• With 2 co-founders</li> <li>• With 3 or more co-founders</li> </ul>
2	What will be your approximate ownership share in the new business?	<ul style="list-style-type: none"> <li>• 0-49% (minority owner)</li> <li>• 50%</li> <li>• 51-100% (majority owner)</li> </ul>

*When QS.3.2 is answered with 0 co-founders*

*Which of the following describes best why you are trying to start your business on your own?*

X1	This is a type of self-employment that does not need a co-founder.
X2	I do not want a co-founder; I want to start this business on my own.
X3	I have looked for a co-founder but have not found somebody suitable.
X4	So far, I have not looked for a co-founder. I will do so in the future.
X5	None of the above.

Harper 2008; Ruef et al. 2003

*When QS.3.2 is answered with 1 or more co-founders*

X6	How many co-founders are female?	0	1	2	3	>3
X7	How many co-founders are relatives of you?	0	1	2	3	>3
X8	How many co-founders are fellow students of you?	0	1	2	3	>3

Chandler et al. 2005, Ruef et al. 2003. Growth: Davidsson 1989; Delmar 1996; Wiklund & Shepherd 2003

#### 8.4 Your founding approach

Please indicate your level of agreement with the following statements (1=strongly disagree, 7=strongly agree).

1	I like to take bold action by venturing into the unknown.
2	I am willing to invest a lot of time and/or money on something that might yield a high return.
3	I tend to act "boldly" in situations where risk is involved.
4	I often like to try new and unusual activities that are not typical but not necessarily risky.
5	In general, I prefer a strong emphasis in projects on unique, one-of-a-kind approaches rather than revisiting tried and true approaches used before.
6	I prefer to try my own unique way when learning new things rather than doing it like everyone else does.
7	I favor experimentation and original approaches to problem solving rather than using methods others generally use for solving their problems.
8	I usually act in anticipation of future problems, needs or changes.
9	I tend to plan ahead on projects.
10	I prefer to "step-up" and get things going on projects rather than sit and wait for someone else to do it.

Individual entrepreneurial orientation; 1-3=risk-taking; 4-7=innovativeness; 8-10=proactiveness; see Bolton and Lane (2012).

For **POTENTIAL SUCCESSORS** (Q5.1/Q5.2=YES) who are not active entrepreneurs (Q2.12=NO)

## 9 Your Parents' Business

You previously said that at least one of your parents is self-employed and/or a majority owner of a business. If your parents own several businesses, please describe the largest one below.

### 9.1 General information

1	In what year has the business been established? Please enter a valid number (e.g., 1951).	Free text field (number)
2	What is the total number of employees (full time equivalents)? Please enter a valid number (e.g., 5).	Free text field (number)
3	Are your parents (i.e., your father and/or your mother) leading the business operationally?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
4	What is the ownership share that is in the hands of your family?	<ul style="list-style-type: none"> <li>• 0-49% (minority owner)</li> <li>• 50%</li> <li>• 51-100% (majority owner)</li> </ul>
5	Do you have a personal ownership stake in the business?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
6	Do you regard this business as a "family business"?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
7	Have you been working for your parents' business?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
8	How many older siblings do you have?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1</li> <li>• 2 or more</li> </ul>

In which economic sector is your parents' business mainly active in?

1	Advertising / Design / Marketing
2	Architecture and Engineering
3	Construction
4	Consulting (HR, law, management, tax)
5	Education and training
6	Financial services (incl. banking, insurance, investment, real estate)
7	Human health and social work activities
8	Information technology (IT) and communication (incl. software & IT services)
9	Manufacturing
10	Tourism and leisure
11	Trade (wholesale/retail)
12	Other services (e.g., transportation)
13	Other

Industry sector, based on NACE



## 9.2 About succession

Please indicate your level of agreement with the following statements (1=strongly disagree, 7=strongly agree).

1	I am ready to do anything to take over my parents' business.
2	My professional goal is to become a successor in my parents' business.
3	I will make every effort to become a successor in my parents' business.
4	I am determined to become a successor in my parents' business in the future.
5	I have very seriously thought of taking over my parents' business.
6	I have the strong intention to become a successor in my parents' business one day.

Succession intention, adapted from Linan & Chen 2009

## 9.3 Performance

How do you rate the performance of your parents' business compared to its competitors over the last three years in the following dimensions (1=much worse, 7=much better)?

1	Sales growth
2	Market share growth
3	Profit growth
4	Job creation
5	Innovativeness

Dess & Robertson 1984, Eddleston et al. 2008

**For potential successors who are active entrepreneurs (if Q5.1 or Q5.2=YES and Q2.12=YES)**

## 10 Your Own and Your Parents' Business

You previously said that you are already running your own business and that at least one of your parents is self-employed and/or a majority owner of a business. The following questions refer to the relationship between these two businesses.

1	Are the two businesses active in the same market/industry?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
2	Do your parents hold an ownership stake in your own business?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
3	Are there relevant business transactions between the two businesses?	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>

**For all students**

## 11 Final Section

1	Thank you very much for your participation! Please indicate your permanent email address if you wish to receive the study results or participate in the lottery.	Free text field
2	Would you be interested in taking part in future surveys? Thank you!	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>

## APPENDIX 2

### The 7-factor model

	Factor						
	1	2	3	4	5	6	7
Entrepreneurial intention 2	,988	-,009	-,042	,017	-,050	-,076	,065
Entrepreneurial intention 3	,987	,099	,013	,017	-,146	-,144	,055
Entrepreneurial intention 4	,964	,068	-,004	,047	-,099	-,070	-,017
Entrepreneurial intention 6	,936	,026	-,084	,098	-,007	-,026	-,014
Attitude toward entrepreneurship 5	,930	-,014	,005	-,089	-,002	,057	,020
Attitude toward entrepreneurship 4	,861	,068	,030	-,146	,090	,134	-,107
Attitude toward entrepreneurship 2	,860	-,040	,082	-,058	,069	,059	-,100
Entrepreneurial intention 1	,834	-,018	,095	,032	-,023	-,099	,074
Entrepreneurial intention 5	,792	-,003	-,136	,142	,007	,066	,020
Attitude toward entrepreneurship 3	,759	,072	-,094	-,116	,039	,268	-,116
Attitude toward entrepreneurship 1	,696	-,150	,230	,045	,104	-,009	-,061
SDGs (innovation, work, sustainability) 3	,038	,805	-,122	-,018	,044	-,063	,056
SDGs (innovation, work, sustainability) 1	,035	,706	,006	,065	-,027	-,010	,084
SDGs (innovation, work, sustainability) 2	,152	,561	,074	,048	,125	-,101	,059
Program learning 4	-,144	,471	,426	,131	,001	-,035	-,114
SDGs (education, gender, inequality, sustainability) 3	,015	,451	-,199	-,153	,411	,140	,180
Program learning 2	,021	-,136	,894	-,102	,072	-,015	,142
Program learning 3	,003	,138	,866	-,012	-,119	-,035	,004
Program learning 1	,170	-,110	,749	-,046	,153	-,105	,231
Program learning 5	-,049	,407	,617	-,083	-,096	,155	-,094
Entrepreneurial self-efficacy 4	-,009	,015	-,221	,894	,033	,002	,105
Entrepreneurial self-efficacy 5	-,082	,099	-,021	,864	,060	-,010	-,033
Entrepreneurial self-efficacy 7	,210	-,050	,083	,597	-,007	,071	-,026
Entrepreneurial self-efficacy 6	,115	-,112	,273	,372	,112	,292	-,060
SDGs (education, gender, inequality, sustainability) 2	-,020	,023	,006	,013	,907	,023	-,019
SDGs (education, gender, inequality, sustainability) 1	-,035	,092	,083	,127	,719	-,163	-,135
Entrepreneurial self-efficacy 1	,048	-,031	,003	,101	-,010	,813	,021
Entrepreneurial self-efficacy 2	,154	-,013	-,072	,067	-,053	,736	,075
Entrepreneurial self-efficacy 3	,046	-,024	,014	,287	-,082	,655	,054
University environment 2	-,068	,197	,226	,067	-,081	,091	,686
University environment 3	-,108	,250	,232	,021	-,081	,028	,606
University environment 1	,055	,190	,271	-,004	,100	,037	,388

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 17 iterations.