ENTREPRENEURAL INTENTIONS AND ACTIVITIES OF STUDENTS AND THEIR INTERRELATION WITH ENTREPRENEURSHIP EDUCATION

GLOBAL UNIVERSITY ENTREPRENEURIAL SPIRIT STUDENTS' SURVEY 2018

NATIONAL REPORT AUSTRIA

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Global University Entrepreneurial Spirit Students' Survey

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1 Introduction

Founding an enterprise as well as business succession is of increasingly high importance for the economy. According to the start-up statistics of the Austrian Chamber of Commerce nearly 40,000 people started an enterprise in 2018.[1]

The promotion of entrepreneurship is critical in stimulating economic growth and job creation as well as innovation. Previous waves of GUESSS as well as other studies consistently have shown that students as well as graduates of universities are increasingly interested in the career option of self-employment, especially in founding their own enterprise[2], but also as successors in (family) firms[3]. Students which express no interest in entrepreneurship at all are a distinct minority. A considerable percentage of students already acquires practical entrepreneurial experience through internships or part- or full-time work in a start-up, in their family firm or even as business owners whilst still pursuing their studies.

Previous waves of the survey have shown that a remarkable percentage of students in Austria envisions to establish their own business within five years after graduating. The career option self-employment is gaining importance when practical work experience and industry-specific know-how are increasing.Therefore, entrepreneurship education has to focus not only students, but also alumni and staff.

Higher education institutions play an important role because they can spread the spirit of enterprise through fostering a positive attitude of their students and staff towards entrepreneurship. They can offer courses and practical field studies to develop entrepreneurial competencies and they can actively support (potential) academic start-ups in various ways. The development of university-wide concepts for entrepreneurship education is urgently needed to create entrepreneurial universities[4]. As an initiative of the European Commission (DG Education and Culture) and the OECD LEED Forum a self-assessment tool for entrepreneurial HEI has been developed.[5] During the last years this tool as well as case studies and train-the-trainer seminars to support organizational change in HEI have been intensively used in the EU member countries. The EU project “EntreComp” developed the Entrepreneurship Competence Framework as conceptual base for projects and studies.[6]

[1] See the European Commission’s „Entrepreneurship 2020 Action Plan“; BMDW (2018); AIT (2018); WKO (2018).
[2] See Calogirou et al. (2010); Niras et al. (2008); World Economic Forum (2009; Schwarz et al. (2009).
[3] See Laspita et al. (2012); Koreen et al. (2019); Palmer et al. (2019a).
[4] See Gibb (2005); Kailer (2010); Volkmann & Audretsch (2017).
[5] See www.heinnovate.eu
[6] See Bacigalupo et al. (2016).

International theme-specific networks (e.g. ESU - European University Network on Entrepreneurship) and working groups of scientific networks (e.g. G-Forum) have also a distinct focus on the development of entrepreneurial universities.

2 The Research Project GUESSS

The Global University Entrepreneurial Spirit Students' Survey (GUESSS) project is an international collaboration to grasp entrepreneurial intentions and activities among students in different countries.[7] The present study is based on previous waves of this survey. The International Survey on Collegiate Entrepreneurship (ISCE) 2006[8] is the antecessor of the GUESSS surveys. GUESSS is based on cooperation between national representatives. Each representative is responsible for contacting universities and sponsors, for data collection and interpretation as well as for the analysis and report for his country. Since 2016, the GUESSS project is jointly organized by the University of St. Gallen (Switzerland, KMU-HSG/CFB-HSG) and the University of Bern (Switzerland, IMU). On the international level, GUESSS 2018 was supported by Ernst & Young. In 2018 a total of 54 countries took part in the anonymous web-based survey and the total final response included 208.636 questionnaires.

Since the start of this international survey in 2006, the country study for Austria has been carried out by the Institute for Entrepreneurship and Organizational Development at the Johannes Kepler University Linz. In the 2018 wave the Department for Corporate Leadership and Entrepreneurship of the Karl Franzens University of Graz acted as cooperation partner.

A special word of thanks is extended to the following organizations for their support: The **Business Start-Up Service of the Austrian Chamber of Commerce** supported this project financially. To increase the response rate, vouchers sponsored by the **Institute of Business Promotion (WIFI) Austria** and the business magazine **"Die Macher"** were raffled among the participants.

2.1 Respondents

A critical success factor of a web-based questionnaire is the general accessibility of students via e-mail as well as the willingness of the universities to inform as many students as possible of the survey. The rectors, the vice rectors of academic affairs of universities and the managing directors and programme directors of the universities of applied science have been contacted by email and/or by telephone and have been asked to encourage the students via round mail to complete the questionnaire. In most cases an e-mail with a short introduction of the project and a link to the online survey was sent to students. Nevertheless in most cases no information is available how many of

[7] See for details: www.guesssurvey.com
[8] See Fueglistaller et al. (2006); Kailer (2007).

their students actually have been informed and whether the information was given directly via mail or through a newsletter. Therefore no exact response rates can be calculated.

As in the previous waves of the survey marked differences in the sample size of participating countries as well as in the return rates of the participating universities can be observed. A selective distribution of questionnaires, f.i. with focus on universities with entrepreneurship chairs and entrepreneurship education courses and extra-curricular measures will probably distort the results. This has to be kept in mind when trying to make any comparisons between countries, between universities, or between results of different waves of this survey.

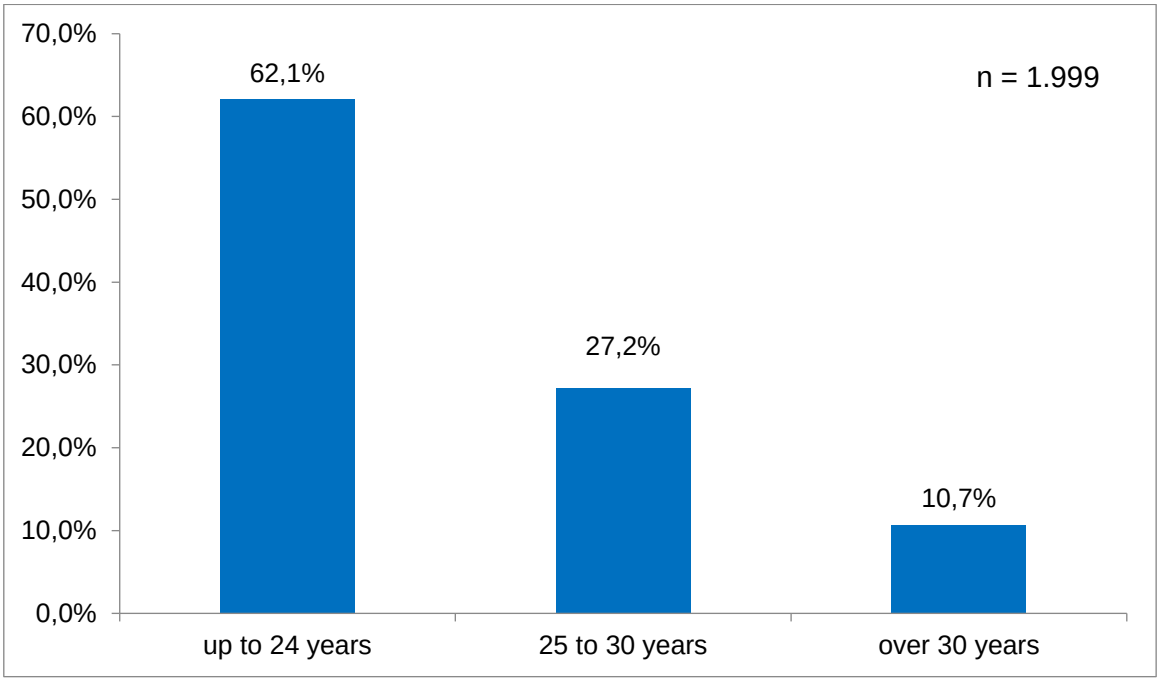
The Global University Entrepreneurial Spirit Students' Survey (GUESSS 2018) includes 54 countries worldwide. In total 208.636 students participated in this online-survey focusing on entrepreneurial intention and start-up activities.

In Austria, 1.999 students from 26 Austrian universities and universities of applied science filled in the complete online-questionnaire. 19 out of these 26 informed their students actively about this survey. Only fully completed questionnaires have been taken into account.

2.1.1 Age

The average age of students participating in GUESSS Austria 2018 is 24.7 years. The age profile (*figure 1*) shows, that almost two third (62%) of the Austrian respondents can be found in the age category “up to 24 years”. 27% are between 25 and 30 years old, and the remaining respondents (11%) are older than 30 years. In this wave remarkably more young students participated (mean in 2016: 26.3 years).

Figure 1: Age profile of the sample



2.1.2 Gender

Like in the previous surveys, more female (63%) than male (37%) students participated in the survey. In the sub-sample of students which already have participated in Entrepreneurship Education, 58% of respondents are female and 42% male. The higher percentage of women has to be taken into account in country comparisons as the female entrepreneurial intention, generally speaking, is lower.

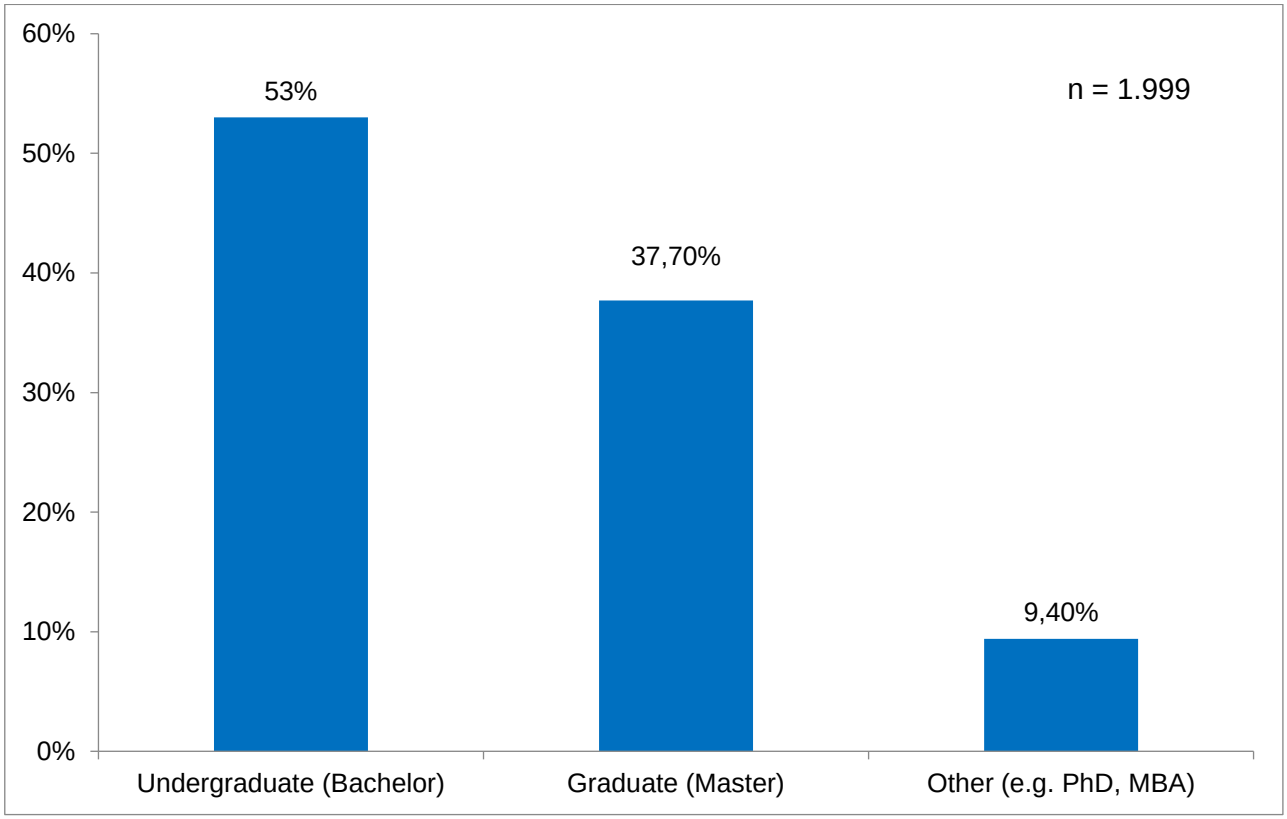
2.1.3 Nationality

By far the most of the respondents (78%) were Austrian citizens, followed by Germans (9%) and Italians (3%). Only 2% of the respondents were exchange students.

2.1.4 Level of studies

As illustrated in *figure 2* the participants in GUESSS Austria 2018 study at different levels. More than half of the students are enrolled in a bachelor program (53%), followed by students studying at the master level (38%). 9% of the respondents are enrolled in a MBA or PhD program. The large number of students studying at the graduate or postgraduate level should be seen in the ongoing conversion from diploma programs to the Bologna system with bachelor and master programs in Austria.

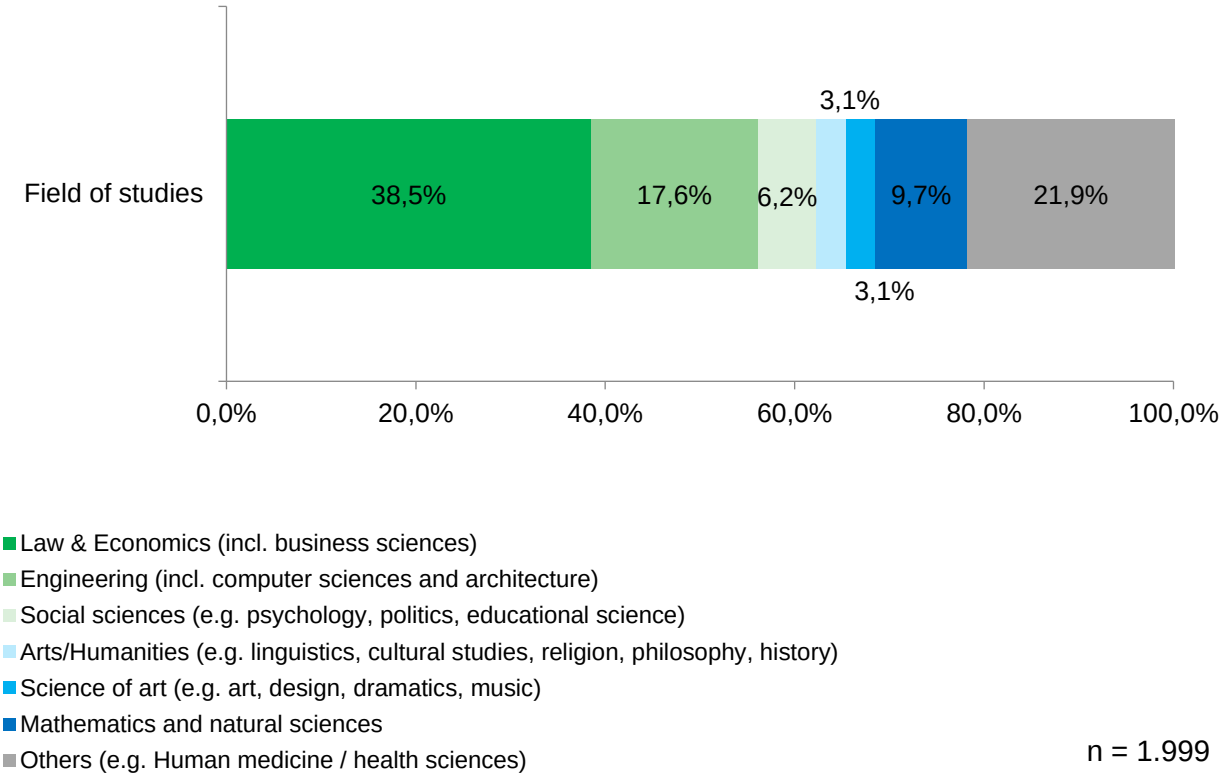
Figure 2: Level of studies



2.1.5 Fields of study

Figure 3 illustrates the distribution of the aggregated fields of study. Approximately one third of the responding students are studying Law, Economics or Business sciences (39%), followed by the category “Others (e.g. Human medicine/health sciences)” (22%), Engineering (18%), Mathematics and Natural sciences (10%), Social sciences (6%) and Arts/Humanities (3%) and Science of Art (3%).

Figure 3: Field of studies

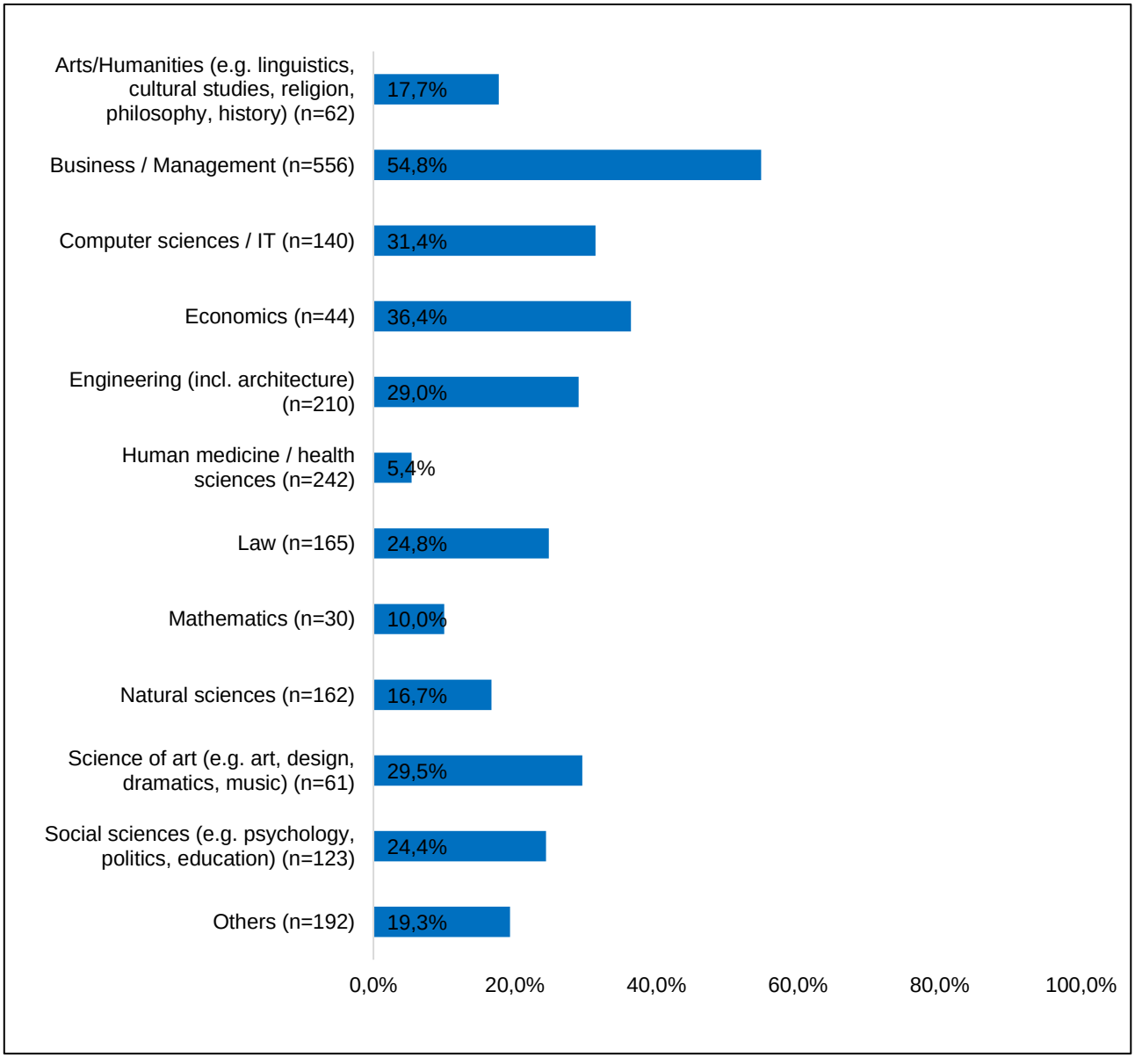


2.1.6 Participation in Entrepreneurship Education by fields of study

Figure 4 illustrates the proportion of students participating in Entrepreneurship Education by aggregated fields of study.

There are clear differences in the participation rate in Entrepreneurship Education. This is partly due to the fact that there are not chairs of entrepreneurship in all fields of study or universities, so that the extent of entrepreneurship courses or events offered is quite different

Figure 4: Participation in Entrepreneurship Education by field of studies

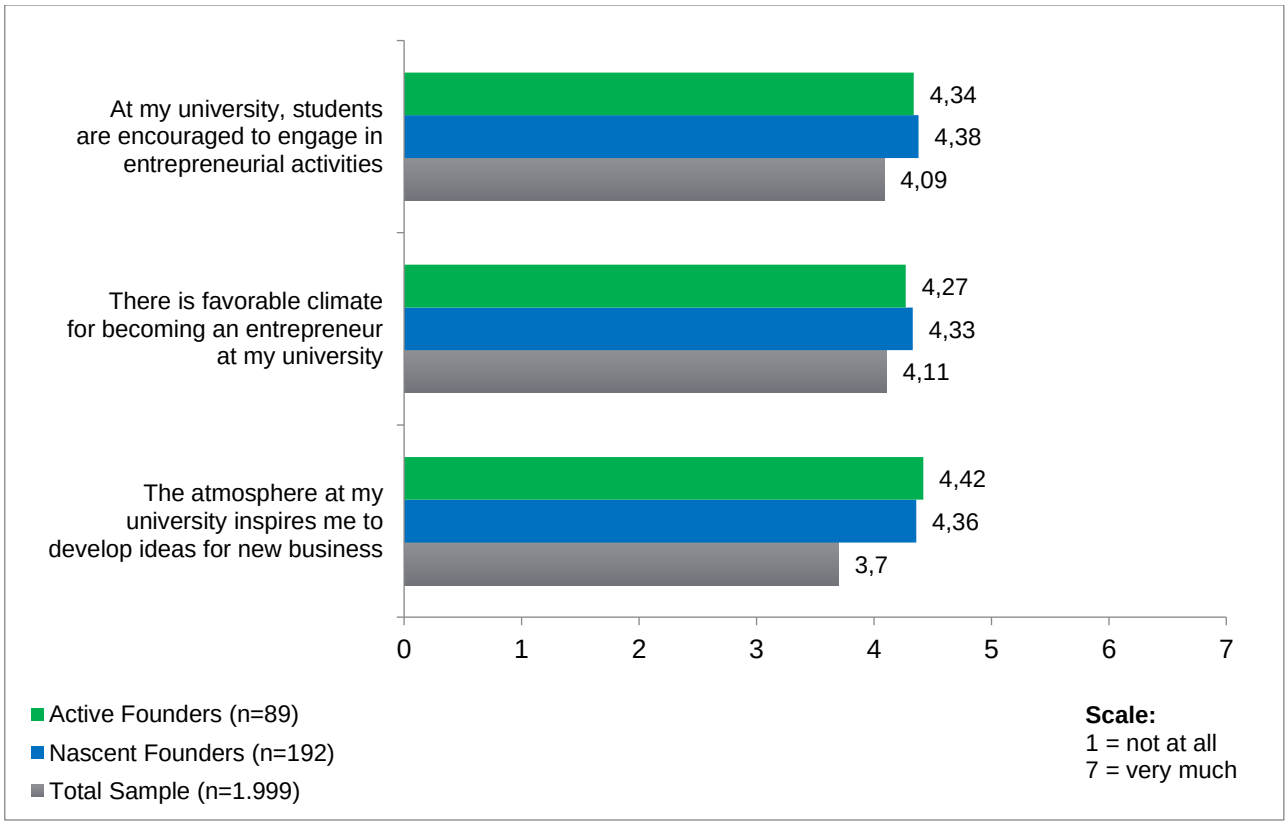


2.1.7 Assessment of the impact of the university on the development of students' competencies

The study analyses the students' perception of the university environment concerning the encouragement of entrepreneurial intentions and activities. Respondents were asked to assess their level of agreement with statements on a seven-point Likert scale ranging from "not at all" [1] to "very much" [7].

There are more or less no differences in the perception of active founders and nascent founders. However, active and nascent founders perceive the university environment as much more as encouraging entrepreneurship than other students (*figure 5*).

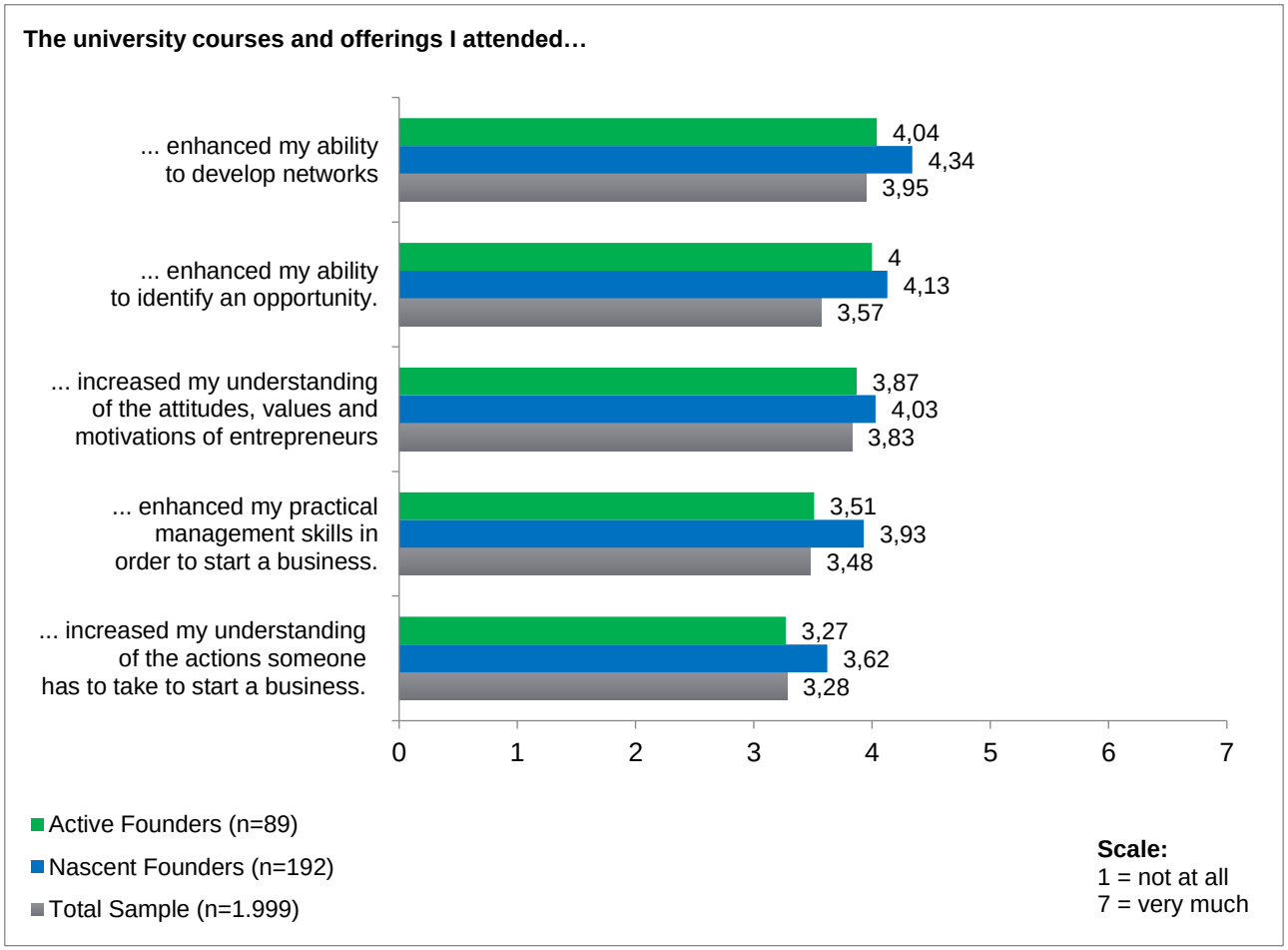
Figure 5: Assessment of the university environment to foster entrepreneurship



Moreover, compared with the results of the previous two waves of the survey, it seems that the overall assessment of the university environment has steadily and positively increased over time.

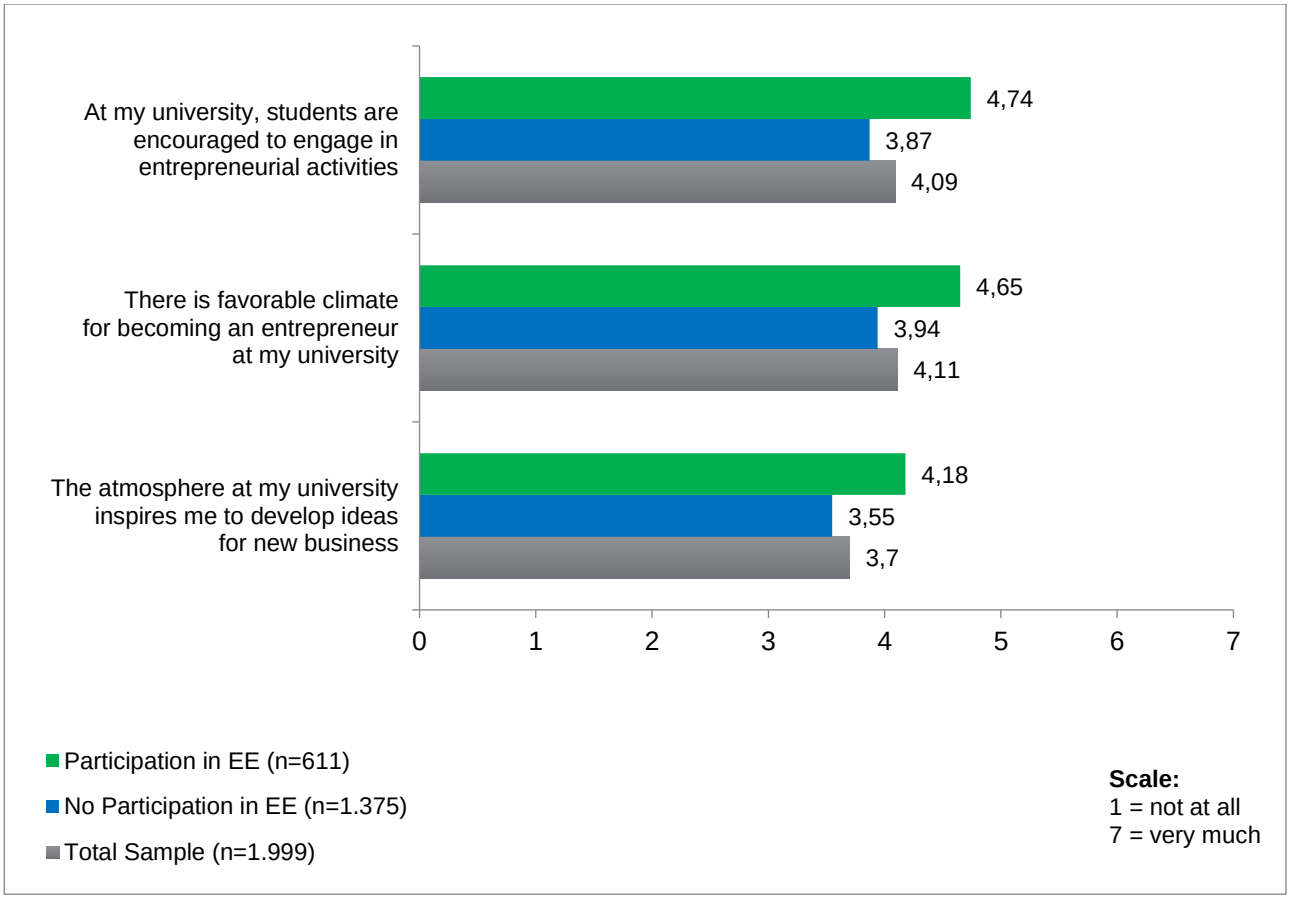
Educational programs and courses at the university level aim at fostering the development of entrepreneurial motivations, intentions and skills. The study focusses on the self-assessment of students' entrepreneurial competency development related to all university courses and offerings in which they have participated (not only entrepreneurship courses!) (*figure 6*). Active founders – and even more pronounced nascent founders – rate the impact of university offerings on the development of their entrepreneurial competencies higher than the total sample. Overall it can be concluded that courses and extracurricular activities of the university mainly enhance the ability to develop networks, to identify business opportunities and increase the students' understanding of entrepreneurial attitudes and values. So, f.i. nascent founders conclude that the university offerings enhanced their practical management and start-up skills remarkably higher than the total sample (3.9 in comparison to 3.48).

Figure 6: Students assessment of the university offerings concerning the development of their competences



Furthermore, *figure 7* shows that students participating in Entrepreneurship Education assess the impact of the university environment on their competencies throughout significantly more positive than non-participants.

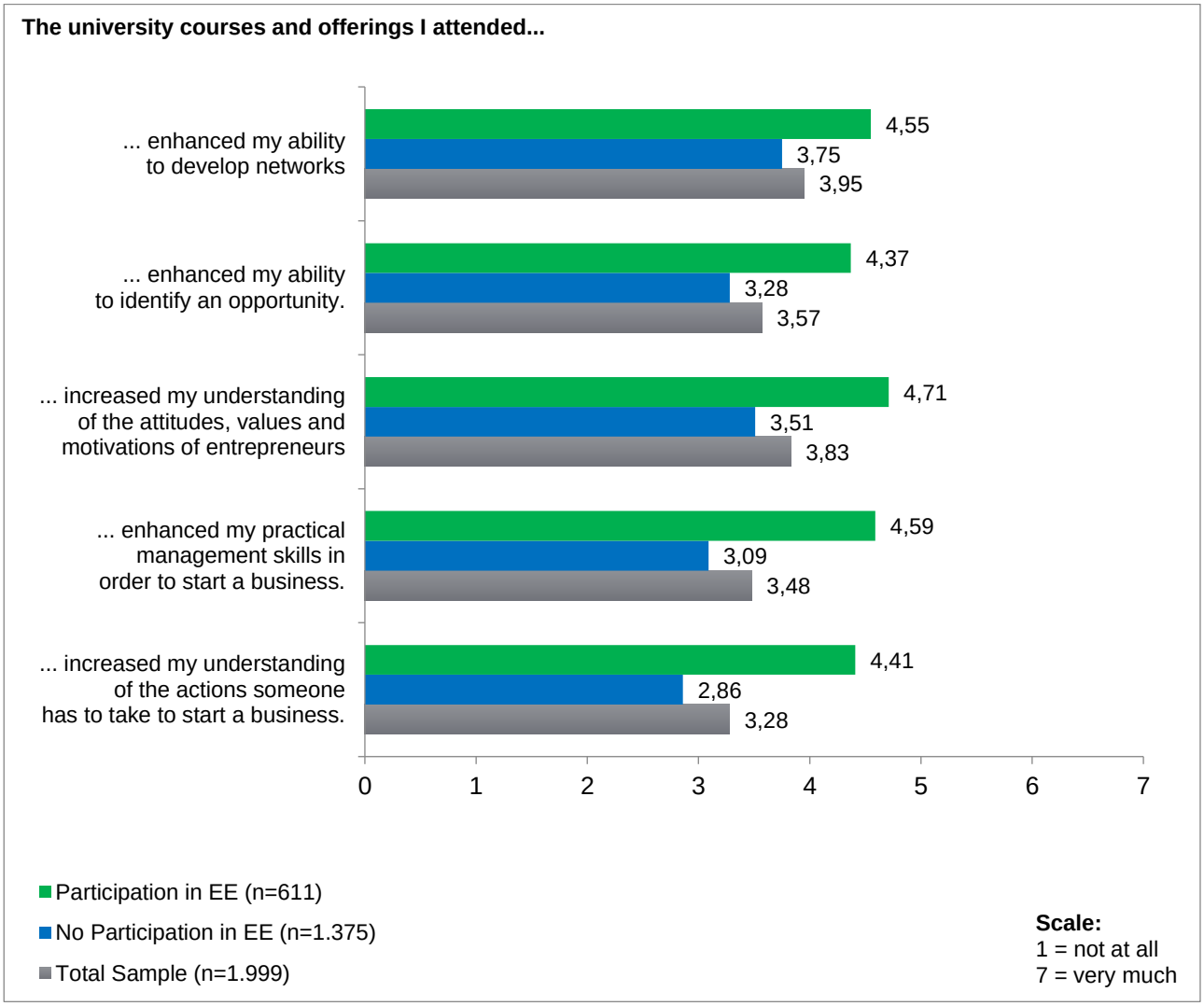
Figure 7: Assessment of the university environment to foster entrepreneurship by participation in Entrepreneurship Education



Students who participated in Entrepreneurship Education perceived the entrepreneurial climate of their university as by far more pronounced (4.74) than non-participants (3.87).

Figure 8 shows that participants in Entrepreneurship Education rate their ability to identify opportunities with 4.37 by far higher than non-participants with 3.28 (7-point Likert-Scale).

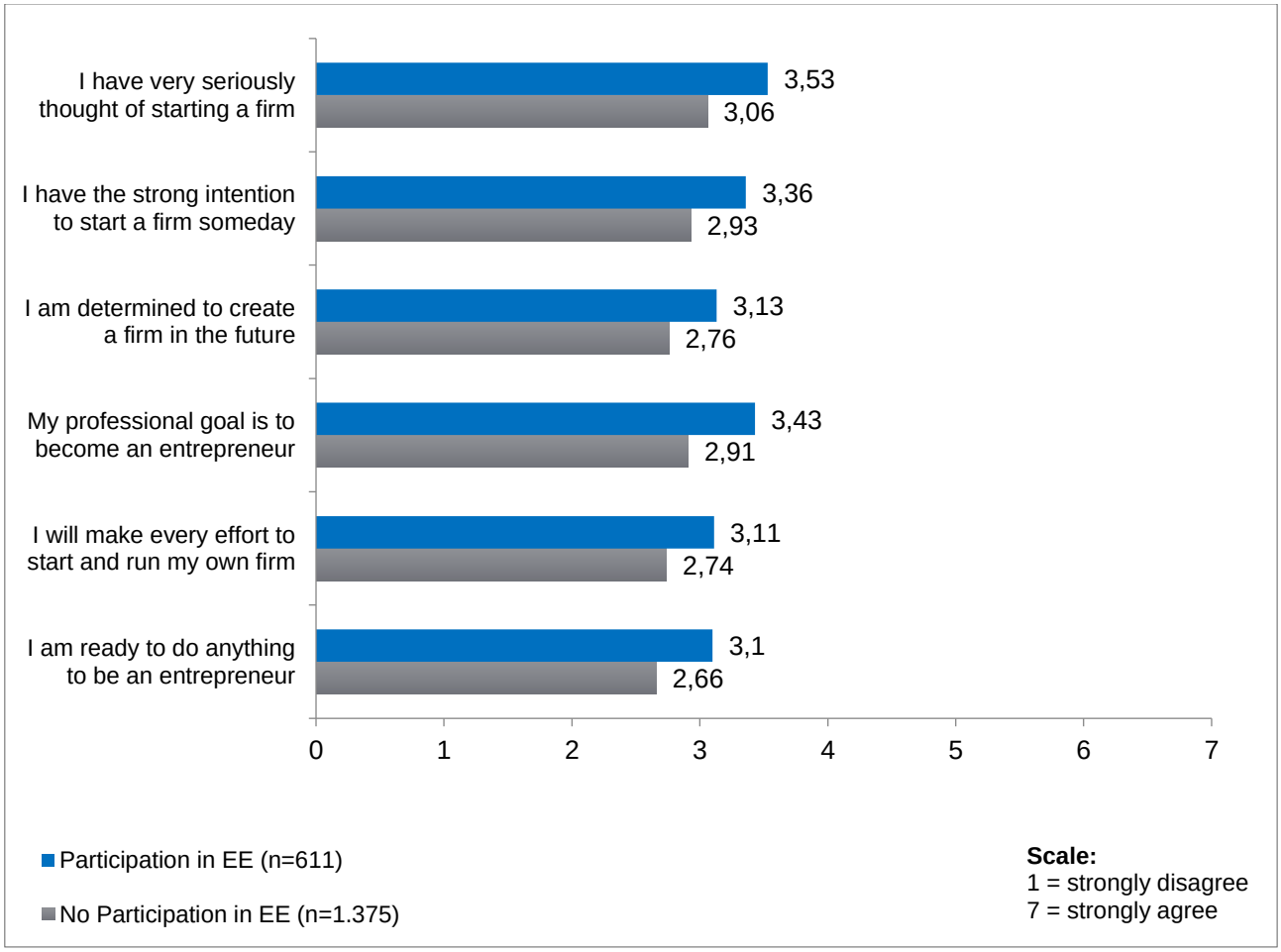
Figure 8: Students' assessment of the university offerings concerning the development of their competences by participation in Entrepreneurship Education



2.1.8 Founding intentions by participation in Entrepreneurship Education

Figure 9 shows that the founding intentions of students who participate in Entrepreneurship Education measures is remarkably higher than those of non-participants.

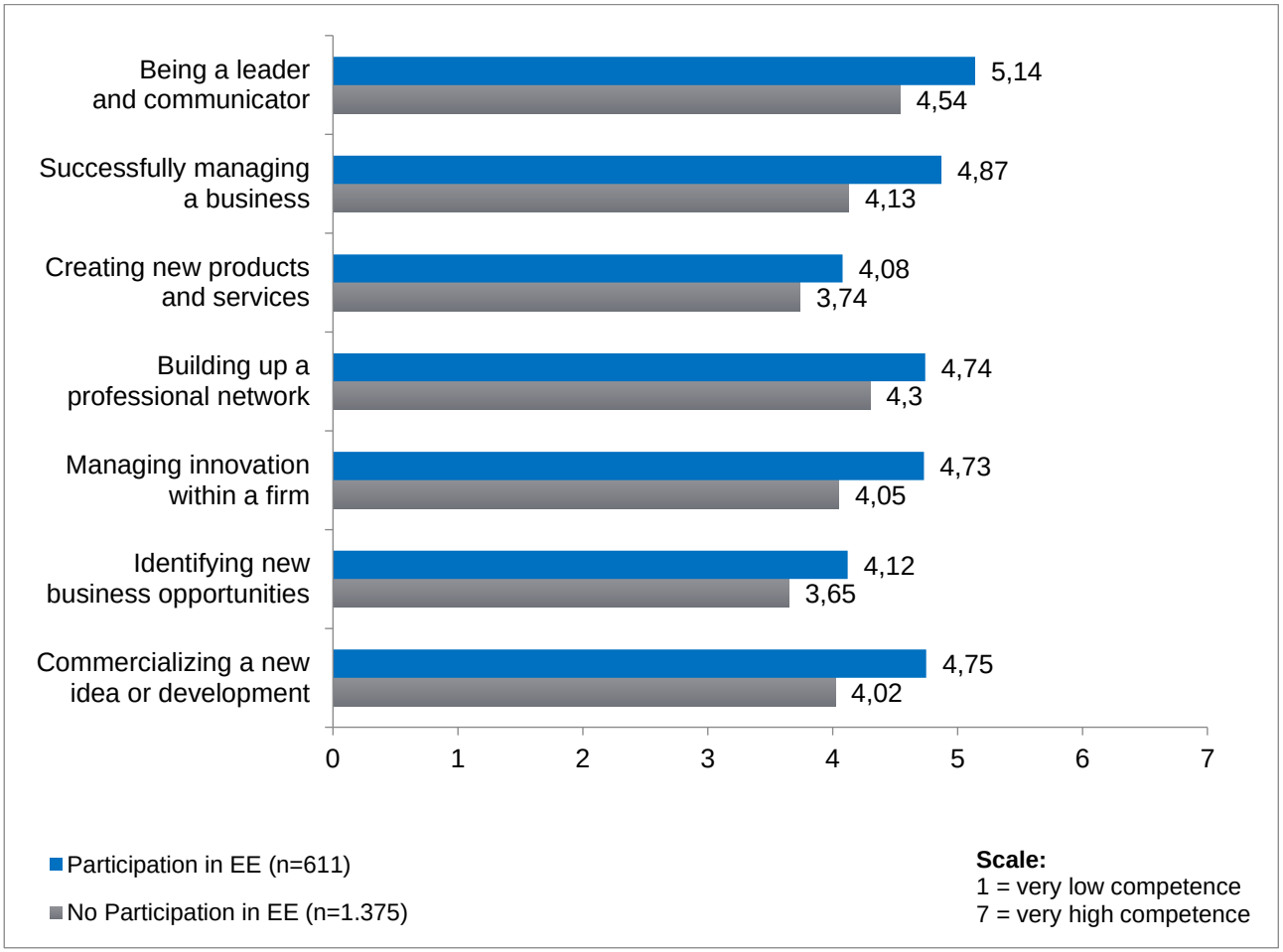
Figure 9: Founding intentions by participation in Entrepreneurship Education



2.1.9 Entrepreneurial competences and skills by participation in Entrepreneurship Education

Entrepreneurial competences and skills play an important role in the successful creation of new ventures. Comparing participants and non-participants of Entrepreneurship Education, we can see (*figure 10*) that students who attended Entrepreneurship Education measures rate their competencies consistently by far higher than non-participating students (f.i. the competence to successfully manage a business: 4.87 in comparison to 4.13 on a 7-point Likert scale).

Figure 10: Self-Assessment of entrepreneurial competences by participation in Entrepreneurship Education



3 Career choice intentions

3.1 Career choice intentions directly after and 5 years after graduation

The expressed intention to aspire either self-employment or employment directly after studies respectively five years after graduation can serve as a first indicator for the strength of an individual entrepreneurial attitude. Alumni studies show that the career goals expressed in student surveys are to a considerable extent put into practice.[9]

Generally seen (*figure 11*) it can be stated that **directly after graduation** 63% intend to start their career as an employee in a firm (39% in an SME, 24% in a large firm). Another 10% of the respondents prefer an employment in the public service. An academic career path is preferred by 7%. The non-profit sector is the most likely career option for 3%. 4% want to found their own business. About 1% aim to take over an already existing company (0.5% successor in parents' / family's firm and 0.6% successor in a firm currently not controlled by the family).

However, five years after graduation, with more professional experience, know-how and know-whom, the picture looks different:

- 24% of the respondents intend to found their own company 5 years after studies and 5% of the students are interested in taking over an existing company (2% as a successor in the family business, 3% as a successor in a business currently not controlled by their family) as a career option. So in total 29% of the students see themselves as entrepreneurs after having acquired professional experience.
- The percentage of students who seek employment either in the private or public sector drops to under 55% (19% in a large firm, 16% in a SME, 10% in the public sector, 7% in academia and 3% in a non-profit organization).

Compared to the last two rounds of GUESSS it can be stated that, although direct comparisons between the waves of the study should be taken cautiously, the founding intentions continuously have increased from 18% (GUESSS 2013) to 24% (*figure 12*).

[9] See Kailer (2010); Kailer et al. (2012).

Figure 11: Career choice intentions: directly after studies and 5 years after graduation

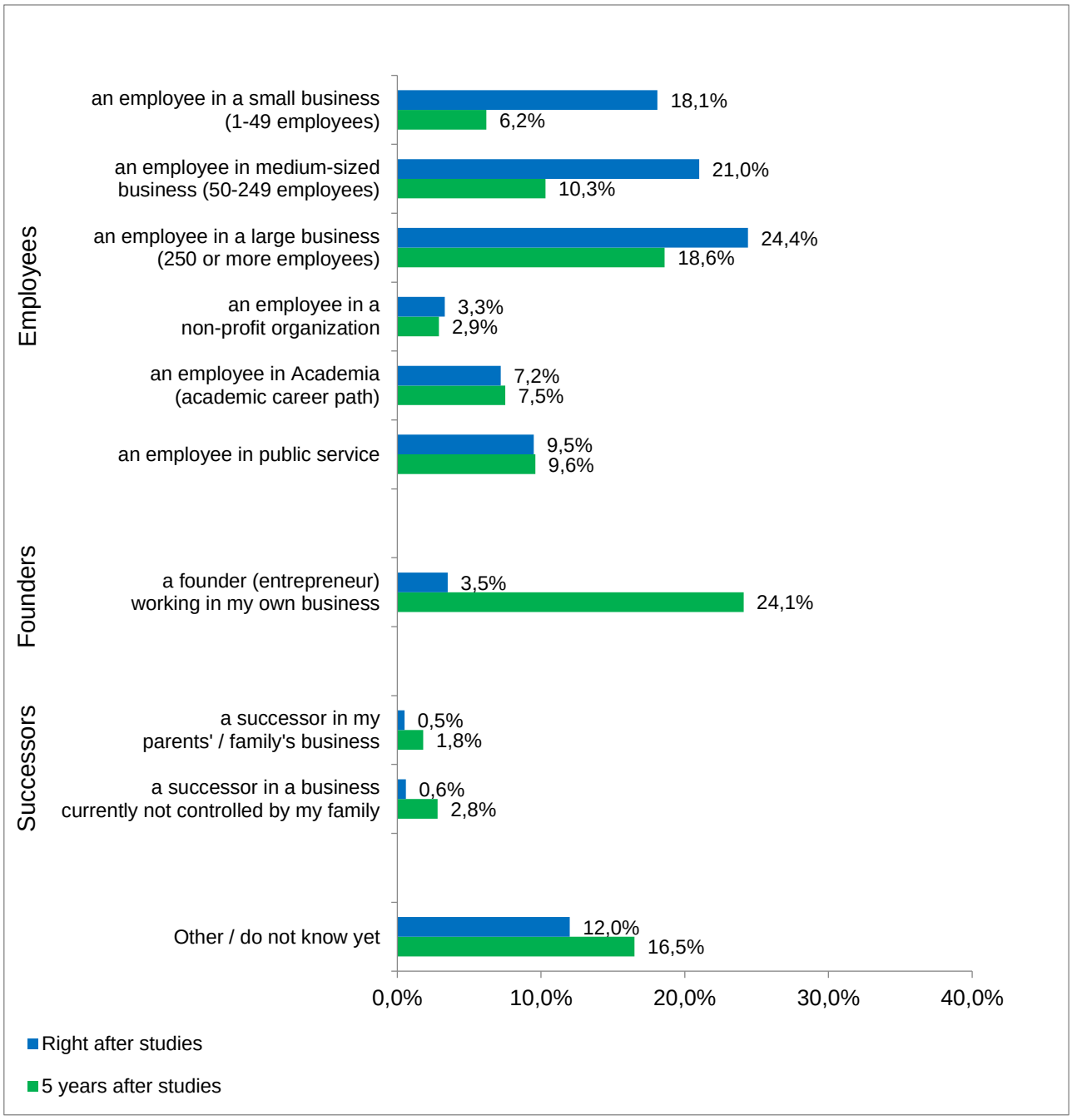
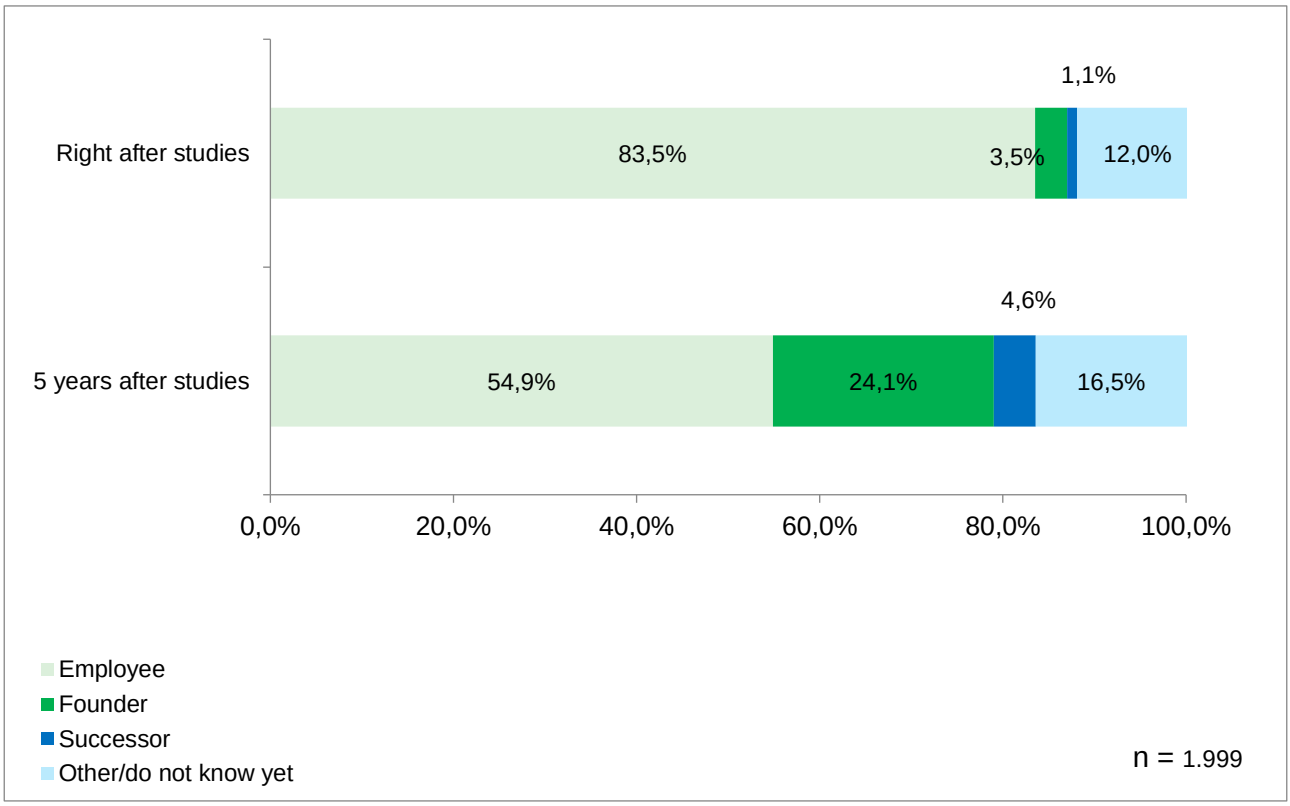


Figure 12: Career intentions right after and 5 years after studies



However, do students' career preferences remain stable or not? *Table 1* reveals that 69% of the students who want to be self-employed right after finishing their studies also intend to remain entrepreneurs 5 years later on. The same applies to students who aim to start as a business successor (f.i. in their family business). They see themselves still as entrepreneurs, either as business successors or as founders of their own enterprise. Employees in SME tend to remain in this company size, but there is a remarkable shift as one third intends to be self-employed or business successor 5 years later. Students who would like to start their career in larger enterprises also tend to stay in this company size but 30% see themselves as self-employed or business successors later on. Students planning to be employed in NPOs, public service or in academia mostly see themselves also in this position 5 years later on.

The overall picture given in *Table 1* shows that the decision for a career as an entrepreneur may be taken directly after the end of studies, but also later on. Especially students which begin their work experience as employees in start-ups, other SME or larger enterprises often, see a later shift into self-employment as a worthwhile option after having gained practical experience.

Table 1: Career choice intentions: Expected changes in 5 years

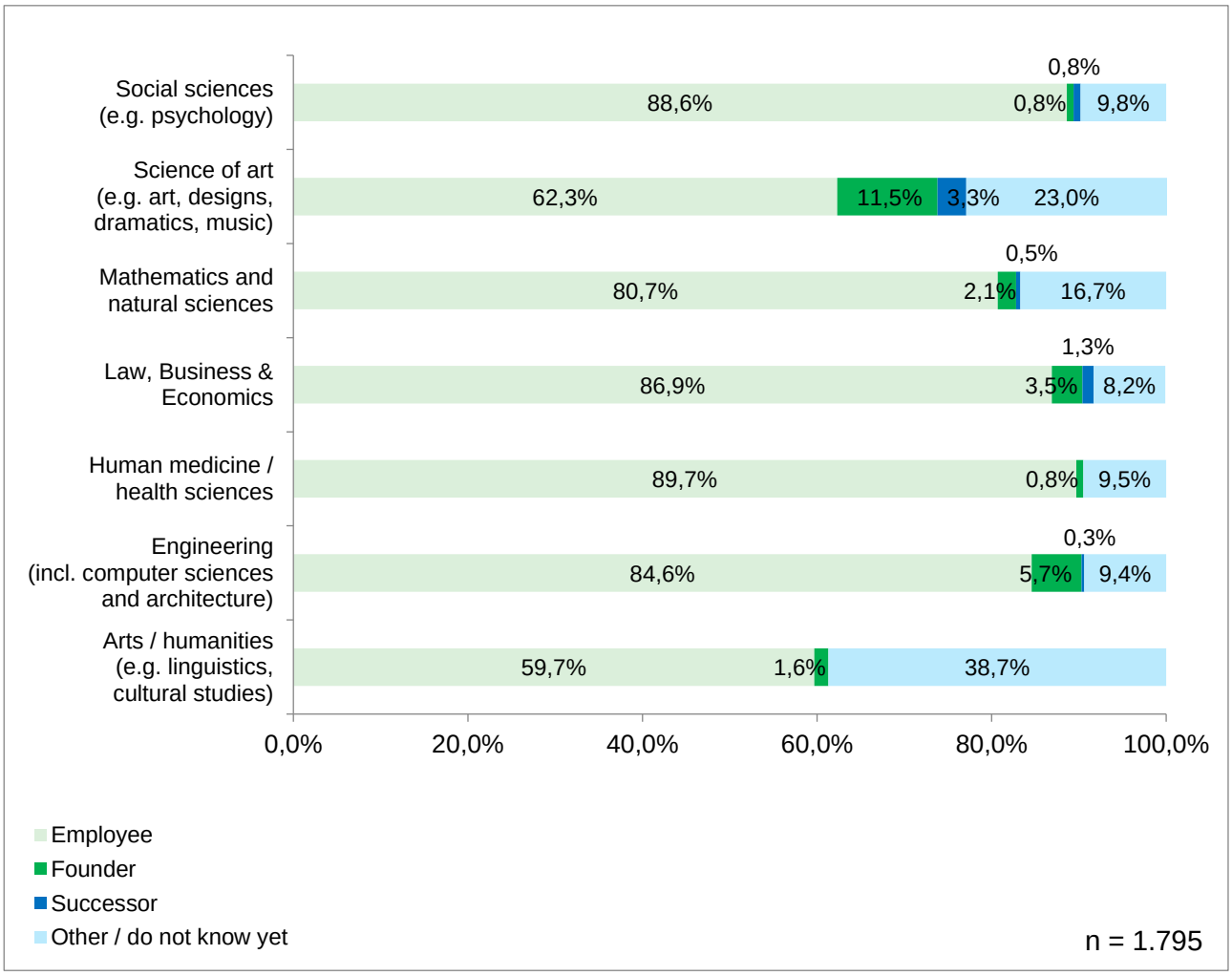
Right after studies	5 years later					
	Employee (SME)	Employee (Large Firm)	Employee (Other)	Self-employed	Successor	Other/do not know yet
Employee (SME) (n=782)	**24%**	17%	11%	29%	6%	13%
Employee (Large) (n=488)	14%	**35%**	11%	25%	5%	10%
Employee (NPO, Public) (n=399)	11%	10%	**54%**	11%	2%	13%
Self-employed (n=70)	4%	7%	10%	**69%**	4%	6%
Successor (n=21)	5%	5%	5%	**43%**	**43%**	0%
Other/do not know yet (n=239)	11%	10%	13%	14%	2%	**50%**

Furthermore, students participating in Entrepreneurship Education show a marked higher propensity to become entrepreneurs in the short as well as in the long run (participants: 7% → 33%; non-participants: 3% → 27%) (see in detail the Figures 27 and 28 in the annex).

3.2 Career choice intentions by field of study

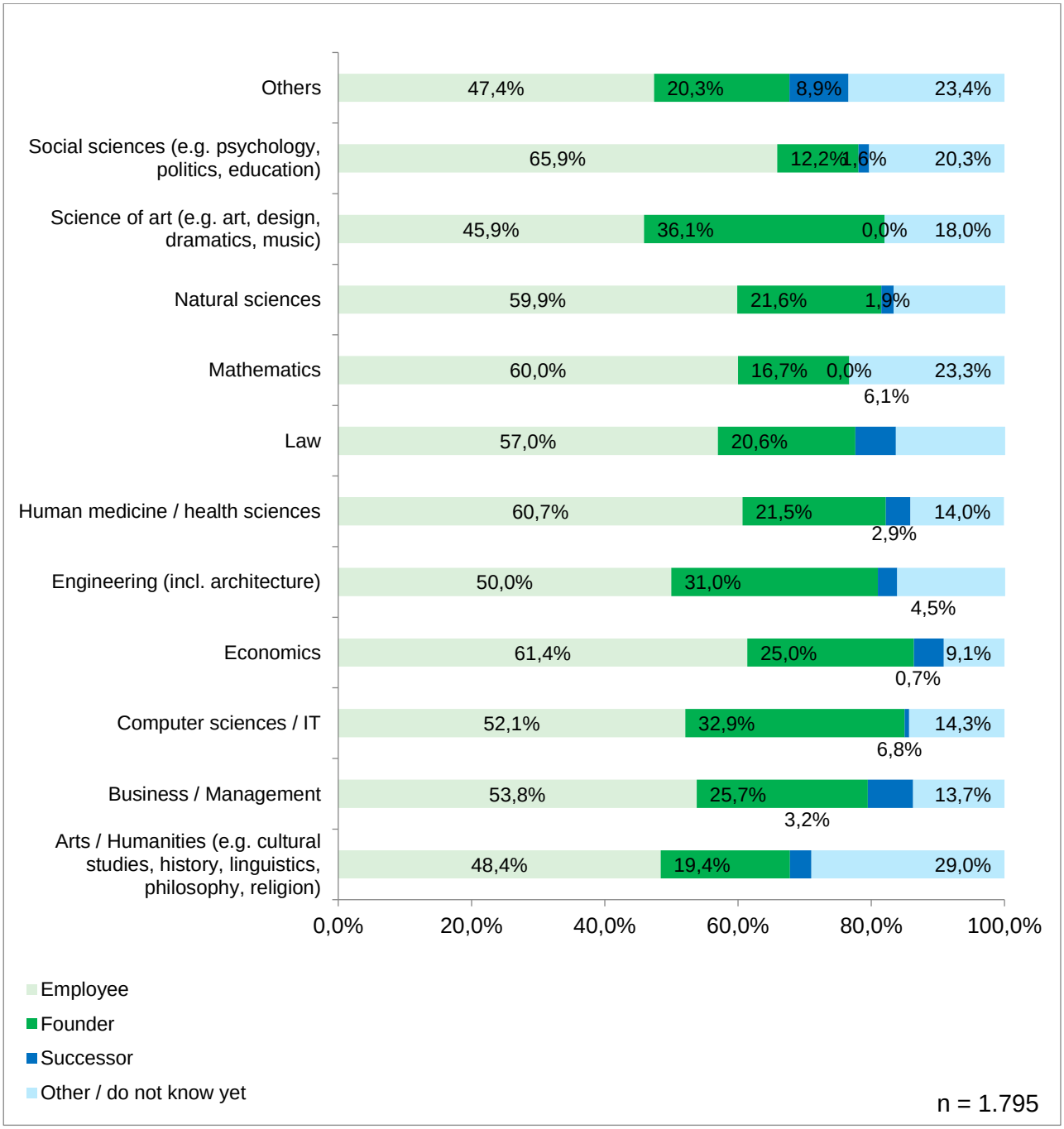
Figure 13 illustrates the career choice intentions **directly after studies** broken down by the field of study. Of course the career choice intentions not only are influenced by perceived business opportunities, but also by the labour market situation for the respective field of study. Entrepreneurship may be opportunity-based as well as necessity-based.

Figure 13: Career choice intentions right after graduation by fields of study



Five years after graduation self employment becomes more important for all fields of study, compared to career paths in established companies (*figure 14*). In most fields of study one out of four up to one third of the responding students perceive themselves as self-employed mostly as founders, but also as business successors. Students in the fields of business and management, IT and computer sciences, engineering, but also science of art have the highest percentages of self-employment intent.

Figure 14: Career choice intentions five years after graduation by fields of study

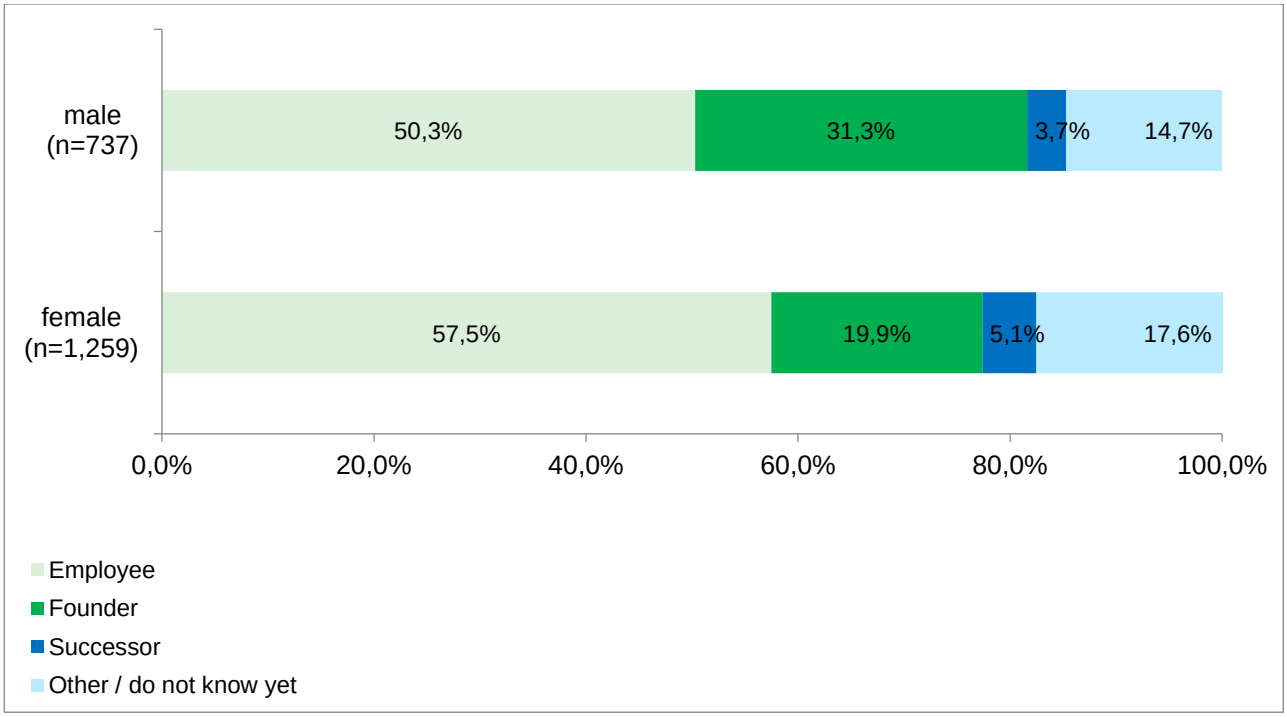


3.3 Career choice intentions by gender

Directly after graduation 9% of the male graduates, but only 2% of the female graduates intend to start an entrepreneurial activity (either as a founder or successor).

In a five year perspective 35% of the male and 25% of the female respondents plan to pursue an entrepreneurial career. It can be stated that a gender gap still exists, but it begins to close after some years of practical experience (*figure 15*).

Figure 15: Career choice intentions five years after graduation by gender



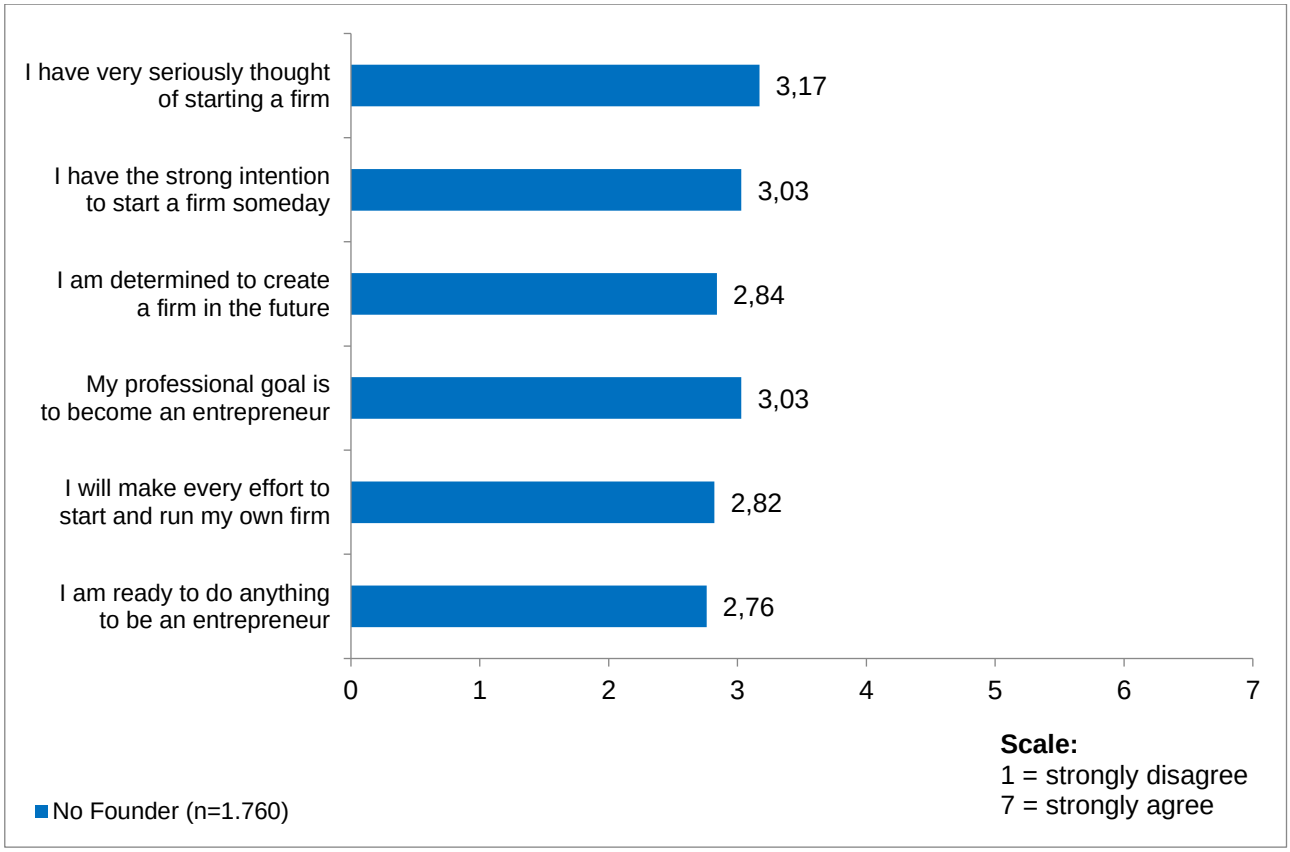
4 Students and Entrepreneurship

This section addresses the entrepreneurial intentions and attitudes of students (n = 1.760), but excluding active founders (n = 89) and nascent founders (n = 192), which will be discussed in detail in chapters 5 and 6.

4.1 Founding intentions

The intention to pursue an entrepreneurial career depends upon demographic, social and personality factors as well as on the personal attitude towards entrepreneurship.[10] *Figure 16* shows the items of the founding intention construct (based on students which are neither active nor nascent entrepreneurs).

Figure 16: Founding intentions

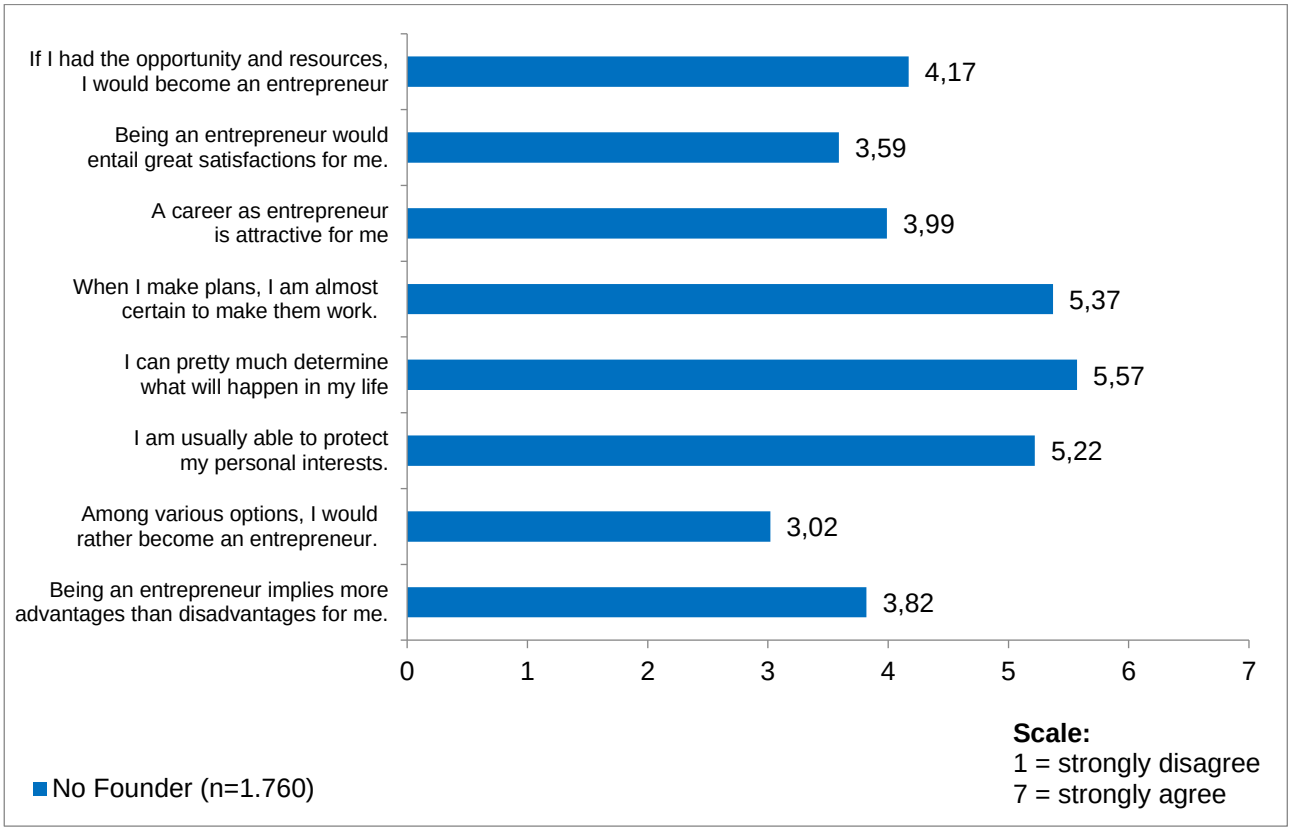


[10] See Liñán/Chen (2009); Schwarz et al. (2009), Maresch et al. (2016), Palmer et al. (2019).

4.2 Self-efficacy and perceived behavioural control

Figure 17 plots the average scores for the students (excluding active and nascent entrepreneurs). The items "When I make plans, I am almost certain to make them work", "I can pretty much determine what will happen in my life" and "I am usually able to protect my personal interests" picture the self-assessment of one's own internality with regard to work and life in general. The rest of the items focus more on the internality associated with an entrepreneurial career.

Figure 17: Students self-efficacy and locus of control

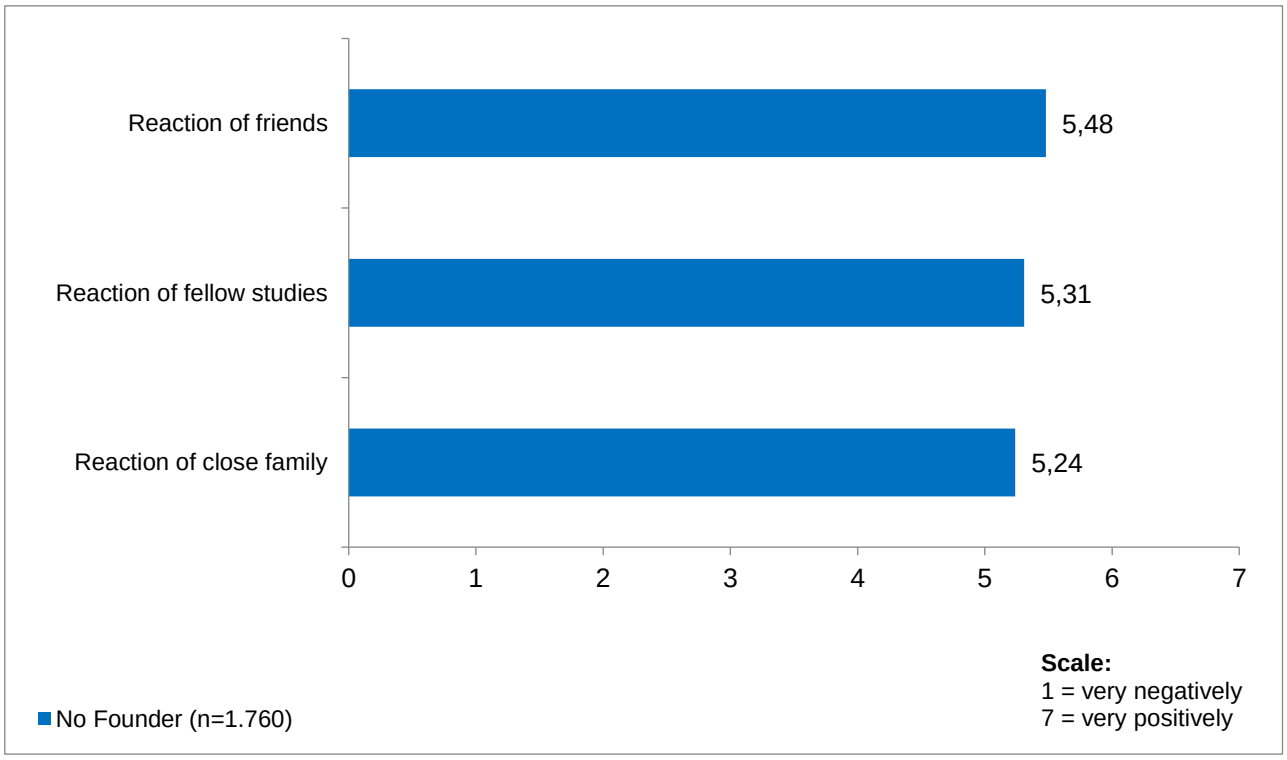


Self-efficacy and perceived behavioral control are two constructs that measure the students' perception to influence their external environment and to be in control of their own destiny. A high score on these items suggests that the students are oriented more internally than externally. This in turn affects their reaction to obstacles and difficult life situations.

4.3 Reaction of the environment

The external environment can influence the decision to pursue a career as an entrepreneur. Thus, the following questions exhibit the perceived reaction of friends, students and family when the decision is made to found a company. Overall, the presumed reactions of the respective environment seem to be very positive (*figure 18*).

Figure 18: Reaction of the environment toward an entrepreneurial career

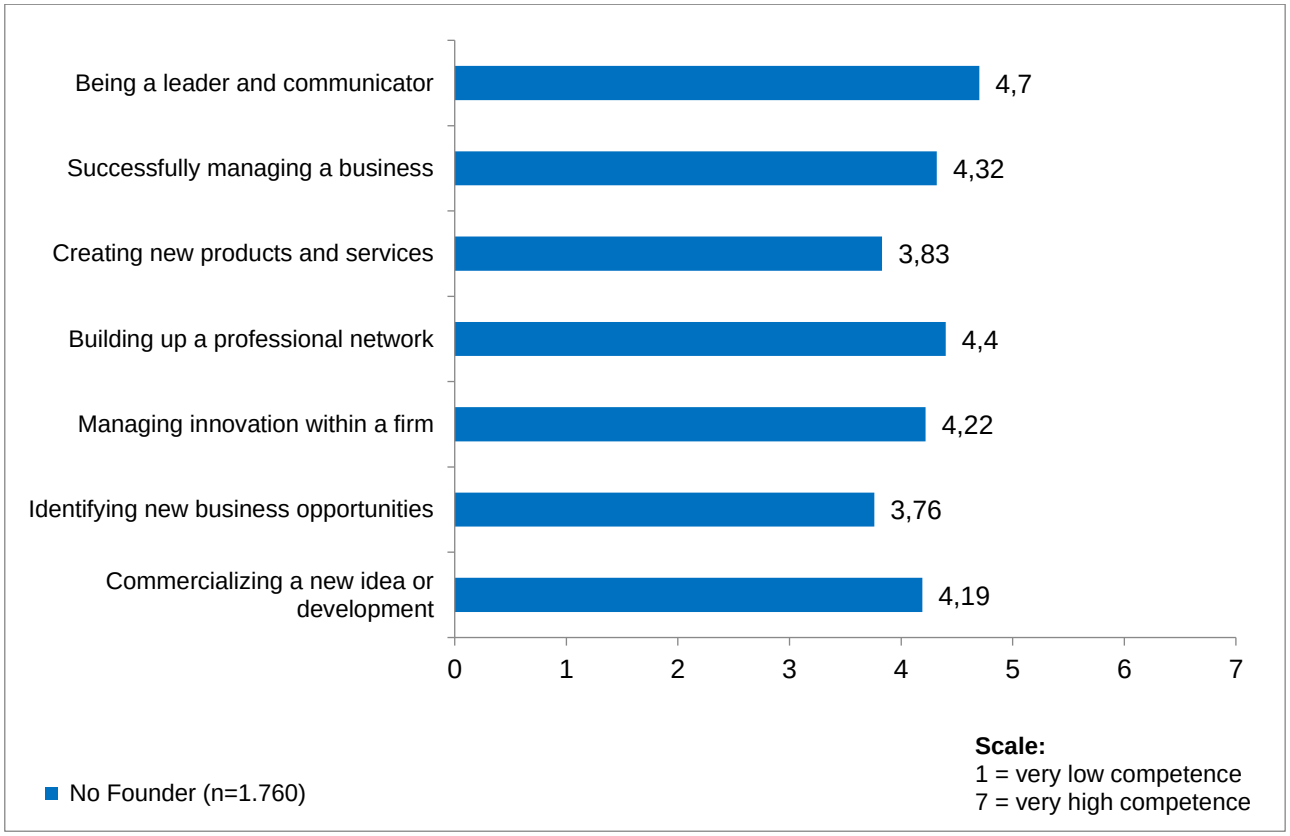


Students who participate in Entrepreneurship Education presume that the reaction of their friends and fellow students (f.i. from the entrepreneurship program) are more positive in comparison with non-participants. Concerning a reaction of the close family the study shows no differences.

4.4 Entrepreneurial competences and skills

Competences and skills play an important role in the successful creation of new ventures. To identify new business opportunities, to communicate effectively with costumers and to build up a professional network are essential competences and skills in the context of start-ups. This self-assessment is based on students excluding active and nascent entrepreneurs (*figure 19).*

Figure 19: Entrepreneurial competences



5 Nascent founders

10% of the Austrian respondents (192 students) are nascent founders, meaning that they are currently trying to start their own business or to become self-employed.

5.1 Characteristics of the nascent founders

The average age of the nascent founders is 25.8 years. 40% of them are women. About 36% of the nascent founders are studying Law or Economics (incl. business sciences), followed by 15% who are studying Computer sciences and 15% who are studying Engineering (incl. architecture).

26% of these nascent founders intend to found their own business or be a successor right after studies. 72% intend to found their own business or be a successor five years later. A considerable part of them can be considered as serial entrepreneur, as about 22% of students planning to found an enterprise are also already active entrepreneurs.

5.2 Foundation partners

70% of the nascent founders plan to found their firm with – mostly - one or even more co-partners. Only 30% intend to start their business as a solo entrepreneur (*figure 20*).

Figure 20: Number of Co-Founders

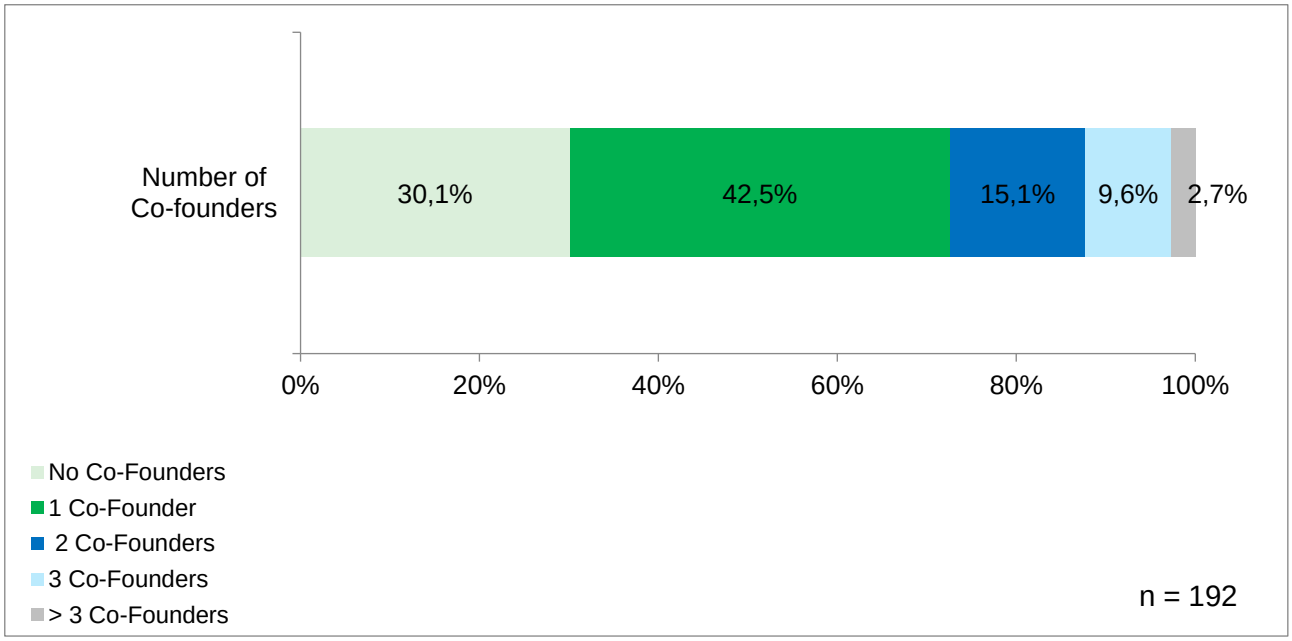


Figure 21 shows that 35% of the nascent female entrepreneurs intend to start their business alone, compared to 28% of their male counterparts.

Figure 21: Number of Co-Founders by gender

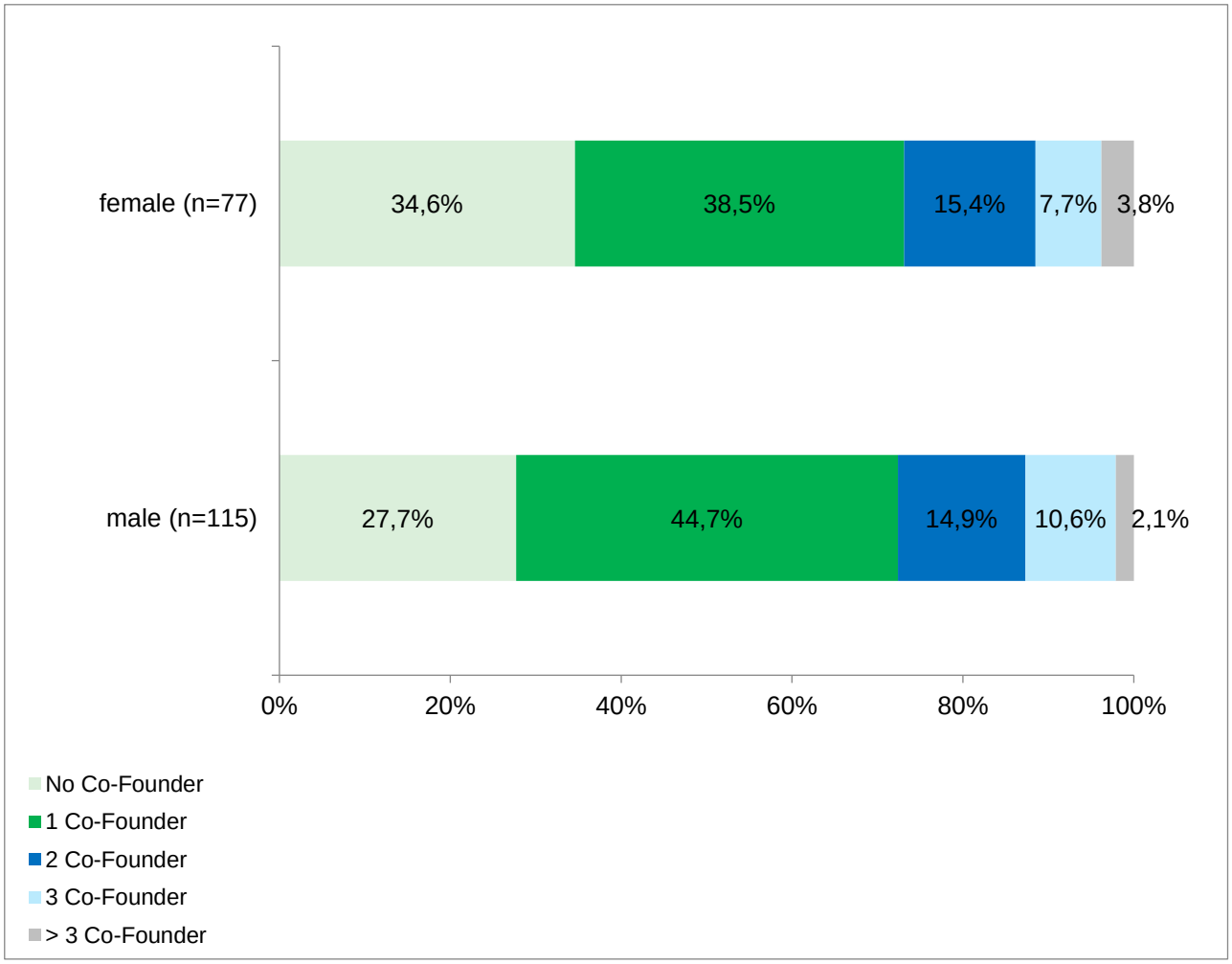
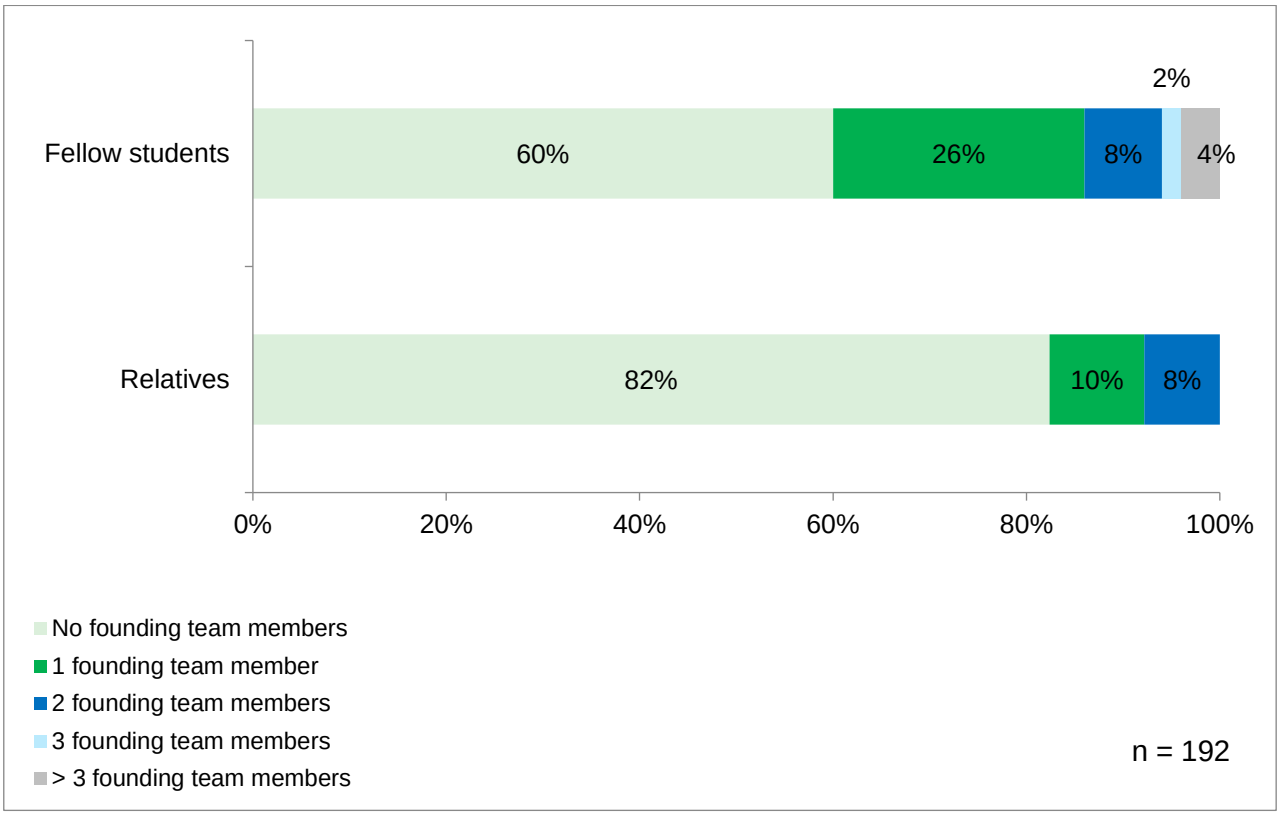


Figure 22 shows that the university context is most important to meet potential start-up partners. 40% of nascent entrepreneurs intend to start their firm together with a fellow student. In comparison only 18% intend to found together with their relatives.

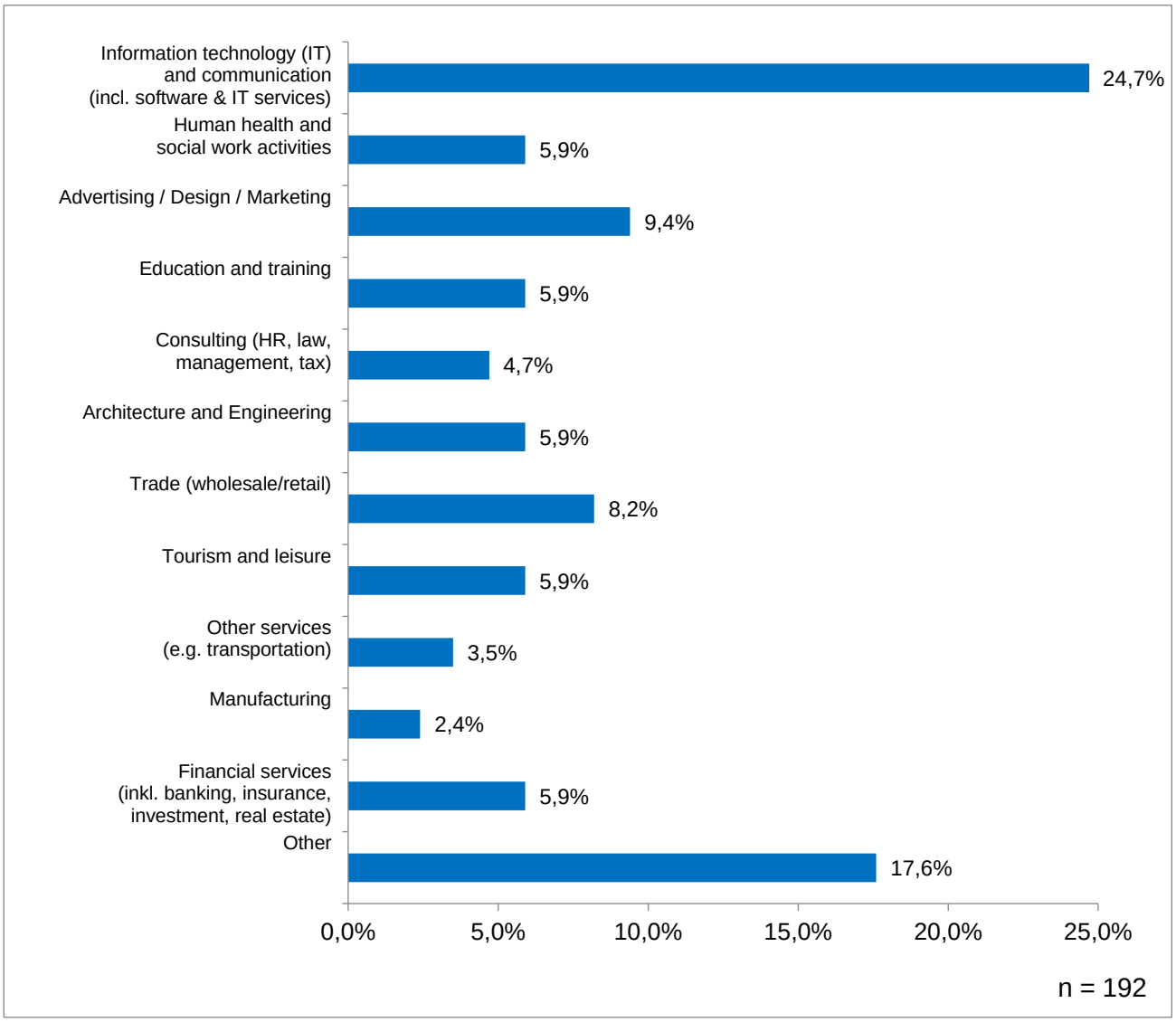
Figure 22: Context for team member recruitment



5.3 Industry sectors

The preferred industry sectors of the nascent founders among students for their start-up are Information and Communication Technology (25%), Advertising/Design/Marketing (9%) and Trade (8%). Only 2% of the nascent founders intend to establish their business in the manufacturing sector (*figure 23*).

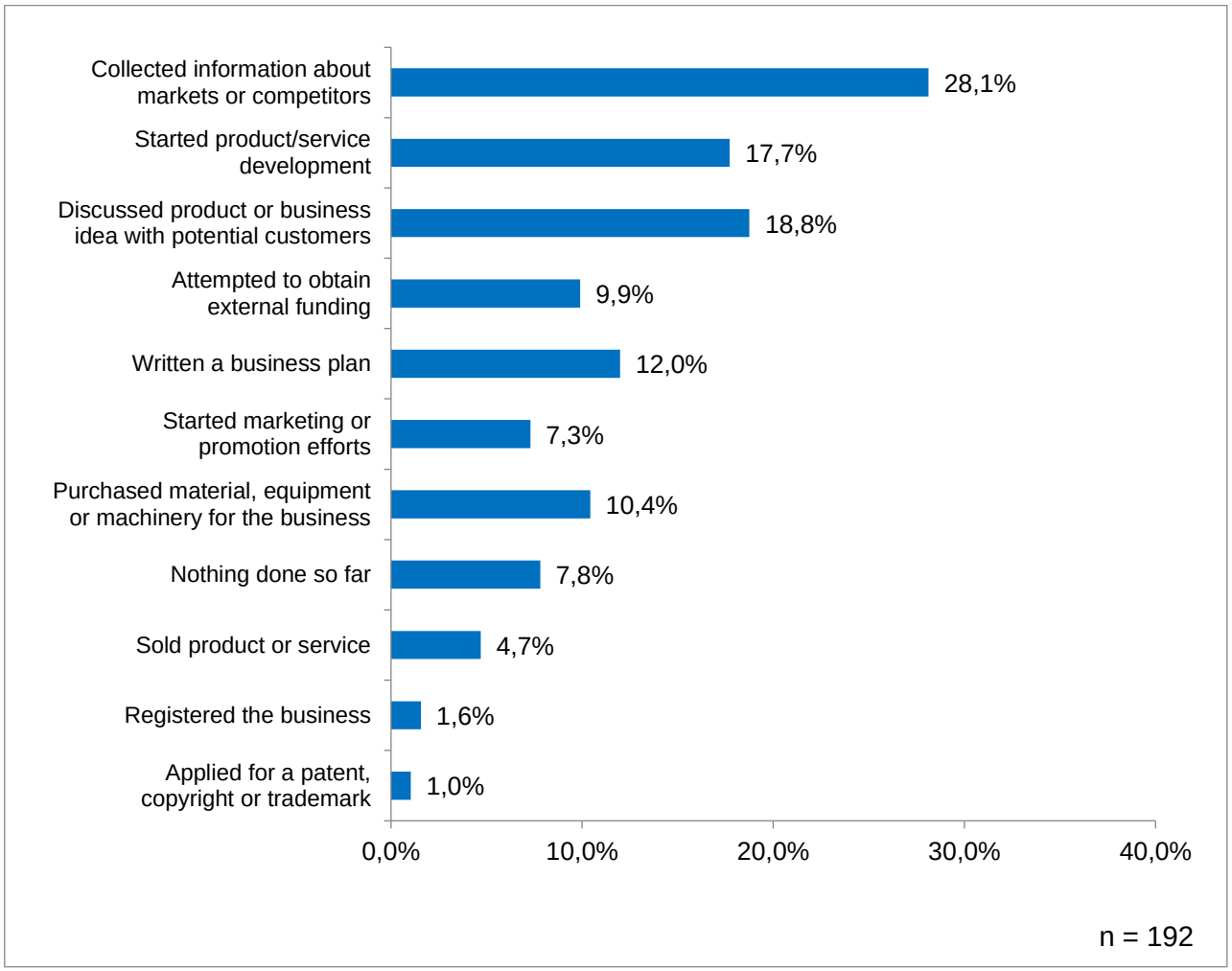
Figure 23: Industry sectors of nascent founders



5.4 Steps taken to found the business

Only a part of the nascent entrepreneurs already has undertaken concrete activities concerning starting up an own enterprise. Mostly (28%) they have collected information about markets or competitors. 18 % started the product/service development, 19% discussed their business idea with potential customers. 12% have written a business plan. Only 8% of nascent entrepreneurs have stated that they have nothing done so far (*figure 24*).

Figure 24: Steps taken to found a business (multiple responses)



6 Active founders

5% of the Austrian respondents (89 students) are active founders, i.e. they are already running their own business or are already self-employed.

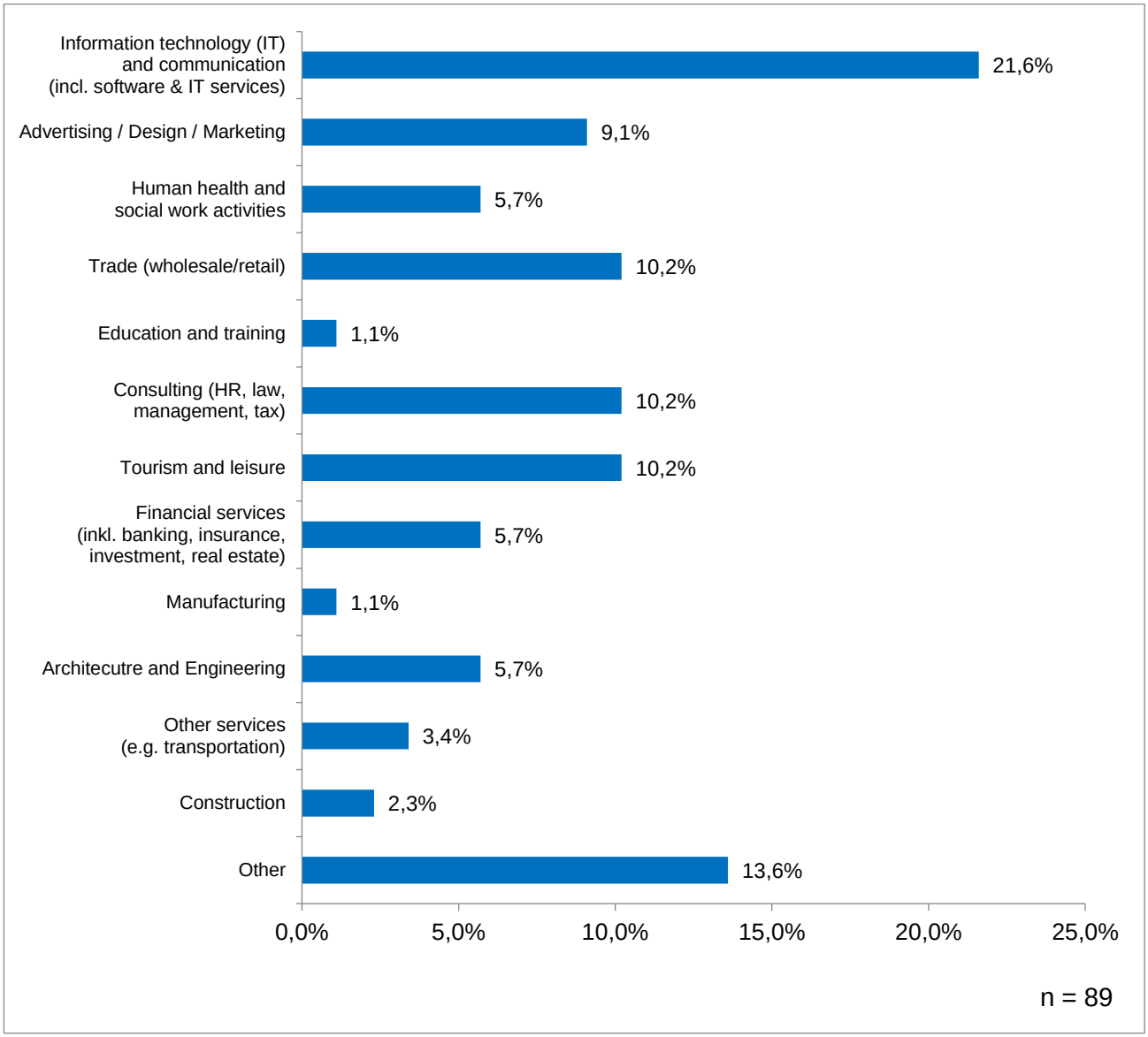
6.1 Characteristics of active founders

The average age of the active founders is 29.8 years. 48% of the active founders are studying Law & Economics (incl. Business sciences), followed by Engineering (including Architecture) (11%), Computer sciences (10%), Science of art (6%) and Social sciences (e.g., psychology, politics, educational science) (5%). 30% of the active entrepreneurs founded their start-up right after studies. 51% founded their business more than 5 years ago.

6.2 Industry sectors

The industry sectors in which most of the student-founders start their business are Information Technology and Communication (22%), Trade (wholesale/retail) (10%), Consulting (HR, law, management, tax) (10%), Tourism and Leisure (10%) and Advertising/Design/Marketing (9%). This distribution of industry sectors corresponds with the nascent founders, where 25% of the future entrepreneurs plan to found in the ICT-sector (*figure 25*).

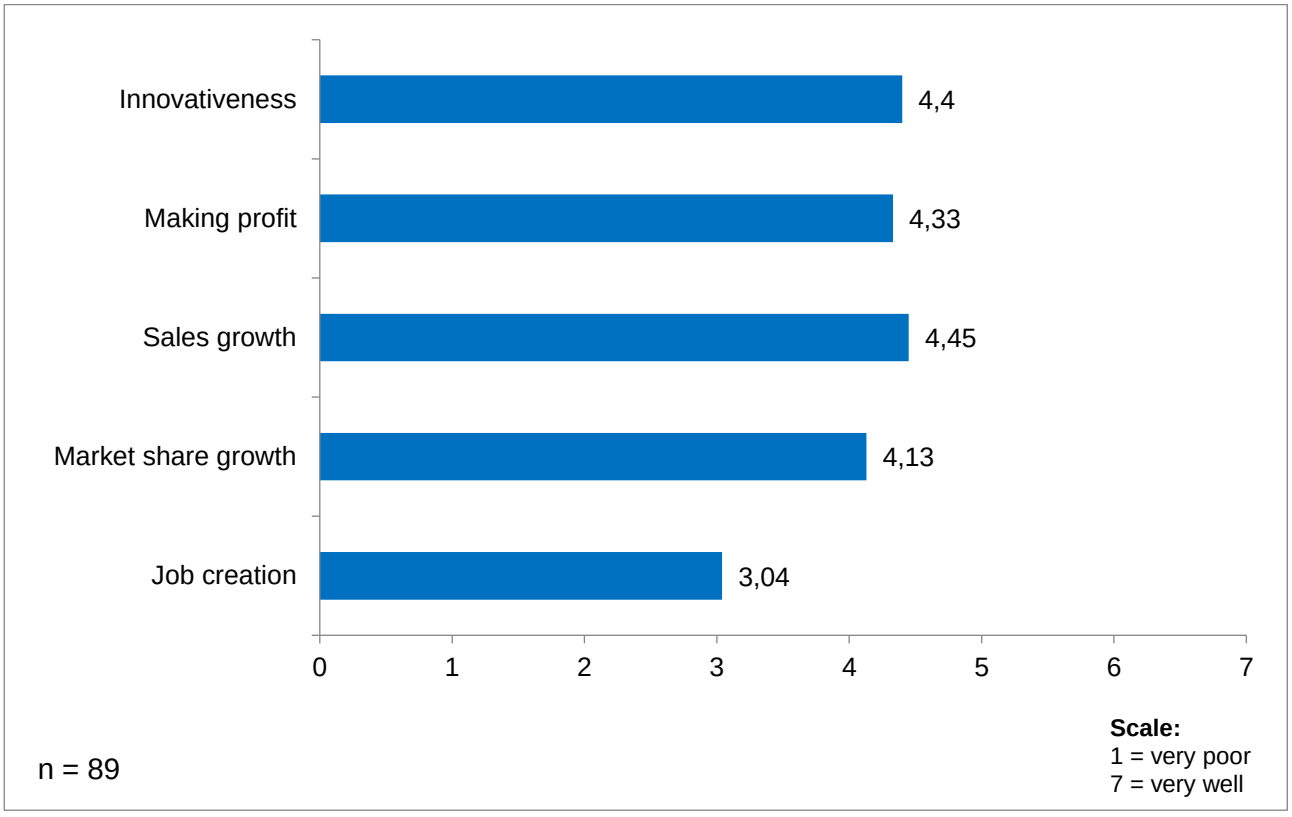
Figure 25: Industry sectors of active founders



6.3 Performance ratings

The active founders were asked to rate the company's' performance compared to their competitors since its establishment. The highest level of agreement (mean score) can be found for "sales growth", "innovativeness" and "making profit". Other performance measures like "market share growth" or "job creation" are rated lower, which is plausible in the light of the youth of these companies (*figure 26*).

Figure 26: Performance ratings compared to competitors



7 Summary of findings

The Global University Entrepreneurial Spirit Students' Survey (GUESSS 2018) is an international online-survey focusing on the entrepreneurial potential and start-up activities of students at universities. The 2018 wave of GUESSS is based on responses from 208.636 students from 54 countries worldwide.

The Austrian country study was conducted by the Institute for Entrepreneurship and Organizational Development at the Johannes Kepler University Linz (Prof. N. Kailer) and at the Department of Corporate Leadership and Entrepreneurship at the Karl Franzens University of Graz (Prof. A. Gutschelhofer). The study was supported by the Start-Up Service of the Federal Chamber of Commerce, the WIFI Business Promotion Institute Austria and "Die Macher" business magazine.

1.999 students from 26 Austrian universities and universities of applied science filled in the complete online-questionnaire. The average age is 24.7 years. More than the half of the respondents are enrolled in a bachelor program, two third are female, most of them studied Law, Economics and Business sciences (39%), Engineering (18%) or Mathematics and Natural sciences (10%).

M**ain results**:

- Directly after graduation 63% of students intend to work as employee in a firm (in an SME 39%, in a large enterprise 24%). 10% strive for employment in the public service, 7% in academia & research, 3% in a non-profit organization. 5% intend to begin as entrepreneurs.
- In a 5 year perspective after graduation there is a distinct shift towards entrepreneurship as career option: 29% of the students want to be self-employed (24% with their own start-up, 5% as business successor).
- Participants in Entrepreneurship Education show a marked higher propensity to become entrepreneurs (7% directly after graduation, five years after graduation 33%).
- Students who have participated in Entrepreneurship Education rate the entrepreneurial climate at their university by far more positive than non-participants (4.7 vs. 3.9 on a 7-point Likert scale).
- Participants in Entrepreneurship Education rate their competencies higher than non-participants (f.i. practical management skills to start-up: 4.6 vs. 3.1 on a 7-point Likert scale).

- 192 students (10%) are currently trying to start their own business (“nascent founders”). They plan to start their own business mostly in the following industries: Information technology and communication (25%), advertising/design/marketing (9%) and trade (wholesale/retail) (8%).
- 28% of nascent entrepreneurs already collected information about markets or competitors, 19% discussed their product or business idea with potential customers, 18% started with product/service development, 12% have written a business plan.
- 70% of nascent entrepreneurs intent to found their company in a team.
- The university context plays a notably role for nascent founders: 40% stated that they intend to found with one or more fellow students. 18% intend to found with relatives.
- 89 students (4%) responding to this study are already self-employed (active entrepreneurs) and created 309 jobs (including 72 co-founders and 148 employees). The majority has no employees, 30% employ one to three persons. The start-ups have been founded mainly in the sectors information technology and communication (22%), consulting (HR, law, management, tax) (10%), tourism and leisure (10%), trade (wholesale/retail) (10%) and advertising/design/marketing (9%).

8 Conclusions and Implications

Generally speaking GUESSS 2018, like previous waves of the survey[11], shows an increasing interest in entrepreneurship over the last years as well as a clear positive increase in the students' perception of their university environment concerning the encouragement of entrepreneurial intentions and activities and a marked intent of students at Austrian universities and universities of applied science to found their own company in the near future or to take over an existing (family) firm. In addition, there are students which are already active entrepreneurs as founders or business successors or which are trying to start-up whilst they are still studying. The results also show that persons which plan to found an enterprise are mostly inclined to stay self-employed also later on. Students which intend to start their professional career in a big company partly intend to pursue their career there further on, partly they expect themselves to be self-employed in the long run.

These results point at different avenues to further develop measures for the promotion of entrepreneurial spirit and support of start-ups:

To foster entrepreneurial intentions and to increase the alertness concerning an career-option as entrepreneur or intrapreneur, as a first step it is important to arouse a general interest in entrepreneurship. Here also the specificities and motivating and inhibiting aspects of living as an entrepreneur[12] should be addressed to enable potentially interested students to make a more informed career choice. Practice-oriented lectures including entrepreneurs as role models should be offered throughout the study programs, beginning at the entry-phase of all studies. More intensive advanced courses and support and coaching programs with specialization in entrepreneurship should be optional. The same applies for courses which are focusing on starting-up in a special industry.

Especially entrepreneurship education for students in non-business studies is important to create an entrepreneurial mindset and culture at universities (f.i. the TIMEGATE program at University of Graz[13]). Additionally universities can also help to kickstart ideas, if they create a sandpit for early stage entrepreneurs where they can prove and improve their ideas. Examples of inter-university cooperation are f.i. the Gründungsgarage[14] in Styria or the academic pre-incubator akostart[15] in Upper Austria.

Given the fact that entrepreneurship requires action, students acquire skills and competences relevant for a career as entrepreneur (or also as intrapreneur in big enterprises or employee in start-ups) mostly through "learning by doing". Without doubt their entrepreneurial potential can be in-

[11] See Kailer (2007); Kailer & Daxner (2010); Kailer et al. (2013, 2014); Kailer & Hora (2017a).
[12] See Palmer et al. (2019b).
[13] See https://www.unternehmensfuehrung.uni-graz.at/de/timegate
[14] See https://www.unternehmensfuehrung.uni-graz.at/de/gruenden/gruendungsgarage
[15] See https://www.akostart.at

creased through practice-oriented entrepreneurship education at universities including extracurricular activities and intensive cooperation with the support infrastructure of the region[16]. There are a lot of cases of best practices within universities how this important **practice-orientation** can be achieved[17], f.i. by including start-up experts as well as experienced entrepreneurs as lecturers and professors of practice in residence in the program. Alumni can act as role models and testimonials and as entrepreneurs-in-residence[18].

Course programs should be combined with **extra-curricular activities**. F.i., the opportunity to test the status of one's entrepreneurial competencies in a **business plan competition** should be helpful in gaining first entrepreneurial experiences (at national level f.i. through "i2b", but also at international level, f.i. the European Business Masters Cup Challenge). As cooperating with other (entrepreneurially oriented) students has a pronounced impact on students' entrepreneurial intention[19], it should be systematically enhanced, f.i. through **networking events**, project-oriented courses with student groups working with real start-ups or an internship in a start-up.

A stronger cooperation between different faculties (e.g. technical, business, medicine, arts) is a prerequisite to foster entrepreneurship education at the (inter)university level, f.i. the Gründungsgarage in Graz and the pre-incubator akostart in Linz; but also at international level, f.i. the Transatlantic Entrepreneurship Academy[20]. Thus, founder teams with a balanced competence portfolio and an interdisciplinary approach can be developed and supported.

In their program development universities should consider that at least two different groups of nascent entrepreneurs among their students which should be addressed:
A first group of students is eager to found their enterprise, often in teams, often even before the end of their studies because they do not want to miss an entrepreneurial opportunity they have recently perceived. This often is the case in technically oriented studies when f.i. a prototype has been developed or when interested students meet promising contact partners at networking events[21]. A specialized support infrastructure (e.g. low-treshold services like start-up centers on the campus, access to (free) co-working-spaces and maker spaces, access to laboratories, financial support by a university-owned venture capital funds, special pre-incubators focusing on students, regional high-tech-

[16] See www.sephe.eu, European Commission (2008), Kailer/Stockinger (2012), Maresch et al. (2016).
[17] See f.i. the results of the EU project „Supporting the Entrepreneurial Potential of Higher Education (sepHE)" (www.sephe.org), Volkmann & Audretsch (2017); Rybnicek, Ruhri & Gutschelhofer (2015); Kailer & Stockinger (2012).
[18] See Nathusius (2013).
[19] See Gruber-Mücke & Kailer (2015).
[20] See https://www.transatlanticentrepreneurshipacademy.org
[21] See Kailer & Hora (2017b), Hora et al. (2018).

incubators like in the AplusB program[22]) can actively support the potential founders according to their respective needs.

A second, larger group consists of students which intend to start-up after having completed their studies and after having acquired practical knowledge and industry-specific know-how. For this group, substantial start-up support is available from other institutions as well. Therefore, universities could concentrate their support on **alumni networks** to foster the contact between alumni and specific departments to intensify knowledge transfer as well as to cooperate with their alumni in the course program as lecturers, testimonials, entrepreneurs in residence or professors of practice.[23] Inter-university networks and course programs[24] could enhance the positive effect.

Increasingly student and academic entrepreneurs also begin to switch between pursuing an entrepreneurial career and being employed f.i. in a bigger company[25]. Cooperations between start-ups and bigger enterprises foster this trend.[26] Entrepreneurship programs therefore should also focus on themes like cooperation between enterprises and intrapreneurship.[27]

[22] See https://www.aplusb.biz
[23] See Kailer & Thum (2011).
[24] See f.i. Rybnicek et al. (2017).
[25] See Sieger et al. (2019).
[26] See f.i. Hora et al. (2018).
[27] See Blanka et al. (2019)

9 Annex

Figure 27: Career choice intentions: directly after studies and 5 years after graduation (only students participating in Entrepreneurship Education)

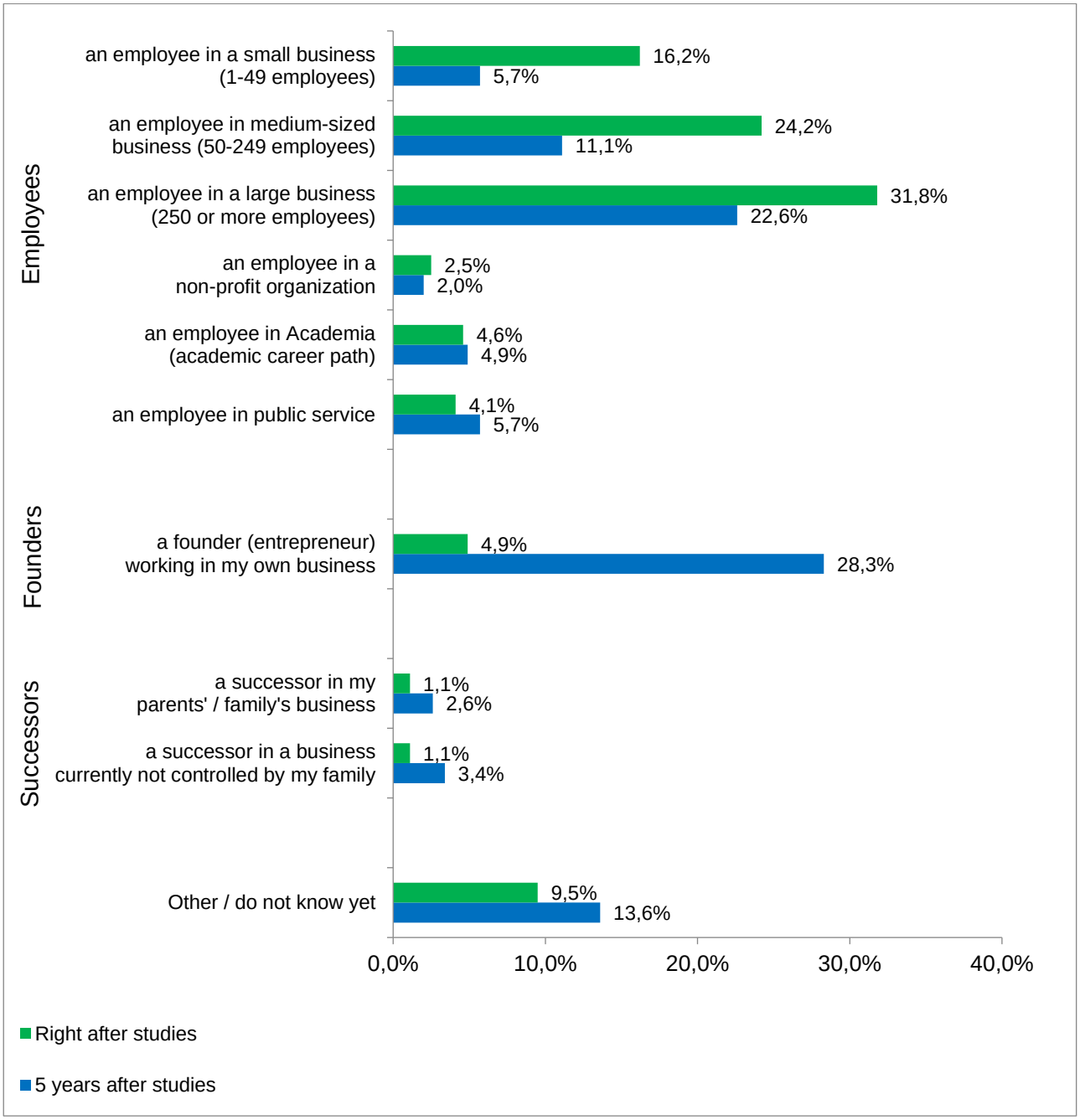


Figure 28: Career choice intentions: directly after studies and 5 years after graduation (only students without participation in Entrepreneurship Education)

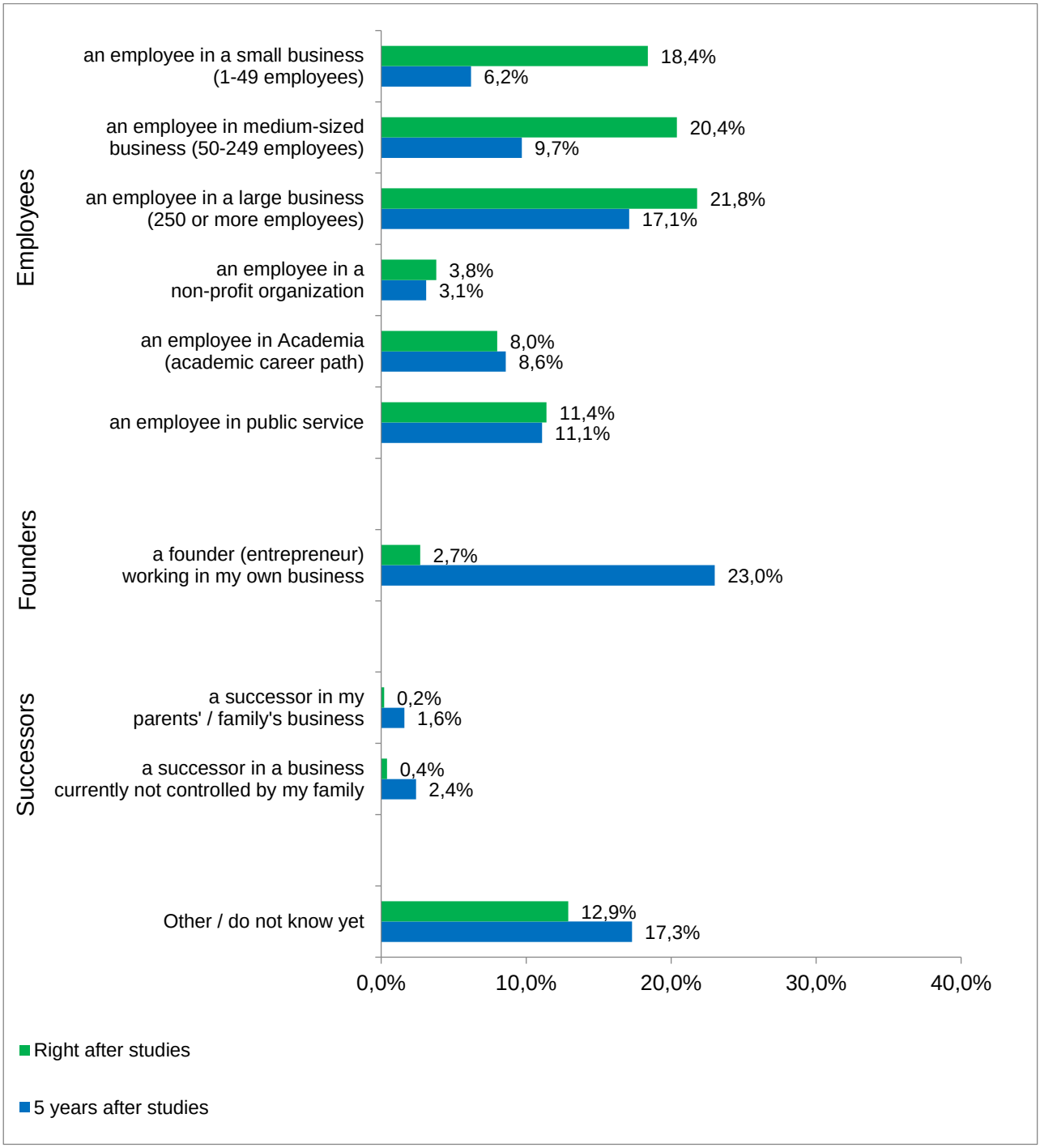
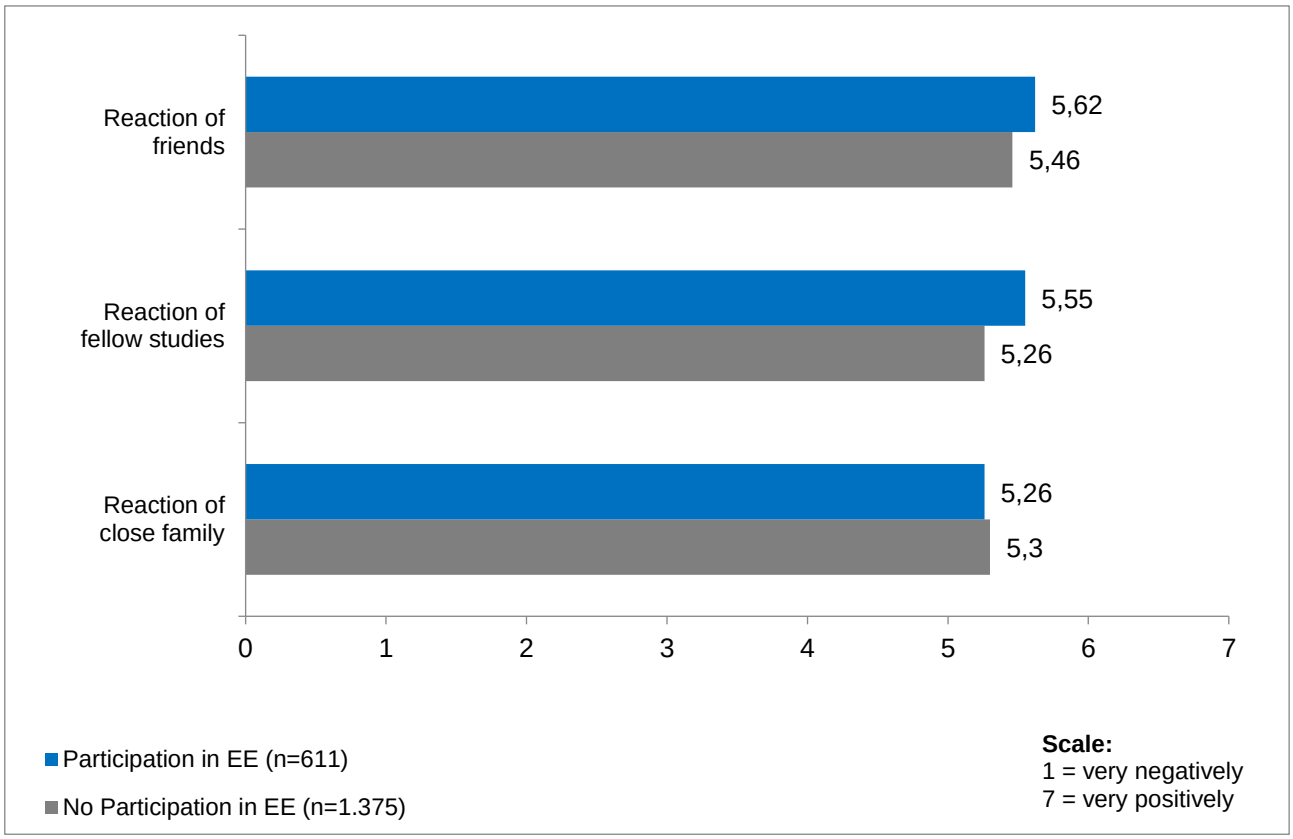


Figure 29: Reaction of the environment toward an entrepreneurial career



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