

## Entrepreneurial tendencies among highly educated students in Germany and Italy - A cross-national study

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### ABSTRACT

Continuous and breakthrough industrial innovations are essential for sustainability and the success of modern economies. As the development of innovative products and technologies is often performed within start-up enterprises, the facilitation of entrepreneurial spirit is of major political interest. However, European countries like Italy and Germany lack behind as highly educated students rather prefer more conventional career paths. In this study we surveyed Bachelor, Master and PhD students in Germany and Italy to further understand the cultural and socio-geographic effects on career decisions. Although only minor differences could be detected among the peer-group, beneficial observations were derived, identifying key-motivators and cultural necessities.

*Keywords:* Talent management; entrepreneurship; impact innovation.

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### INTRODUCTION

In our highly developed western society innovation is the key driving force for economic growth and sustainable societal wealth (Ayres 1988). Even though a noticeable share of expenses is usually put into research and development of big enterprises, most breakthrough innovations originate from start-up companies and innovative minds outside big corporations as rigidity is present when instead agility is needed (Weiblen and Chesbrough 2015). A popular example in recent history is the mRNA-based coronavirus disease 2019 (COVID-19) vaccine that helped to tackle the global pandemic. This innovative technology was developed by BioNTech, a start-up company that later was acquired by pharmaceutical giant Pfizer (Miller, Şahin et al. 2021). Even though Pfizer is one of the biggest pharma giants in the world, the game-changing vaccine technology was not developed in-house. A similar strategy is followed by the German chemical and pharmaceutical enterprise Merck, that secures its innovativeness by tailored acquisitions of technology centred companies (Merck 2022, Merck 2023).

Numerous reasons for the lacking innovativeness of large enterprises are identified in the literature. Many are consequences of increasing globalization leading to strong competition and fast product life cycles (Faber 2009). However, governmental bureaucracy (Blind 2012) and lacking internal technology transfer (Strobel and Kratzer 2017) are involved as well among other

reasons. Taking this into account, the socio-economic importance for reinforcing technology driven entrepreneurship becomes evident to ensure the continuation and advancement of societal development and public wealth, especially when only limited natural resources are present like in the case of Europe. To better understand the importance of cultural influences on entrepreneurial mindsets, we further focus on the comparison of two European countries, Italy and Germany, whose economies are quite dissimilar despite the geographical proximity. Although Germany and Italy have among the highest share of tertiary education graduates in Europe (Eurostat 2018) technical driven entrepreneurship somehow is underrepresented in both countries (GEM 2021). This is particularly surprising for Germany, as it has by far the highest proportion of highly qualified doctoral students of all EU-27 countries (Eurostat 2018).

In the literature a lot of investigation is dedicated to identifying push and pull factors for entrepreneurship in general. With this study however we aim for investigating the career decisions of highly educated students which in this study are defined as graduates/student of Master of Business Administration (MBA) and doctoral (PhD) programmes as well as Bachelor/Master students with a scientific or engineering background in Germany and Italy that have a suitable academic background for founding innovative and technical driven opportunity start-ups. We want to understand why the share of entrepreneurial activity among this peer group is comparatively small in a global

context and what the different motivators between German and Italian students are. With this knowledge in hands, tailor-made support can be developed to further increase entrepreneurship in European countries to secure continuing innovation and future wealth.

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## THEORETICAL BACKGROUND

According to Decker, Haltiwanger et al. (2014), the impact of business start-ups and young companies contribute substantially to the gross job creation in the United States (US) economy. These findings can be directly translated to Europe as young companies account for nearly 40% of the net job creation even though their total share on employment is only around 15% (Issam and Peter, 2019). The beneficial influences of innovative minds in general are the driving force for regular reinvention and advancement of established business models (Nunes and Breene, 2011). Especially disruptive technological innovation is a key criterion to ensure continuing economic growth (Bower and Christensen, 1995). However, disruptive technologies are high-risk investments and chances of success are difficult to assess during development (Kristiansen and Ritala, 2018). A modern approach encompassing these problems makes use of open innovation (Chesbrough, 2003) connecting flexible and innovative entrepreneurs with the powerful but often rigid infrastructure of established enterprises.

While this can boost economies with a high share of talented young entrepreneurs, European countries, and especially Germany, lack behind as the share of entrepreneurial activity (founding of start-up business) is significantly low. This is even more surprising as Germany is the front runner of tertiary education in the European Union in 2018 (Eurostat, 2018) and accounted for 17.9% of all tertiary education students in that region. With 6.4% of PhD projects among the students Germany even reached the second highest number behind the Czech Republic (6.8%) when neglecting the non-representative countries Luxembourg (9.8%) and Lichtenstein (18.9%). In the same Eurostat 2018 statistics Italy ranked fourth in tertiary education students (10.8%) with a 1.5% share of PhD graduates. In contrast to the above-average education tendencies, entrepreneurial activities in both countries are far behind global as well as local average in 2021 and 2020 as outlined by the Global Entrepreneurship Monitor (GEM) (GEM, 2022). This manifests sub-average intended entrepreneurial activity as well as established business ownerships among both countries. Interestingly, the share of entrepreneurial employees, however, in both countries is among global average and the social status of successful entrepreneurs even far beyond average. While Bergmann, Hundt et al. (2016) outlined positive impacts of university environments on student entrepreneurs taking first actions, business establishment

was strongly dependent on the regional and regulatory context. In recent years the German government actively promoted the entrepreneurial activity through incentives like the “High-Tech Gründerfonds” or the “EXIST” program, establishing a fruitful environment for new ventures and university spin-offs. However, a strong cultural barrier against entrepreneurial attitude still negatively impacts the German economy (Fuerlinger, Fandl et al., 2015). Also in Italy, the share of tertiary education entrepreneurs is quite low, especially among students with a master’s degree (Campanella, Della Peruta et al., 2013). The main reasons identified by (Israr and Saleem, 2018) again correlated with little entrepreneurial education, hampering the required entrepreneurial mindset.

For identifying carrier decisions leading to opportunity entrepreneurship among students in Italy and Germany we surveyed Bachelor, Master and PhD students from local elite universities with engineering and scientific subjects. To additionally tackle the question of entrepreneurial and economic education impacting the likelihood for starting up new companies, also MBA fellows and alumni of the Collège des Ingénieurs (CDI) were targeted by our study.

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## METHOD AND DATA

For collecting the necessary data, we developed a 15-minute survey with 4 sections and 54 both open and closed questions (please see Annex 1), that investigate the actual entrepreneurship status in Italy and Germany as well as systematically retrieve personal motivators for entrepreneurial desirability of the students in both countries. The four sections in which the tool was divided addressed the most important topics for the subsequent analysis:

- **Section 1 – General information:** This part was dedicated to collecting general data about the interviewee (e.g., age, education level, field of study) to identify its main characteristic that are useful to further understand the obtained correlations and evaluate the conclusions derived.
- **Section 2 – Economic and entrepreneurial education:** Interviewees were asked about their educational background in the two topics and how the education system helped them or not in gaining that knowledge. The reason was to understand the impact of the Italian and German education systems on the willingness of the interviewees to pursue an entrepreneurial career.
- **Section 3 – Future career plans:** The aim was to understand the preferences of the interviewees regarding multiple career options that are usually available for highly educated professionals.
- **Section 4 – Entrepreneurial career:** The last section was focused on the particular characteristics of the entrepreneur. Here, the

purpose was to dig deeper in certain push-pull factors that influence personal career choices, increasing the level of detail to understand the differences between the two countries.

After collecting the data through the above-described survey, the answers have been analysed one-by-one and rearranged in clusters. The data analysis process was made possible thanks to the software Survio® and Python packages including Pandas, Matplotlib, NumPy and Seaborn.

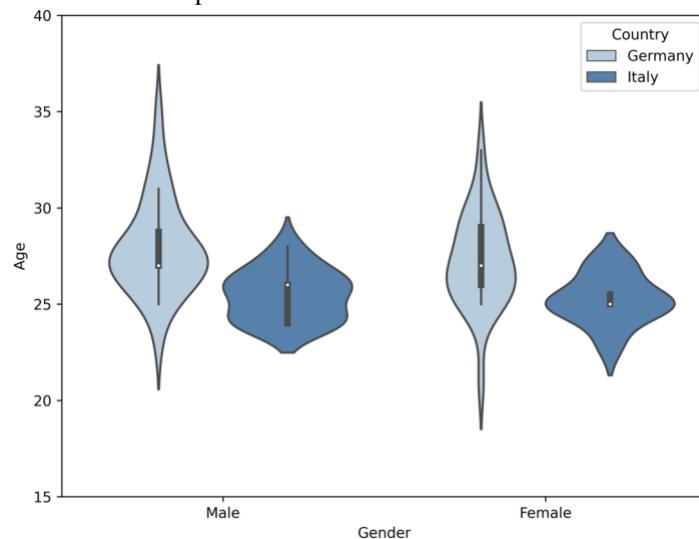
## RESULTS

This paper intends to conduct a comparison of entrepreneurship desirability between Germany and Italy as well as explore the root causes. In evaluating the characteristics of 86 instances ( $N = 64$  from Germany,  $N = 22$  from Italy), the men and women-participants are evenly involved in the survey. The age of German samples ranges from 18 to 38 with an average age of 28, while the subset of Italian respondents is mainly concentrated between 23 and 29 with an average of 25, giving a total age average of 27 years. Additionally, the educational qualification of the participants is classified into the following segments: (1) Bachelor, (2) Master and (3) PhD, and (4) Other. The Master's degree is placed first with 54.10% and 54.55% for Germany and Italy respectively, followed by the PhD degree with 40.98% in German and 22.73% in Italian samples. The Bachelor's degree is held by 4.92% of German and 22.73% of Italian participants. An overall of 66.29% of the respondents

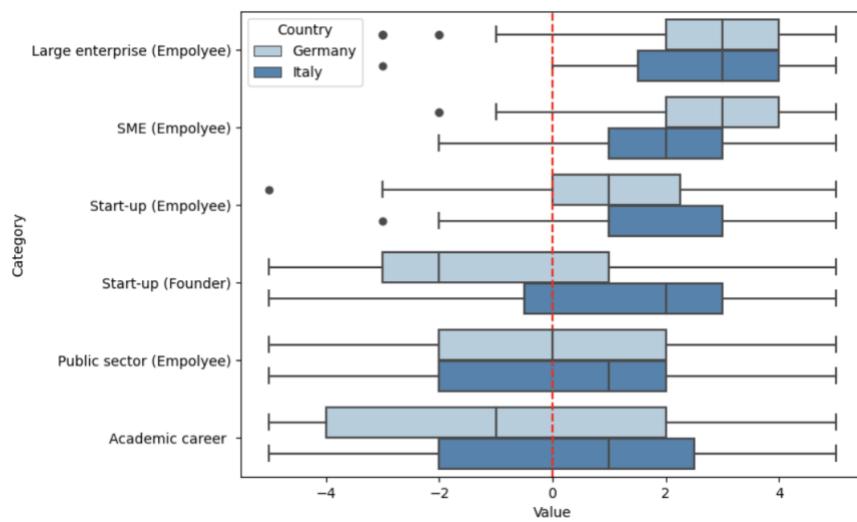
pursued natural science degrees, followed by engineering with 19.10% and art degrees including MBA with 14.61%.

The graduates invest considerable effort in planning for their individual career journey by evaluating their personal growth, environmental factors, and company culture. Figure 2 outlines the preferences for the common career options (see questionnaire section 3 in Annex 1) of highly educated talents and the corresponding rate from the survey. The magnitude of the rate indicates the acceptance and willingness to work in this sector. Among all, being employed by large enterprises is acknowledged as the most promising option in both Germany and Italy, followed by small and medium-sized enterprises (SME). It is noticeable that the deviation for the start-up sector is significant for both countries. In general, Germans consider working as a start-up founder or in an academic career as the worst career option by giving negative scores. In comparison to Germans, Italians express more willingness to engage in start-up enterprises as employee or founder, and for academic career paths.

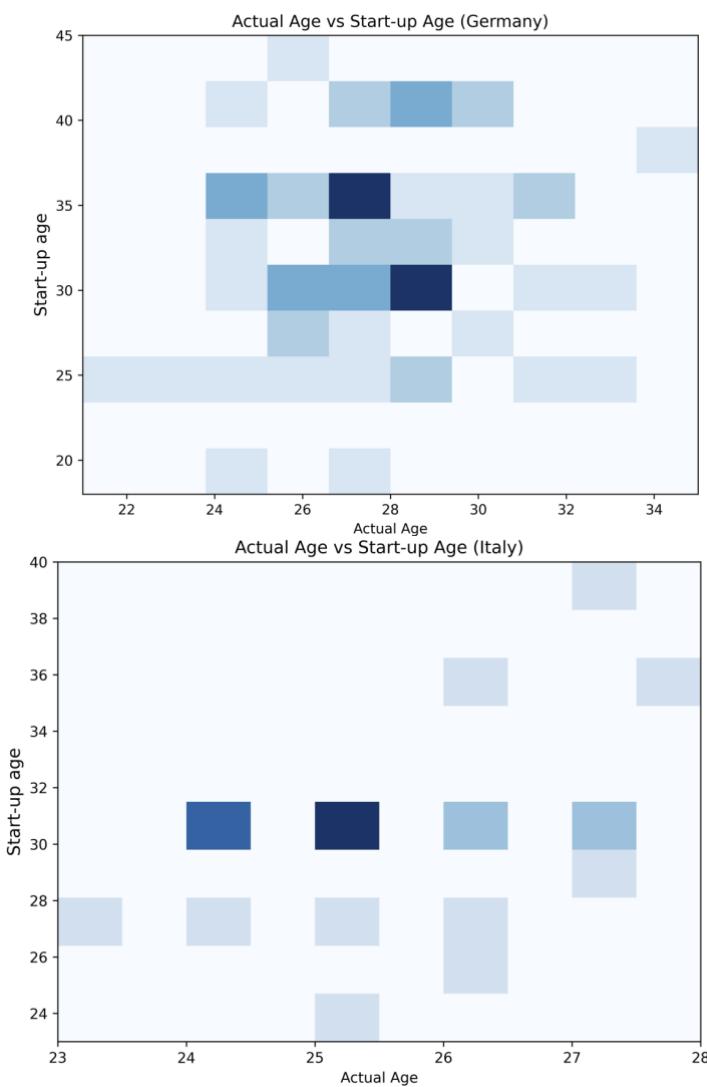
Figure 3 compares the actual age of participants and the ideal expected age to start with entrepreneurial activities (start-up age). Most Italian participants consider the beginning of the 30s as the right age to launch a start-up business because of the accumulated fortune, previous experience, and social network. The result is partially in alignment with German participants. Aside from 30 - 32, the range between 35 to 37 is accounted as the second upper bound to ensure success in a start-up business in Germany.



**Fig. 1:** Age and gender distribution of German and Italian participants



**Fig. 2:** Six career options for German and Italian participants (-5: worst choice, +5: best choice)



**Fig. 3:** Actual age and expected ideal age that German and Italian participants would prefer to launch a start-up business

The underlying entrepreneurial motivation is either associated with active attraction (pull) or passive impellent causes (push). This paper systematically investigates the push-pull factors with respect to entrepreneurial desirability at the micro (e.g. personal growth) and meso (e.g. company culture) levels, shown in Table 1. Noticeably, the implementation of innovative ideas is the major driver for both German and Italian

participants with a score of 2.85 and 3.30, respectively. Differing from personal conviction, the entrepreneurial decision is ultimately not or very little influenced by family expectations for all participants with -3.00 and -2.43 in Germany and Italy. Interestingly, a significant deviation is found in fortune seeking sector. The desire concerning a large fortune is much higher given by Italian participants than German participants.

**Table 1:** Comparison of drivers being entrepreneurs (-5: least important, +5: most important)

Driver	Germany (Mean)	Italy (Mean)	Delta (Absolute value)
Fortune seeking (pull)	0.90	1.91	<b>1.01</b>
Freedom of choice (pull)	2.65	2.52	0.13
Insufficient attractive employers (push)	-1.08	-0.91	0.17
Idea implementation (pull)	<b>2.85</b>	<b>3.30</b>	0.45
Family expectation (push)	-3.00	-2.43	0.57
Modern working environment (pull)	1.65	1.96	0.31
Personal growth (pull)	2.70	3.09	0.39

Aside from push-pull effects, hurdles of entrepreneurship, particular at the early stage, are simultaneously analysed in this paper as shown in Table 2. Embedded financial risks, Idea uncertainty, and lack of investors are accounted as three major challenges for launching entrepreneurial businesses. Similar reflections

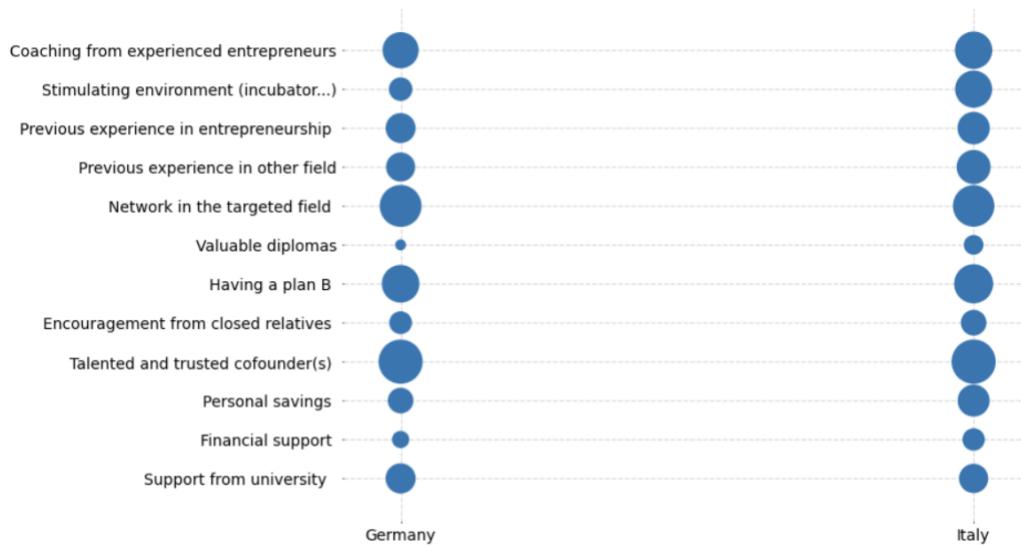
are determined for Italian samples. On the other hand, compared to Germans, Italian subjects demonstrate more tolerance towards the excessive workload culture and low compensation at the early stages of entrepreneurial careers. In addition, Germans prefer structured carrier paths with risk-averse mentality.

**Table 2:** Comparison of hurdles being entrepreneurs (-5: least important, +5: most important)

Hurdle	Germany (Mean)	Italy (Mean)	Delta (Absolute value)
Financial risks	<b>3.55</b>	<b>3.00</b>	0.55
Low salary at early stage	1.30	0.65	0.65
Chaotic environment	1.00	0.43	0.57
Negative career impact if ideas fail	-0.05	0.13	0.18
Bureaucracy	1.98	2.57	0.59
Loneliness	-0.08	-0.17	0.09
Competitive environment and mentality	0.78	0.35	0.43
Heavy workload	0.93	-0.30	<b>1.23</b>
Lack of investors	1.83	2.43	0.60
Uncertainty mindset	2.17	2.43	0.26

Figure 4 illustrates a variety of conditions to ensure entrepreneurial awareness and leverage the motivation of highly educated talents with an entrepreneurial mindset. As for the German group, cooperation with talented cofounders, network, coaching from experienced

entrepreneurs, and plan B in case of failure are valued as inevitable prerequisites by the majority. Apart from the aforementioned factors, simulating environment, previous working experience, and personal savings obtain high rating scores within the Italian group.



**Fig. 4:** Opportunities and methodologies to leverage the entrepreneurial motivation for German and Italian participants

## DISCUSSION AND CONCLUSIONS

The results show that highly educated students are inclined towards entrepreneurship if there is a favourable environment, both educational and professional, such as working with talented founders; less risk, such as being supported by expert coaching and creating a Plan B; or, as is the case for Italians, if there are savings and knowledge bases that provide security. Comparing the two countries, Italians show an increased entrepreneurial willingness to engage as entrepreneurs in start-ups e.g., through founding or as employees. Seeking the potential fortune of successful entrepreneurship Italians are more resilient towards harsh working conditions and demonstrate an increased willingness to take risks when compared to Germans.

Germans on the other hand, prefer more secure traditional career paths. A potential explanation for this can be given by a higher offer of well-paid positions within large companies established in the stronger German economy. Nonetheless, for both subject groups the perception of risk and more broadly the attraction for entrepreneurship could be generally leveraged with Bachelor and Master courses as highlighted within our survey. With this knowledge in hands, universities should revise natural science and engineering curricula by providing mandatory or manifold voluntary courses in economics and entrepreneurship targeting future entrepreneurs.

This work could be further developed by extending the data sources to other countries and comparing the results between the different cultures (for example comparing Asian mentality with European and/or North American mentality); other factors that can be considered, are macro environmental indicators such as higher education, general economic performance of the country or employment rates. The research could also

target start-up founders: Analysis of their motivational factors, their perception of risk and uncertainty could be compared with those of the samples considered. The new question that arises then is whether attitudinal differences, a more entrepreneurial point of view imparted through education, could change the data collected.

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## REFERENCES

- Ayres, RU, 1988, Technology: The wealth of nations, *Technological Forecasting and Social Change* 33(3): 189-201.
- Bergmann, H, et al., 2016, What makes student entrepreneurs? On the relevance (and irrelevance) of the university and the regional context for student start-ups, *Small Business Economics* 47(1): 53-76.
- Blind, K, 2012, The influence of regulations on innovation: A quantitative assessment for OECD countries, *Research Policy* 41(2): 391-400.
- Bower, JL and CM, Christensen, 1995, Disruptive Technologies: Catching the Wave, *Harvard Business Review*.
- Campanella, F, et al., 2013, The Role of Sociocultural Background on the Characteristics and the Financing of Youth Entrepreneurship. An Exploratory Study of University Graduates in Italy, *Journal of the Knowledge Economy* 4(3): 244-259.
- Chesbrough, HW, 2003, Open Innovation: The New Imperative for Creating and Profiting from Technology,

- Harvard Business School Press, ISBN: 978-1-57851-837-1.
- Decker, R, et al., 2014, The Role of Entrepreneurship in US Job Creation and Economic Dynamism, *Journal of Economic Perspectives* 28(3): 3-24.
- Eurostat 2018, Tertiary education statistics, Retrieved 23.09.2022, 2022, from [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Tertiary\\_education\\_statistics](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Tertiary_education_statistics).
- Faber, MJ, 2009, Open Innovation Ansatz von Chesbrough. Open Innovation: Ansätze, Strategien und Geschäftsmodelle. M. J. Faber. Wiesbaden, Gabler: 21-44.
- Fuerlinger, G, et al., 2015, The role of the state in the entrepreneurship ecosystem: insights from Germany, Triple Helix 2(1): 3.
- GEM, 2021, Global Entrepreneurship Monitor - 2021/2022 Global Report, Retrieved 23.09.2022, 2022, from <https://www.gemconsortium.org/file/open?fileId=50900>.
- GEM, 2022, Global Entrepreneurship Monitor 2021 - 2020." Retrieved 24.09.2022, 2022, from <https://www.gemconsortium.org/economy-profiles/germany-2>.
- Israr, M and Saleem, M, 2018, Entrepreneurial intentions among university students in Italy, *Journal of Global Entrepreneurship Research* 8(1): 20.
- Issam, H and Peter, H, 2019, Job Creation in Europe: A firm-level analysis, European Commission, <https://doi.org/10.2760/590043>
- Kristiansen, JN and Ritala, P, 2018, Measuring radical innovation project success: typical metrics don't work, *Journal of Business Strategy* 39(4): 34-41.
- Merck, 2022, Annual Report 2021.
- Merck, 2023, Acquisitions & Divestments, from <https://www.merckgroup.com/en/investors/why-invest/acquisitions.html>.
- Miller, J, et al., 2021, Projekt Lightspeed: Der Weg zum BioNTech-Impfstoff - und zu einer Medizin von morgen, Rowohlt E-Book, ISBN: 978-3-498-00277-0.
- Nunes, P and Breene, T, 2011, Reinvent Your Business Before It's Too Late, Harvard Business Review.
- Strobel, N and Kratzer, J, 2017, Obstacles to innovation for SMEs: evidence from Germany, *International Journal of Innovation Management* 21(03): 1750030.
- Weiblen, T and Chesbrough, HW, 2015, Engaging with Startups to Enhance Corporate Innovation, *California Management Review* 57(2): 66-90.

## **ANNEX 1: THE QUESTIONNAIRE QUESTIONS AND THEIR STRUCTURE**

### **Section 1: First of all, some general information - let us know you!**

1.1

Q) How old are you?

A) Open answer: type one or a few words...;

1.2

Q) What's your gender?

A) Multiple choice: Male, female, prefer not say;

1.3

Q) (optional) What is the yearly level of income of your family (parents)? (select one answer)

A) Multiple choice: €50.000 or less, between €50.001 and €100.000, more than €100.001;

1.4

Q) Where did you do most of your university studies (after high school)? (select one or more answers)

A) Multiple choice: Italy, Germany, Other places (please specify);

1.5

Q) What's your educational level? (including the one you may be working on now)

A) Multiple choice: Bachelor's degree, Master's degree, PhD, MBA, Other;

1.6

Q) What's your field of study?

A) Open answer: Type one or a few words...;

1.7

Q) Does anyone in your circle have an entrepreneurship background? (select one answer, and in case needed please specify any particular situation through the "Other" option)

A) Multiple choice: Nope, Close friends, family, other...

### **Section 2: Questions on economic and entrepreneurial education during your studies**

2.1

Q) How many classes directly targeted economic topics during your whole studies? (select one answer. Usually, a standard course that lasts 1 semester consists in 6 ECTS)

A) Multiple choice: 0 ECTS, from 1 to 6 ECTS, from 7 to 18 ECTS, more than 18 ECTS;

2.2

Q) (optional) If you had the possibility, would you have increased the amount of courses on one or both the two topics?  
 (You can tell us more about this in the optional field just below if you want)

A) multiple choice: Yes about economics, not about economics, yes about entrepreneurship, not about entrepreneurship;

2.3

Q) (optional) When do you think economic and entrepreneurship classes would be the most useful? (change the order according to your preference (1.-most important, last-least important)

A) order for importance the following texts: 1. High school, 2 bachelor, 3 Master, 4 PhD

2.4

Q) (optional) Please tell us more about your perception of education in economics and entrepreneurship?

A) Open answer: type one or a few words...

### **Section 3: Questions on future career plans**

3.1

Q) (optional) In which field/ industry would you like to be working in for the next 5 years? (e.g., automotive, finance, chemical, pharmaceutical. If you want to change the field from the one you are currently in please specify also the one you are currently in)

A) Open answer: Type one or a few words...

3.2

Q) How would you rate the following career opportunities?

(-5 for non-desired career and +5 for your dreamed one!)

In case you think there are more appropriate answers, please let us know in the following non-mandatory open question!

Please be aware that each asset is written BELOW the corresponding scale)

A) Answers to rate: direct entry as an employee in a huge company, direct entry as an employee in a small / medium size company, employee in a start-up, founder of a start-up, public sector, academic career;

3.3

Q) (optional) Additional answer n1 about your favourite career opportunities

A) Open answer: type one or a few words

### **Section 4: Questions regarding the reasons behind becoming or not an entrepreneur**

4.1

Q) How would you rate the following drivers for founding a company?

(-5 for non-important, 5 for important)

In case you believe there are more appropriate answers, please let us know in the following non-mandatory open question!

Please be aware that each asset is written BELOW the corresponding scale.)

A) Answers to rate: Seeking for the big money, having freedom of choice (having no boss), because there are not enough good jobs on the market, want to explore a promising / innovative idea, people expect me to do so, cool working environment, personal growth;

4.2

Q) (optional) additional answer n2: any other reason to found a company?

A) Open answer: type one or a few words

4.3

Q) How would you rate the following reasons for not founding a company?

(-5 for non-important, 5 for important)

In case you believe there are more appropriate answers, please let us know in the following non-mandatory open question!

Please be aware that each asset is written BELOW the corresponding scale)

A) Answers to rate: financial risks (e.g., bankrupt), small salary at the beginning, chaotic environment, negative career impact if the idea fails, complicated bureaucracy, loneliness in your project, too competitive environment and mentality, too much work, hard to find investors/ money, uncertainties on how good your idea actually is;

4.4

Q) (optional) additional answer n3: any other reason for not founding a company?

A) Open answer type one or a few words...

4.5

How would you rate the importance of the following assets when founding a company?

(-5 for non-important, 5 for important)

In case you believe there are more appropriate answers, please let us know in the following non-mandatory open question!

Please be aware that each asset is written BELOW the corresponding scale);

A) Answers to rate: Support from school / university, financial support / investment from family, personal savings, talented and trusted cofounder(s), encouragement from closed relatives, having a plan B, valuable diplomas, network in the targeted field, previous experience in other field than entrepreneurship, previous experience in entrepreneurship, stimulating environment (incubator...), coaching from experienced entrepreneurs

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4.6

- Q) (optional) additional answer n4: any other important assets when it comes to found a company?  
A) Open answer: type one or a few words...

4.7

- Q) Please select the answers that fit the best to you:  
(select one or more answers)

A) Selection among: I have already founded a company, I will found a company in the next 3 years, I believe I will never found a company because I don't like the idea, I believe I will never found a company because of reasons I don't control (external factors), For the moment I would not found a company as I don't have enough experience in entrepreneurship, I will first work in industry, gain more experience and maybe create a start-up if I have a convincing idea, before deciding to found a start-up I would like to work in one, other...;

4.8

- Q) According to you, what is the perfect age to start founding a company?  
A) Open answer: type one or a few words...

4.9

- Q) (optional) In case you have founded / you want to found a company, can you tell when you came up with the idea of becoming an entrepreneur?  
A) Selection of one of these sentences: always wanted to be an entrepreneur, bachelor, master, MBA, PhD, internships, first professional experience, other...;

4.10

- Q) Last but not least, here is the comment section!  
(Wow, you made it! And now, one last effort: tell us whatever you feel like about the subject or this survey)  
A) Open answer: type one or a few words...