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Student-run Venture Capital funds as a funding alternative to meet the challenges of raising for university spin-offs

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Abstract

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A trend toward student-run venture capital funds has emerged more recently. Originating in the US, this concept has also become increasingly established in Europe. According to previous literature, university spin-offs experience a higher degree of information asymmetry and thus greater fundraising challenges. This thesis aims to empirically identify both information asymmetries and untapped potential in German university spin-offs and to compare these with the advantages of student-run venture capital funds. Gained insights are illustrated using the five-year performance review of the most prominent example from the US, the DormRoomFund.

Keywords: Entrepreneurship, Venture Capital, University Spin-offs, Student-run Venture Capital Funds

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1 Introduction

Indeed, a significant proportion of scientists are pursuing entrepreneurial ambitions as opposed to the traditional career path in academia. Based on a study by Nature magazine, 815 scientists were asked if they would leave academia to commercialize their research in a startup. That research question was answered “Yes” by 47%. Nevertheless, given entrepreneurial ambitions are only really pursued by a small percentage. Out of 1403 respondents, only 6% stated that they had founded a company. Lack of entrepreneurial skills (mentioned by 53% of the respondents), as well as financial obstacles and the associated uncertainty (mentioned by 72% of the respondents), were named as the main obstacles to founding a university spin-off (Brody 2017). Within a study of the European Startup Monitor based on 2,515 startups of the 28 European member states and others, a share of 9.7% was associated with spin-offs from a university. Compared to independently founded startups, which based on the study account for a share of 73.3%, university spin-offs represent a comparatively small amount (German Startup Association 2016).

Essentially, a spin-off is characterized by the fact that it is established based on an existing project. This may be the case from a university or a parent company (Pirnay 2003). Since the work examines early-stage fundraising problems of university spin-offs, the focus here is exclusively on the former. In principle, university spin-offs represent the transformation of research results into commercializable goods and services involving a technological component. Thus, university spin-offs are crucial in making explorations accessible to the market (Rasmussen and Borch 2010; Ramaciotti and Rizzo 2014). Due to their scientific foundation, they play an important role in innovation and the transfer of knowledge and imply great potential to be relevant in building businesses and regional development (Bramwell and Wolfe 2008). Early-stage funding for university spin-offs challenges more than conventional startups (Lindström and Olofsson 2001). Being accompanied by a significant level of

technological innovation, there is a high degree of information asymmetry between the student entrepreneur and the investor (Blair and Hitchens 1998; Cornell and Shapiro 1988). Furthermore, tend student founding teams to be formed in a homogenous manner (Clarysse and Moray 2004). Hence they are lacking industry experience, business background, and network which hinders investors to mitigate the information asymmetry (Cooper and Daily 1997).

Thus, it appears that investors are using alternative vehicles to address this target group. Besides early-stage funds focusing specifically on university spin-offs, student-led venture capital funds and scouting programs, in which students serve as venture scouts, are increasingly emerging (Legler 2021). Pioneered by the American initiative Dorm Room, initiated by the association of various business angels First Round Capital, student-run venture capital funds were created. The concept, which was initially rather concentrated in America, has recently spread to the European region, as well. In addition to the Creator Fund located in London (Creator Fund 2021), the Swiss venture capital investor Wingman Ventures initiated the Wingman Campus Fund project. Run by students from the universities of the University of St. Gallen, EPFL Lausanne, and ETH Zurich, it finances student founding teams. Wingman Campus Fund was founded to bring more students closer to the tech space, to better support student founding teams, and to pave the way for students to become venture capital investors (Wingman Campus Fund 2021). Lower barriers to entry and greater democratization of investment knowledge gained through the internet have repeatedly benefited young investors. Student-run venture capital funds also benefit from lower information asymmetries and earlier knowledge of deal flow due to the proximity of student founding teams, which are often their fellow students (Speiser 2021). This paper aims to explore whether a student-run venture capital represents a good financing alternative. This prediction is based on a study of German university spin-offs that investigates whether these companies have problems in early-stage financing due to greater information asymmetry.

2 University spin-off landscape in Germany

According to a Worldbank study published in July 2020, Germany registered 72,844 startups in 2018 and ranks fourth in Europe (Statista 2021). Nevertheless, concerning the European Startup Monitor, university spin-offs account for a share of 12.5% of the companies founded. The peak value is recorded by Switzerland with 18.5% university spin-offs of the newly founded companies (German Startup Association 2016). Many universities support student start-up teams offering programs and internal incubators. A good indicator of the ambivalence of the university spin-off landscape in Germany is the number of EXIST scholarships approved (Top 50 Start-ups 2020). Universities participating or having participated in the past in EXIST programs register a significantly higher number of spin-offs (Lautenschläger and Haase 2013). EXIST-Gründerstipendium is a funding program of the Federal Ministry for Economic Affairs and Energy and is co-financed by the European Social Fund (ESF). Within the framework of the scholarship, the founding teams receive funding over a period of 12 months to prepare the foundation of their company (EXIST-Gründerstipendium 2021). In 2019, 426 applications were submitted, of which 229 were approved. The TU Munich (TUM), with 17 approved scholarships, and the Rheinisch Westfälische Technische Universität (RWTH), with 15 approved scholarships, clearly stand out. Since 2007, TUM has received 169 approvals and thus has the most EXIST grants in a long-term comparison. Likewise characteristic of the German university spin-off landscape is the fact that most grants are awarded to technical universities. Nevertheless, those universities represent a smaller share of German universities. At 73%, most scholarships are awarded to universities. However, with 6 scholarships received, the Munich University of Applied Sciences also represents one of the 10 institutions with the highest number of founding students (Figure 7). Another statement about the university spin-off landscape in Germany can be made concerning the EXIST research transfer (Figure 8). This program promotes the conversion of research results into business utilizing start-ups. According

to this evaluation, the Fraunhofer Institute receives the most approvals. The Berlin Charité also shows a certain relevance, since it does not represent a complete university, but only the medical faculty of the Humboldt and the “Freien” University (Top 50 Start-ups 2020).

3 Challenges in Fundraising for university spin-offs

University spin-offs represent the transfer of research results to the commercial market (Rasmussen and Borch 2010; Ramaciotti and Rizzo 2014). Due to their scientific basis, university spin-offs have a greater innovation efficiency than other high-tech start-ups (Blair and Hitchens 1998). They target inventions that are not pursued by established companies because of the high-risk level (Shane 2004). Accordingly, university spin-offs are confronted with circumstances in which not only the technology and thus the business model is unproven, but the market, including customer needs and customer benefits, is completely new (Lindström and Olofsson 2001). They are faced with a phenomenon called “liability of newness” (Stinchcombe 1965). According to a study, early-stage financing causes significantly more problems for university spin-offs than for business spin-offs (Klofsten 1988). Due to different reasons, high-tech companies are particularly affected by imperfections of the capital market. At first, with a higher level of technological innovation comes a higher level of risk. The profits of high-tech investments are skewed and subject to great uncertainty, as R&D projects have a low probability of success (Carpenter and Petersen 2002; Mansfield 1979; Harhoff 1999). In the biotech sector, for example, it takes several years for a company to become profitable since a viable product must first be developed, which then has to be approved by the Food and Drug Administration (FDA) in a process lasting many years. Due to the long process, there is a high risk of failure, which leads to a higher overall risk for an investor, as well. Secondly, resulting from the high uncertainty, an investor is confronted with a higher degree of information asymmetry. The entrepreneurs can better assess the associated risk due to the proximity to their venture and the self-conducted research and especially in the case of very innovative ventures

and complex issues, it presents a great challenge for the investor to accumulate the requisite level of expertise to understand or evaluate the issue and thus the corresponding business plan (Zhang 2008; Cornell and Shapiro 1988).

Information asymmetries are particularly prevalent in financial markets. Borrowers typically have an information advantage over lenders as entrepreneurs have better knowledge about their projects (Brealey, Leland, and Pyle 1977). The phenomenon of moral hazard (Carayannis 2020) hinders the direct transfer of information between market participants. Since rewards for overstating positive qualities might be expected, neither lenders nor entrepreneurs can be expected to be 100 percent transparent about the facts. If the average value of projects is higher than the average cost, there could be an oversupply of low-quality projects as entrepreneurs create an advantage by imposing poor projects on uninformed market participants. For good projects to be funded, information must be shared.

Problems in appropriating information could lead companies to limit the amount of information they publish (Carpenter and Petersen 2002). It appears, however, that companies in many U.S. industries view patents as an ineffective method for estimating R&D returns and tend to prefer secrecy (Levin 1987). Information can be shared through the actions of the entrepreneur. The entrepreneur's disposition to invest in his project can state a positive signal about quality (Brealey, Leland, and Pyle 1977). However, high-tech companies have a small amount of collateral. R&D investments have minimal salvage value in the event of failure, as they primarily represent salary payments. Due to the company-specific R&D results, there is furthermore a low collateral value (Carpenter and Petersen 2002). Likewise, the track record as a scientist, through past scientific work, is a convincing signal that the entrepreneur knows the true value of the venture and has the necessary expertise to develop the technology (Zhang 2008). Nevertheless, prior research indicates that early-stage venture capital funds view the business experience as the key consideration when evaluating an investment. University spin-

offs tend to form homogeneous teams based on scientific founders (Clarysse and Moray 2004). Hence, the founding team has a low level of industry experience and thus few contacts with people with a business background (Cooper and Daily 1997). Commonly, university spin-offs were evaluated by investors with a certain skepticism, and in case of an investment, the founders' team was forced to be replaced by a complementary team (Roure and Keeley 1990; Cyr, Johnson and Welbourne 2000). Moreover, according to studies, social connections can reduce information asymmetries between investors and entrepreneurs. On the one hand, through direct social ties, which, in addition to the pure transfer of information, also imply a trust-building function, and on the other hand, through indirect social ties, which solely indicate an effect of the transfer of information (Freiburg and Grichnik 2012; Uzzi 1996). According to Mark Granovetter, economic outcomes are influenced by social networks due to three aspects. First, in terms of information flow and quality. As information is difficult to verify, individuals rely primarily on people they know. Second, social networks provide an instrument for reward and punishment. Third, social networks imply a level of trust (Kautonen, Zolin, Kuckertz, and Viljamaa 2010). Consequently, financial service providers have the ability to mitigate information asymmetries about upcoming actions of the team and the true value of the spin-off through incentivization and monitoring (Granovetter 2005). Both signaling and screening additional information from uninformed actors, can further limit information asymmetries (Certo 2003; Carpentier, L'Her and Suret 2008). Social relationships allow investors to obtain information about the talents and tendencies of the founding team and mitigate the problem of moral hazard (Gulati and Gargiulo 1999; Shane and Cable 2002). Especially in the case of informal investors, personal connectedness plays a significant role, as entrepreneurs want to protect their reputation within their network (Nofsinger and Wang 2011). Founder teams can leverage their reputation by partnering with more experienced individuals, such as external advisors, to appear more favorable to investors (Podolny 1994). University spin-offs can be

founded by experienced professors with a significant academic track record but are also run by students who have fewer track records and industry experiences (Holzki 2021). Owing to the typically homogeneous team structure, the lack of business reputation, and thus limited network in areas such as industry and the investor ecosystem, fundraising in the early-stage sector poses a challenge for university spin-offs (Clarysse and Moray 2004; Cooper and Daily 1997; Klofsten 1988).

4 Student-run venture capital funds

4.1 Introduction of student-run venture capital funds

In recent years, university-industry collaborations have emerged as a way to provide social and economic benefits within society to achieve a "third mission" (Etzkowitz et al. 2000). Those manifest in various, interacting forms of technology transfer, such as science parks, incubators, university-industry joint ventures, and licensing of technology (Groce, Grilli and Murtinu 2013).

In addition to university funds, which are directly affiliated with a parent university, the establishment of student-run venture capital funds has been increasing in the recent past. Led by one of the most prominent examples the DormRoomFund, which also coined the term "Dorm Fund". The DormRoomFund was initiated by Josh Kopelman, Managing Director at First Round Capital, who stated that college campuses are a wonderful ecosystem for creating disruptive ideas. Facebook, Microsoft, Dell, Yahoo, Google all started in a dorm room (Kopelman 2012). The format was founded in 2012 by First Round Capital to support student founder teams. First established in Philadelphia, the DormRoomFund was set up at the University of Pennsylvania and Drexel University (Thomas 2014). According to the principle, run by students from campus, prompting investments in student startups that have the potential to significantly impact the markets (Brockman 2015). The student-run investment team will receive \$500,000 and invest tickets of \$10,000 to \$20,000, each in convertible notes, in student

startups over a two-year period (Thomas 2014). With \$2 million in assets under management, 42% was allocated to e-commerce and consumer-focused startups, 23% to enterprise-focused, 14% to medical technology, 9% to educational technology, 7% to hardware-focused startups, and 5% to financial technology companies. Within a portfolio of 155 investments, 13 exits such as Zodiac, Quickhelp, Lily, and Forge have already been reported (Crunchbase 2021).

Following on from First Round Capital's initiative, the DormRoomFund, increasingly student-run venture capital fund formats emerged. Southern California in particular experienced increased activity of student-run venture capital funds with Triton Funds LLC (Triton Funds 2021), investing agnostically in early to mid-stage startups, and the California Crescent Fund, which invests tickets up to \$40,000 in student-run startups (Crescent 2021). Yet likewise, student-run funds appeared on the East Coast such as RedHawk Ventures in Miami (Redhawk Ventures 2021). A more prominent example represents Rough Draft Ventures, powered by General Catalyst, supporting students in building their ventures from a “rough draft” to startup companies by giving them access to early-stage funding (Rough Draft Ventures 2021).

Among the first fund concepts in the European region was the Creator Fund, situated in London. Initiated by Brent Hoberman and funded by Founders Factory, the Creator Fund recruits students at 14 universities such as Oxford, Cambridge, LSE, UCL, Kings, Imperial, LBS, Warwick. Educated as venture capitalists, they are able to invest in student startups with tickets up to £30,000, whereas the equity stake is defined on a case-by-case basis (Moules 2020; Butcher 2020). To date, the Creator Fund has been able to assemble a portfolio of 13 student-run startups, such as Versed Ai, Refund Giant, POCKiT, and Tenyks (Creator Fund 2021). Recently, the DACH region also experienced a student-run fund, Wingman Campus Fund, founded by Wingman Ventures. Similar to the DormRoomFund, 15-20 students from the universities of ETH Zurich, EPF Lausanne, and the University of St. Gallen were recruited to

make five investments per campus of up to 20,000 Swiss francs in student startups (Pratty 2021).

4.2 Concept of student-run venture capital fund

The funds are conceptually different and vary in size and investment focus. Atland Ventures, for example, represents a small fund focused on the GenZ community, providing a unique perspective on a venture (Atland Ventures). The University Growth Fund, on the other hand, follows the concept of pairing students with investment professionals and hence has been able to build a portfolio of around 30 companies, inclusive AirBnB, Canopy, Lyft, Spotify, Snapchat (Ugrowth Fund 2021). Student venture capital funds are distinguished from classic university funds, which are based on the existing technology transfer offices of the university and thus focus their investment internally on financing projects within the parent university.

Evolving from the traditional structures to more professional ones, university funds are replicating venture capital funds organized as limited partnerships and managed by executive teams with professional experience (Croce, Grilli, and Murtinu 2013). Originally shaped by the DormRoomFund, though adopted by funds such as the Creator Fund and the Wingman Campus Fund, the "peer-to-peer investing model in a community with a history of student entrepreneurship" emerged. (Brockman 2015) Supported by a professional venture capital firm, acting as the LP of the student-run funds, the students receive an amount of capital, which they are allowed to invest agnostically within a pre-set ticket range in student-run startups. The students have 100% ownership of the investment decision (Uncubed). While the DormRoomFund piloted in Philadelphia and thus initially targeted students from universities around Philadelphia, European funds pursue a cross-city approach. The Creator Fund, for instance, recruited students from 14 entrepreneurial universities across cities in order to achieve high coverage of university spin-offs (Butcher 2020). Likewise, the Wingman Campus Funds created its team based on students from ETH Zurich, EPFL Lausanne, and the University of St.

Gallen. Having the professional venture capital fund as a partner as well as its and by the student-run established network, the selected students will receive training as well as mentorship during the period they are part of the investment team (Pratty 2021).

4.3 Advantages of student-run venture capital funds

Indeed, the fact that Generation Z is the target market for many startups is indicated by the successful emergence of the Gen Z VCs online community. With over 10,000 members, a platform is created enabling young investors to share knowledge and deals. Due to their unique perspective and trend awareness, Generation Zs contribute significant value (Speiser 2021). Taking this into account, the strengths of a student-run venture capital fund are also characterized by the nature of the investment team.

The lower barriers to entry and greater democratization of investment knowledge gained through the internet benefited young investors. Based on the “Peer-to-Peer-Investing-Model”, the main advantage of a student-run constitutes by its knowledge about the student founders (Brockman 2015). A student investment team has a keen understanding of students and the campus ecosystem. Furthermore, student venture capital funds have immediate access due to their location (Kopelman 2012). Lux Libertas Ventures, for instance, was able to identify a niche due to a significant business-to-consumer venture gap, which can be optimally served by the digital native disposition of students as they grew up with technology (Tran 2021). According to Molly Follower, CEO of the DormRoomFund, students of Generation Z aren't pinned in patterns compared to experienced investors and have more variable notions when it comes to an ideal founder (Speiser 2021). Since students invest in startups of their peers, they are subject to less information asymmetry than conventional investment funds because they have a better knowledge of the founding team. Student investors do not necessarily consider aspects such as the founders' reputation and investment in their firms to reduce information asymmetries. Due to the diverse investment team, student investors have a similar background

as their peers and thus a level of expertise to assess the ventures accordingly (Kopelman 2012). Furthermore, by improving the reputation of the venture leveraging the brand of the backing venture capital fund in case of DoormRoomFund, for instance, and providing a network to professional venture capital firms.

Having a deep insight into the student startup ecosystem, student investors have a good overview of the landscape of university startups and are able to identify deals, for instance, before the founders seek capital (Moules 2020). Hence, a student-run venture capital fund offers an alternative source for deal flow for the backing venture capital firm. By reducing funding gaps, giving student entrepreneurs access to a broad network of business angels, professional venture capital funds, and entrepreneurial expertise but also inspiring students to be found, student-run venture capital funds significantly impact startup ecosystems. Lastly, enables student-run venture capital funds students to gain practical experiences as venture capital investors. Students are able to gain an unadulterated venture capitalist experience through one hundred percent autonomy (Pratty 2021). Thus, professional venture capital firms benefit from access to experienced graduates to staff their investment teams.

5 Survey

5.1 Hypothesis

Previous studies emphasize university spin-offs experience greater problems in early-stage fundraising due to their higher innovation efficiency, operating in newer or not-existing markets and more at the technological forefront, compared to conventional ventures and the associated higher risk of the venture (Lindström and Olofsson 2001; Blair and Hitchens 1998; Klofsten 1988). Besides the higher risk level, essentially, the resulting information asymmetry is the reason university spin-offs are exposed to market imperfections (Zhang 2009; Cornell and Shapiro 1988).

The statistical analysis intends to investigate whether German university spin-offs suffer from information asymmetry. As it is difficult to determine, information asymmetry-reducing factors are examined as a proxy. The literature suggests several approaches to reduce information asymmetry. First, the entrepreneur's willingness to invest in his own company implies a certain trust-building signal for the investor, as it shows the entrepreneur's confidence in his own company (Leland and Pyle 1977). Since university spin-offs tend to deal frequently with low collateral (Carpenter, Robert E., and Bruce C. Petersen 2002), the focus is on the next two aspects. Another element with an information asymmetry reducing effect is the reputation of a founder. Investors approximate the competence of a founder with his previous activities or his track record (Zhang 2009; Clarysse and Morray 2004). Consequently, this paper proposes that the founder's experience has a reducing effect on the problems in early-stage funding for university spin-offs.

H1: Problems in the early-stage funding of a university spin-off can be mitigated by the experience of the founding team.

Furthermore, based on studies conducted, the literature suggests information asymmetries between investors and entrepreneurs can be lowered through social connections (Freiburg and Grichnik 2012; Uzzi 1996). Besides the trust-building effect, social contacts serve for a better and more transparent flow of information as well as a certain action incentive for the entrepreneur, as they do not want to lose their reputation in their network (Granovetter 2005).

H2: Problems in the early-stage funding of a university spin-off can be mitigated by the social ties between the founding team and the investor.

5.2 Sample and data collection

Focusing on the German university start-up landscape, the sample was drawn primarily from universities running a university incubator or entrepreneurship program. Corresponding to the German university spin-off landscape, we were primarily guided by the EXIST scholarships

received to assume an appropriate level of relevance for the German university spin-off landscape (Figure 12 and Figure 13) For a higher number of study attendees, participants from a total of 40 German entrepreneurship centers, incubators and accelerator programs of universities as well as research institutions were contacted. Both current program participants and alumni were surveyed, as well as university spin-offs unrelated to university incubators. 24 university spin-offs participated in our survey. Among the university startups surveyed, 18 are either currently part of or alumni of a university entrepreneurship program. The startups are mainly distributed in sectors such as logistics, energy technology, and education technology, each of which accounts for 12.5% of the sample. Also common to portions of the sample, at 8.33% each, are industries such as e-commerce, construction technology, and software (Figure 9).

5.3 Measurements

Early-stage financial sources: Analogously to a study by Lindström, Goran, and Christer Olofsson (2001), problems in early-stage financing of startups were measured using a scale, contending a 5-point interval {"Not difficult"=1; "Rather not difficult=2"; "Slightly difficult"=3; "Difficult"=4; "Very difficult"=5}. The founders were asked to rate the problems in obtaining early-stage funding.

Experience of the founding teams: Based on the study by Huynh (2016), the experience of the founding team was also examined. This was done employing a two-item measurement asking the founders to rank their experience in venture building {"Not experienced"=1; "Slightly experienced"=2; "Moderately experienced"=3; "Experienced"=4; "Very experienced"=5} as well as their experiences in their respective industries {"Beginner"=1; "Intermediate"=2; "Advanced"=3; "Very advanced"=4; "Expert"=5}.

Social networks: Following previous management study and in line with Huyhn's (2016) study, different areas were selected to evaluate the quality of the social network. Subjects such as Ties,

Density, Reciprocity, Trust, Information Quality, Diversity, and also the exposure to Business Angels and Venture Capital Funds were selected. The individual areas are based on different literature sources and were addressed with one question each to maintain a lean survey. Density implies interaction with the network, which survey respondents were asked to estimate {"Never"}=1; {"Sometimes"}=2; {"Often"}=3; {"Very often"}=4; {"Always"}=5} (Marsden 1993). The probability of returning favors from the network was also examined {"Never"}=1; {"Yearly"}=2; {"Monthly"}=3; {"Weekly"}=4; {"Daily"}=5} (Miller and Kean 1997). The Ties of the founding team were assessed with the propensity to participate in social, political, and family discussions {"Very weak"}=1; {"Weak"}=2; {"Moderate"}=3; {"Strong"}=4; {"Very strong"}=5} (Parks and Floyd 1996). Similarly, the trust of the network toward the founder was studied {"Not trustworthy at all"}=1; {"Not trustworthy"}=2; {"Neither trustworthy nor untrustworthy"}=3; {"Trustworthy"}=4; {"Very trustworthy"}=5} (Tsai and Ghoshal 1998). The information quality of the network was investigated inspired by O'Reilly (1982) regarding the accuracy of the information {"Poor"}=1; {"Fair"}=2; {"Good"}=3; {"Very good"}=4; {"Excellent"}=5}. In addition to exposure to venture capital funds and business angels, access to business-relevant information was also examined {"None"}=1; {"Some"}=2; {"A moderate amount"}=3; {"Many"}=4; {"Almost exclusively"}=5}. Questions on market data, design, marketing competence, and packaging technology competence were asked to assess the diversity of information {"Poor"}=1; {"Fair"}=2; {"Good"}=3; {"Very good"}=4; {"Excellent"}=5} (Gupta and Govindarajan 2000).

A detailed overview of questions can be found in the appendix (Figure 10).

5.4 Validity and limitations

To ensure the content validity of the measurements, the content structure of the study is designed based on previous studies performed by Lindström and Olofsson (2001) and Huynh (2016). Nevertheless, some limitations of the study should be pointed out. The research is intended to provide a statement about the German university spin-off landscape. Despite the

extensive number of contacted institutes, as well as directly contacted founding teams, there was a very low response rate. Thus, only a sample of $N = 24$ could be drawn. A sample of this size is considered to be limited in its explanatory power concerning the population. Moreover, due to the small number of student venture capital funds and their short existence, a statistical analysis of student-run venture capital funds was not possible. The advantages of student venture capital funds could only be assessed by means of argumentation in addition to the disclosed data of the DormRoomFund.

5.5 Results

Model estimation and reliability of the variables

Based on the survey questions, 13 variables "Problems Fundraising," "Experiences Venture Building", "Industry Experiences", "Density", "Ties", "Returned Favors", "Trust", "Information Accuracy", "Market Data", "Product Design", "Marketing Know-How", "Packaging Design", and "Network VC" were created.

To ensure a linear regression analysis, the individual variables were combined using averaging. A Cronbach's alpha test was performed to evaluate the reliability of the variables to be summarized. As they are combined into the variable "Network", the reliability for the variables "Density", "Ties", "Returned Favors", "Trust", "Information Accuracy", "Market Data", "Product Design", "Marketing Know-How", "Packaging Design", and "Network VC" was tested and resulted in an alpha of 0.665 (Figure 19). For a higher Cronbach's alpha value, the item "Returned Favors" was removed. Thus, a value of 0.697 was obtained (Figure 20).

Since the variables "Experiences Venture Building" and "Industry Experiences" account for the reputation of the founding team another test was conducted. A negative average covariance was identified between the items. Consequently, it was decided not to combine the variables, since the reliability of the model would be violated (Figure 18).

Correlations

Since all variables are ordinally scaled, a rank correlation coefficient according to Spearman was relied upon to calculate the correlation. Although the hypotheses formulated imply a presumption of effect, a two-sided significance test was nevertheless conducted. First, we calculated the correlation for our dependent variable "Problems Fundraising" and our independent variable "Experiences Venture Building." According to our expected effect presumption of hypothesis H1, a negative correlation of -0.497 can be observed between the variables. Since we tested two-tailed, the correlation is significant ($p < .05$).

Subsequently, the correlation was calculated for the variables "Problems Fundraising" and "Industry Experiences", as the latter accounts for the reputation, as well. Likewise, a negative correlation was identified in this relationship. The correlation coefficient is -0.171. However, the correlation is not significant.

Lastly, the correlation between the items "Problems Fundraising" and "Network" was calculated. Analogous to the directed presumption of the effect of the formulated hypothesis H2, a negative correlation could be observed. The correlation coefficient is -0.607 and is significant ($p < .01$).

Variable	1	2	3
1. Problems Fundraising			
2. Experiences Venture Building	-.497*		
3. Industry Experiences	-.171	.002	
4. Network	-.607**	.543**	.425*

* $p < .05$. ** $p < .01$.

Figure 1: Spearman's Rank Correlation Table

Hypothesis tests

Multivariate linear regression was used to test the hypotheses. Based on the correlation identified, both an effect of the independent variables “Experiences Venture Building”, “Industry Experiences”, and “Network” on the dependent variable "Problem Fundraising" and a relationship between the individual independent variables were suspected. As a result of the Cronbach Alpha test, it was decided to proceed separately with the variables associated with the reputation of the founding team. Looking at the adjusted R^2 , the goodness of fit of the model is ($R^2 = .340$) Since the model is based on a sample collected in reality, the value can be considered as acceptable.

Variable	<i>R</i>	<i>R</i>²	Adjusted <i>R</i>²	<i>SE</i>	<i>p</i>
(Constant)	.652	.426	.340	0.758	.001

Note. Predictors: (Constant), Network, Industry Experiences, Experiences Venture Building

Figure 2: Overall Model Summary for Problems Fundraising towards Network, Industry Experiences, Experiences Venture Building

As the value in the ANOVA table is significant $F(3,20) = 4.941$, $p < .001$) this suggests a corresponding explanatory contribution of the model.

Model		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
1	Regression	8.513	3	2.838	4.941	.010
	Residual	11.487	20	.574		
	Total	20.000	23			

Note. Dependent Variable: Problems Fundraising

Predictors: (Constant), Network, Industry Experiences, Experiences Venture Building

Figure 3: ANOVA Table for Problems Fundraising towards Network, Industry Experiences, Experiences Venture Building

The regression equation is $y = 7.996 + 0.012x_{\text{Industry Experiences}} - 0.03x_{\text{Experiences Venture Building}} - 1.303x_{\text{Network}}$. The coefficient of “Experiences Venture Building” illustrates the negative relationship between venture building experiences and network on fundraising problems. However, the effect of experiences in venture building is not significant. A statistical significance is obtained only for the coefficient of the network. Unlike the relationship preserved in the correlation, the regression indicates a positive effect on the problems in fundraising. Such an unexpected effect could be due to a negative relationship of the variables "Industry Experiences", "Experiences Venture Building".

When calculating a correlation, we obtain a positive correlation coefficient, which, however, is not statistically significant (Figure 1). Thus, we cannot assume a systematic correlation. Furthermore, such an unexpected effect could be explained by the omission of further variables. Hypothesis 1 states that problems in the early-stage funding of a university spin-off can be mitigated by the experience of the founding team. There is no support for this hypothesis in our model - “Industry Experiences” ($p < .950$) and “Experiences Venture Building” ($p < .888$). Hypothesis 2 claims that Problems in the early-stage funding of a university spin-off can be mitigated by the social ties between the founding team and the investor. Likewise, as the correlation between the Items “Problems Fundraising” and “Network”, the effect of the variable “Network” is significant ($p < .007$). Based on the results of this regression model hypothesis 2 is supported.

Variable	B	SE B	β	t	p
(Constant)	7.996	1.096		7.477	.001
Industry Experiences	.012	.198	.12	.063	.950
Experiences Venture Building	-.030	.211	-.028	-.143	.888
Network	-1.303	.438	-.644	-2.976	.007

Note. Dependent Variable: Problems Fundraising

Figure 4: Coefficients Problems Fundraising towards Network, Industry Experiences, Experiences Venture Building

6 Discussion and derivations of the survey for student-run venture capital funds

This research aims to examine whether student-run venture capital funds are an adequate financing alternative for university spin-offs. Student-run venture capital funds represent a more recent concept with limited scientific research to date. Hence, the topic was approached from the perspective of university spin-offs. The literature primarily suggests, based on previously conducted studies, a higher degree of information asymmetry, due to the greater innovative power and according to risk level, in university spinoffs, as the key challenges in early-stage fundraising of student-run startups (Lindström and Olofsson 2001; Klofsten 1988; Zhang 2008; Blair and Hitchens 1998; Cornell and Shapiro 1988). Furthermore, past scientific research proposes various ways to reduce information asymmetries. In addition to the willingness to invest in their venture, aspects such as the experience of the founding team and the social connections of the founders, especially to investors, were also mentioned (Leland and Pyle 1977; Zhang 2009; Clarysse and Morray 2004; Freiburg and Grichnik 2012; Uzzi 1996). This study focuses in particular on the latter two concepts to use them as a proxy to determine whether German university spin-offs face information asymmetry. The hypotheses were tested by surveying 24 German university spin-offs. The study is based on research conducted by

Huynh (2016) in Spain, which investigates early-stage financing of university spin-offs using characteristics, namely capabilities as well as the social network, of the founding team and on a paper by Lindström and Olofsson (2001), which explores the early-stage financing problems of new technology-based firms based on 150 startups which are either a venture capital portfolio company, or have received funding by Swedish fund within the last 5 years, or are listed on the Swedish small firms lists. Of the university spin-offs studied, 33.33% reported having very great difficulties in early-stage fundraising, and 41.67% experienced great difficulties (Figure 16). Additionally, 50% of the ventures surveyed operate in rapidly expanding markets (Figure 12) and the same amount attributes an innovative technological level to their company (Figure 14). Hence, the survey results reflect the phenomena indicated by the literature (Lindström and Olofsson 2001) and emphasizes university spin-offs dealing with the “liability of the newness” (Stinchcombe 1965). Based on the study results, it was not possible to draw a significant conclusion about the relationship between the founding team's experience and early-stage financing problems. In this case, the research results do not support the existing literature. Even though we were able to detect a significant correlation, the regression model could not confirm it. However, the results suggest a relationship between fundraising problems and the founding team's network. The negative relationship is illustrated in a significant correlation coefficient validated by the regression analysis. Thus, the results deviate from the findings of the study conducted by Huynh (2016), which could not discover a direct relationship between the network of the founder and early-stage fundraising. However, the results of the study suggest an intermediary role of the network that enhances the capabilities of the founders and thus has an indirect impact on fundraising.

Since the factors, used as a proxy for mitigation of information asymmetry, have been empirically demonstrated to some extent, our research indicates that German university spin-offs face a sufficient level of information asymmetry. Moreover, in the study conducted, 50%

of the 24 ventures surveyed reported having good traction and 25% reported having very good to excellent traction (Figure 17). Therefore, this research highlights a certain amount of potential in university spin-offs, which nevertheless experience major problems in early-stage fundraising due to information asymmetry.

Identified strengths of student-run venture capital funds are primarily focused on a lower degree of information asymmetry between investor and founder, due to the proximity to the student founders and the resulting better understanding of the landscape of university spin-offs, as well as the freer pattern-independent investment selection process (Brockman 2015; Kopelman 2012; Speiser 2021). Furthermore, student-run venture capital funds are able to provide support to student founders with network and reputation by cooperating with professional venture capital firms (Moules 2020). Consequently, student-run venture capital funds may represent an adequate financing alternative, as they are subject to a lower degree of information asymmetry between founder and investor compared to traditional funds (Brockman 2015; Kopelman 2012; Speiser 2021). Furthermore, by providing network and adding reputational value leveraging the brand in case of the DormRoomFund.

7 Implications from the 5-year performance of the DormRoomFund

Since student-run venture capital funds are a new concept and generally fund performance data in venture capital tends not to be published, it is difficult to provide a data-based assessment. However, after five years of performance, the DormRoomFund has published a report that concludes the fund's performance and the project's impact on the university spin-off landscape and student investors. As of the publication of the report, the DormRoomFund has been able to make 155 investments. The portfolio companies have been able to raise over \$300M in follow-on capital from investors such as Sequoia Capital, Andreessen Horowitz, and Y-Combinator. The portfolio valuation was able to reach a value of over \$1B. Student founders from 43

universities also outside the Ivy League were funded. Here, 43% of the investments were made to undergraduate founders.

The DormRoomFund was able to build a team of 36 partners within 19 universities. The share of women of 35% is far above the VC average of 7%. 60% of the current partners are undergraduate students (Figure 24). With also MBAs, Master's students as well as Ph.D. candidates, the DormRoomFund is able to gain a holistic insight into the university ecosystem. After five completed cohorts, a community of 120 alumni has been established. 47.8% of the community members are active founders or professional venture capital investors themselves (DormRoomFund 2017).

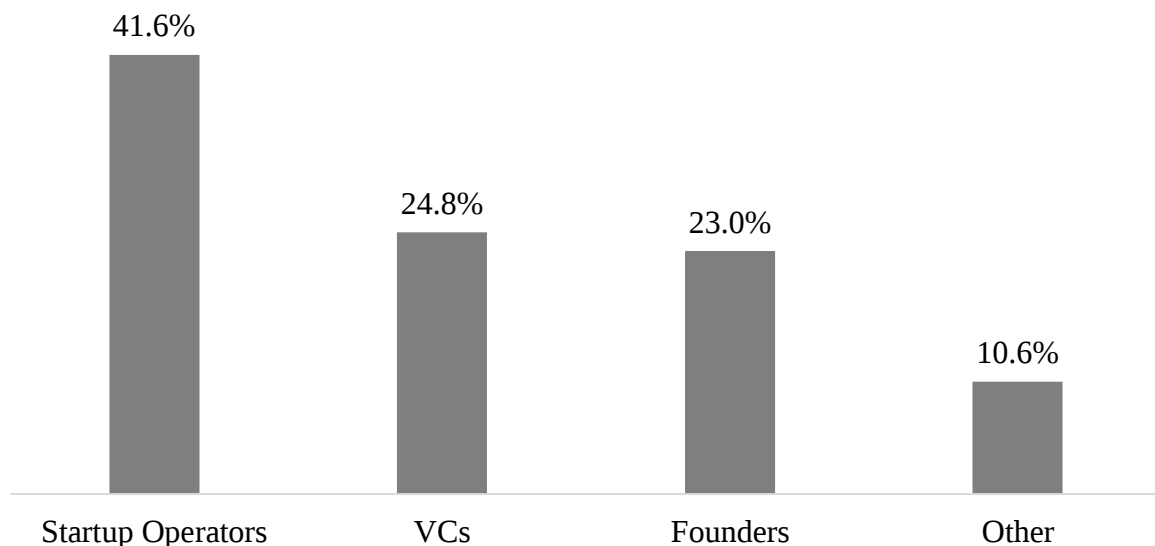


Figure 5: Alumni community DormRoomFund breakdown

8 Conclusion

Based on studies conducted using diverse samples, prior literature suggests that university startups face higher levels of information asymmetry than startups from other origins due to the “liability of the newness” (Stinchcombe 1965). Likewise, information asymmetry could be empirically demonstrated using the mitigating effect on this asymmetry of the network of the founding team as a proxy, which partly corresponds to the mediating function based on the

study by Huynh (2016). Since the study also shows a significant level of traction of the ventures, this indicates promising startups that nevertheless face problems in early-stage fundraising.

The research suggests several advantages of student-run venture capital funds, which primarily focus on a lower degree of information asymmetry in the investment selection process as well as supporting student founder teams in aspects such as network and reputation (Brockman 2015; Kopelman 2012; Speiser 2021). Hence, student-run venture capital funds might be an adequate financing alternative for university spin-off.

The DoormRoomFund's five-year performance review highlights the impact such a concept can have on the startup ecosystem and the future venture capital landscape. Besides the significant value creation, especially undergraduate students benefit from funding, who represent founders with limited network and reputation. Furthermore, the DormRoomFund demonstrates having a strong contribution to the future development of the startup and venture capital landscape, as a large portion of the alumni found themselves or become venture capital investors (Dorm Room Fund 2017).

Student-run venture capital funds are a relatively new concept with limited scientific research. Nevertheless, with the Creator Fund and the Wingman Campus Fund, a trend is emerging that could also influence the European venture capital and university start-up landscape. For future research, it is crucial to further investigate this phenomenon and to analyze the performance of student-run venture capital funds as well, to obtain more concrete indications about the appropriateness of student-run venture capital funds. Also, the impact on the venture capital labor market offers an important angle for future research, as student-run venture capital funds represent an alternative source of deal flow as well as a breeding ground for students interested in venture capital and thus an additional opportunity for recruiting. Ultimately, student-run venture capital funds represent a very promising financing alternative. Establishing projects should be followed and studied with great attention, as they could offer significant potential.

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10 Appendix

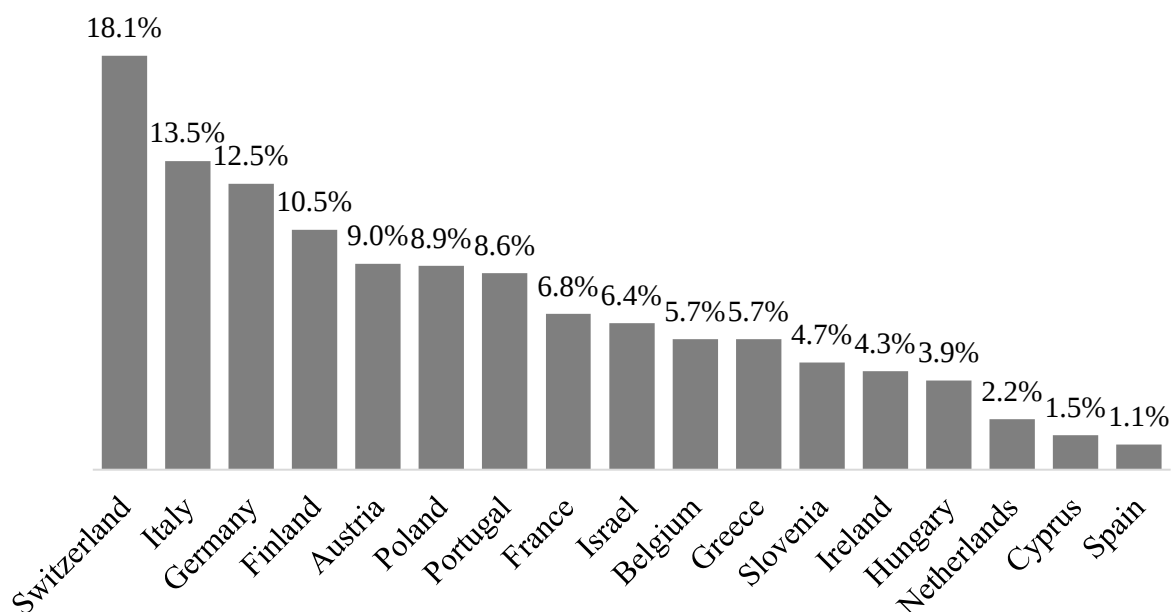


Figure 6: Startups founded from a university in selected European countries 2016

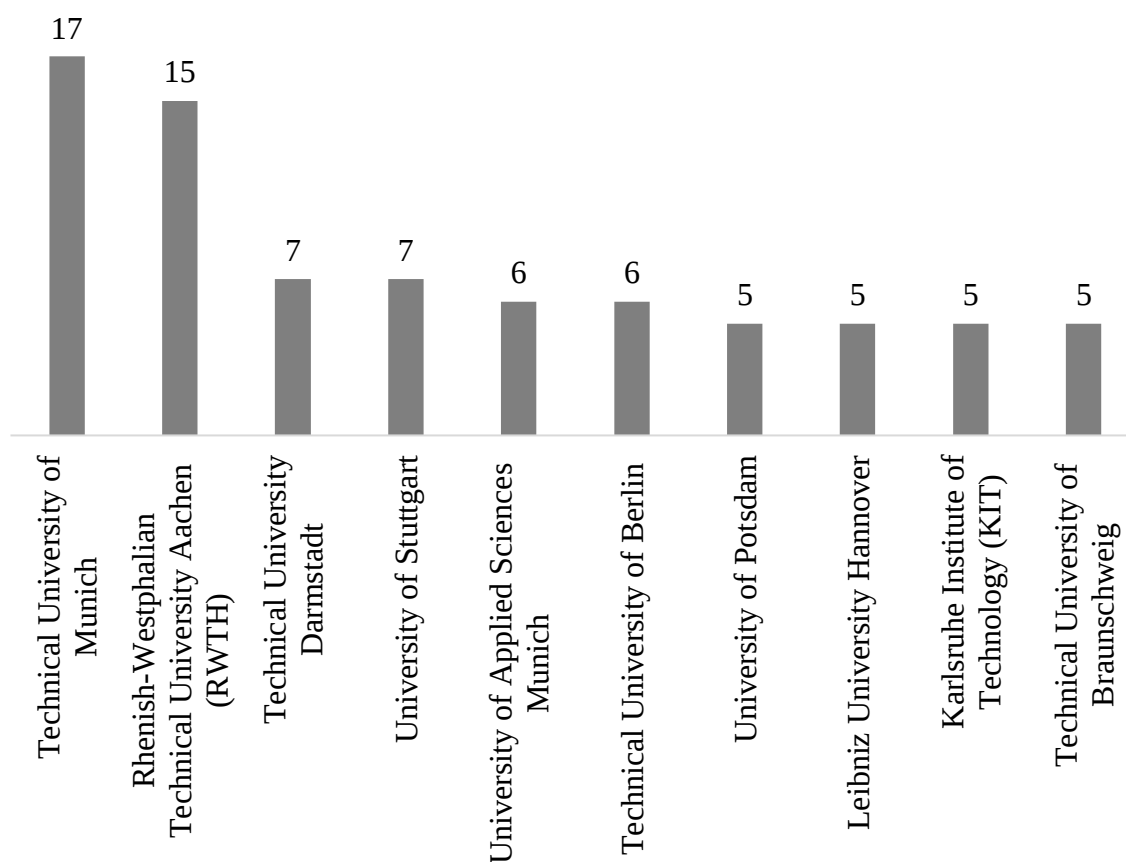


Figure 7: Universities with the most start-up grants in 2020

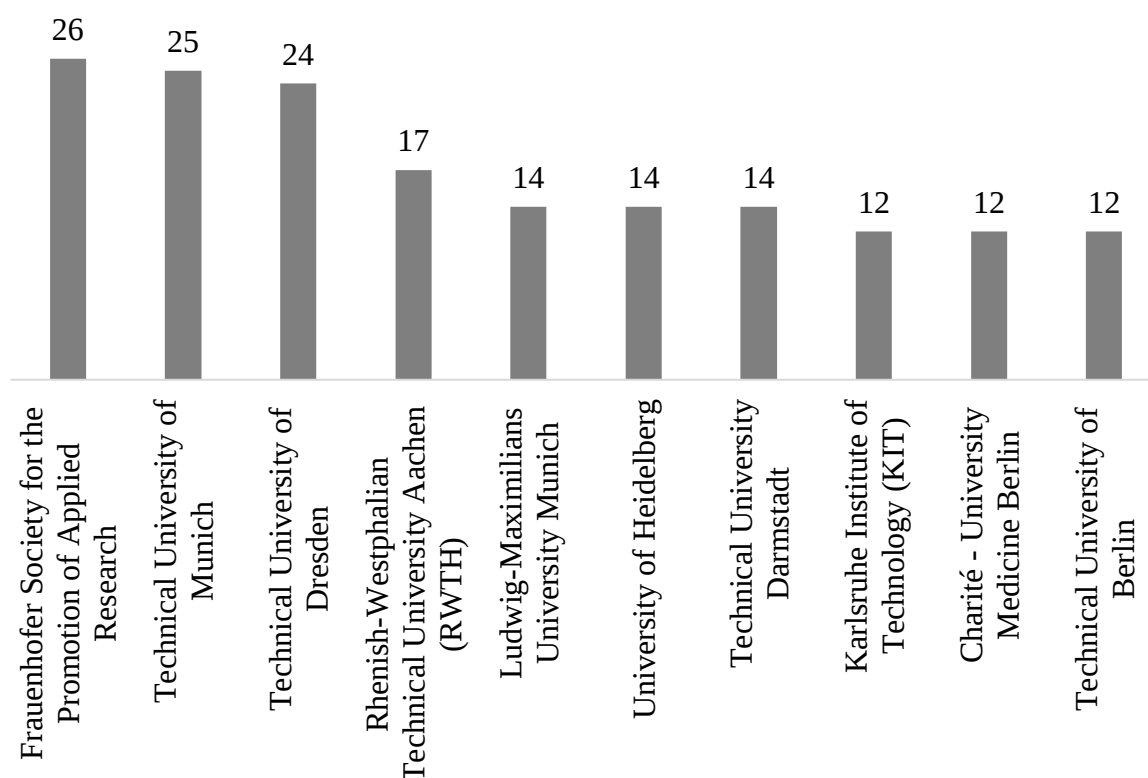


Figure 8: The universities and research institutions with the most research transfers (2007-2019)

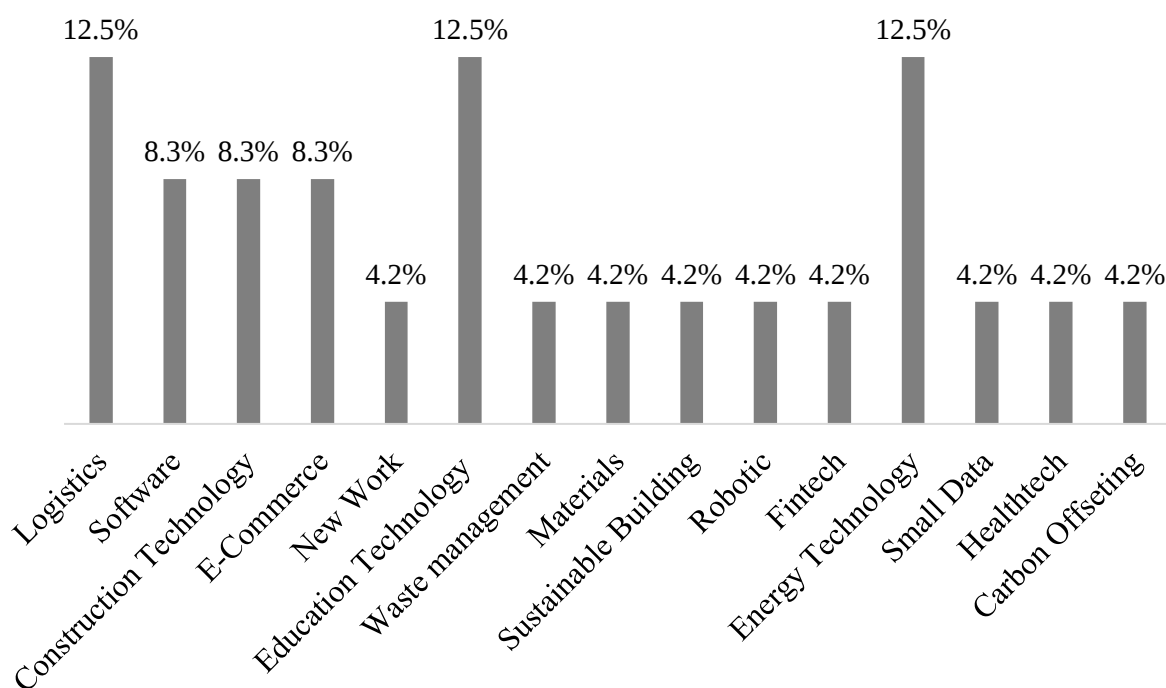


Figure 9: Sample University Spin-Offs

Statement	N	Min	Max	Mean	Std. Deviation
How do you rate the financing problems during the early stage development?	24	1	5	4.00	.855
Does your venture operate in a new or non-existing market?	24	1	5	3.50	0.722
How many assets can you provide for collateral?	24	1	5	1.63	0.875
Is your venture based on a proven technology?	24	1	5	3.88	0.850
How innovative would you rate your venture?	24	1	5	3.83	0.868
How much effort do you put into providing information signaling the wealth-creation potential of your venture?	24	1	5	2.88	1.076
How would you rate your willingness to engage in discussions related to social, political and family matters?	24	2	5	3.33	0.816
How often do you interact with your network?	24	1	5	3.33	0.917
Does your network include venture capitalists or business angels?	24	1	5	2.04	1.083
Rate your experiences in building a venture?	24	1	5	1.83	0.868
How would you rate your experience in your selected background?	24	1	5	2.71	0.908
How often are favors returned by your network?	24	1	5	3.25	0.608
How trustworthy are you perceived by your network?	24	1	5	4.13	0.448
In terms of market data, how do you rate the access to expertise within your network?	24	1	5	2.96	0.751
In terms of product designs, how do you rate the access to expertise within your network?	24	1	5	2.71	0.908
With regard to marketing know-how, how do you rate the access to expertise within your network?	24	1	5	2.88	1.076
With regard to packaging design or technology, how do you rate the access to expertise within your network?	24	1	5	2.54	0.779
How would you rate the startup's current traction?	24	1	5	3.13	3.83
Network	24	1	5	3.05	0.461

Figure 10: Mean and Standard Deviation Table

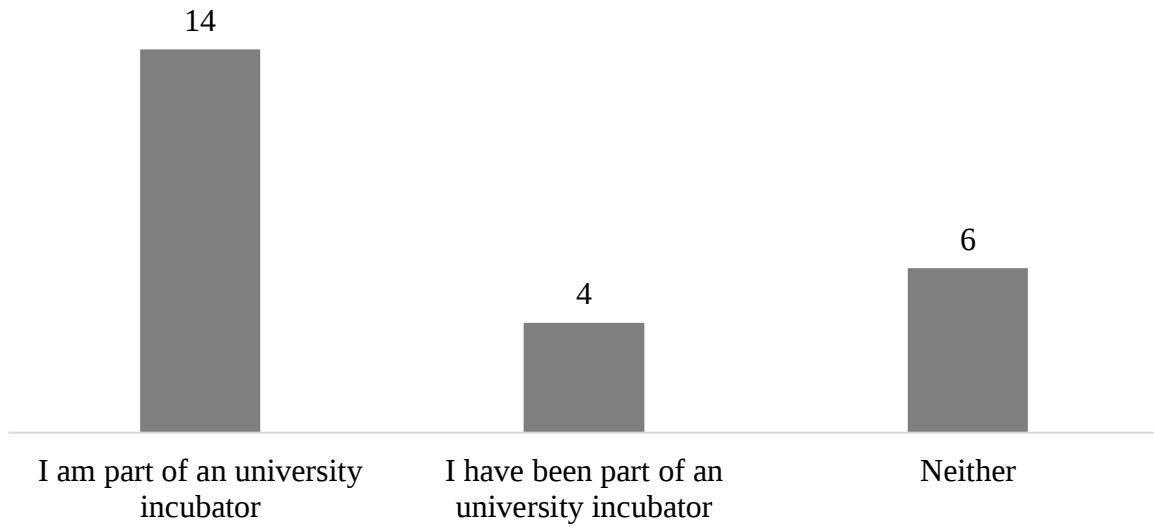


Figure 11: Are you actively/have you actively been part of an university incubator?

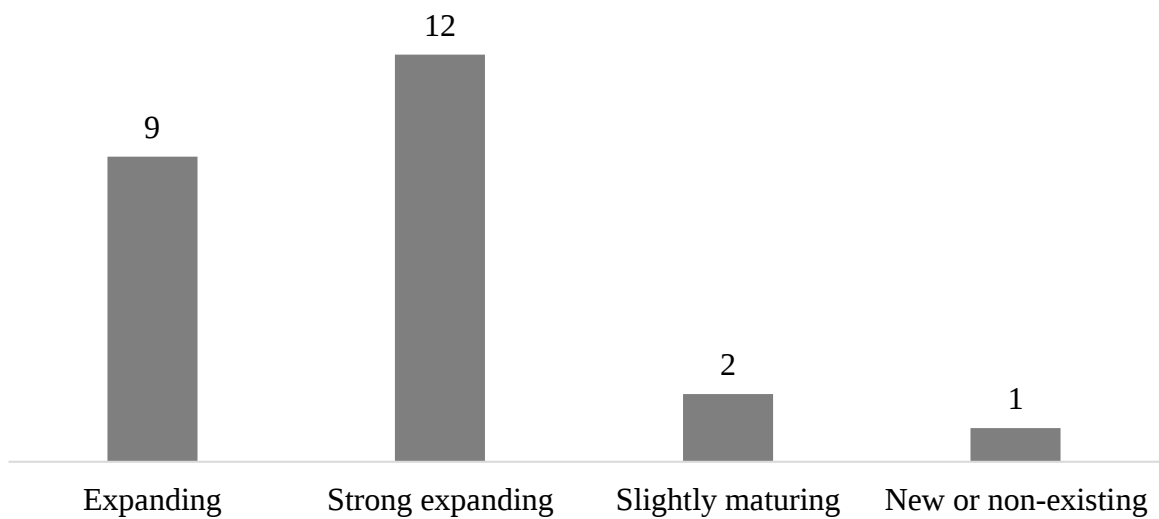


Figure 12: Does your venture operate in a new or non-existing market?

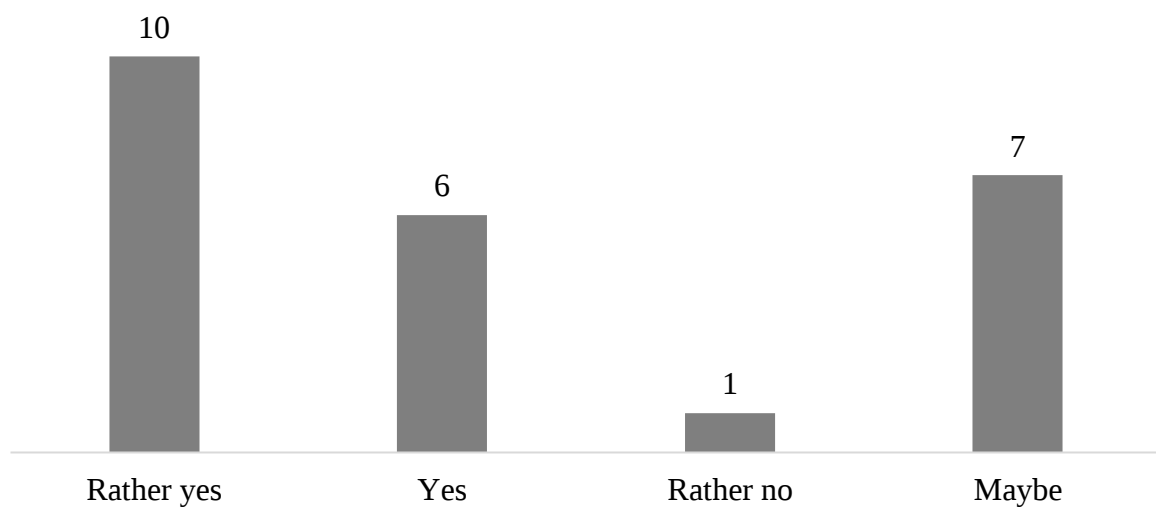


Figure 13: Is your venture based on a proven technology?

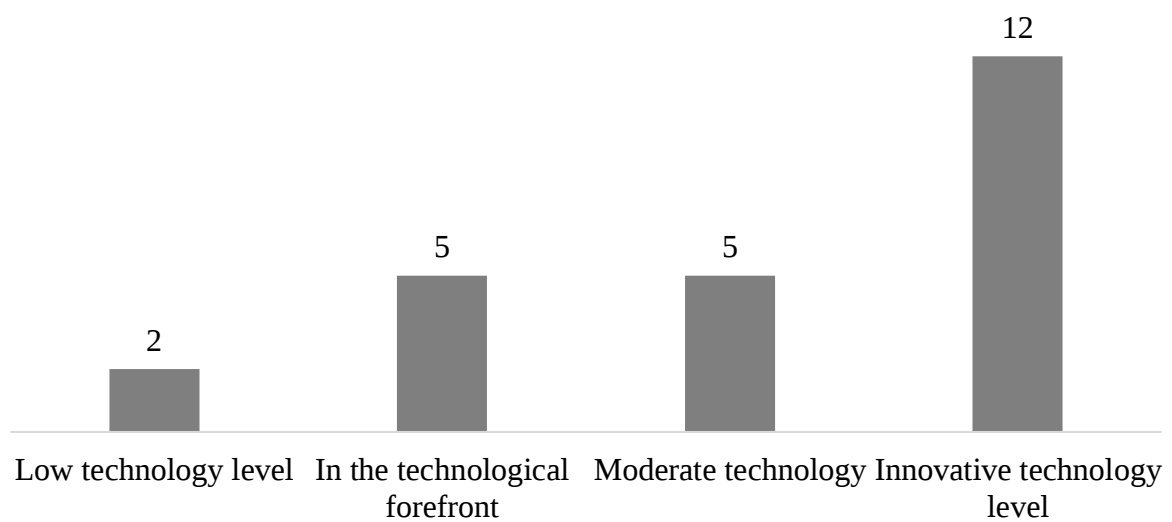


Figure 14: How innovative would you rate your venture?



Figure 15: How many assets can you provide for collateral?

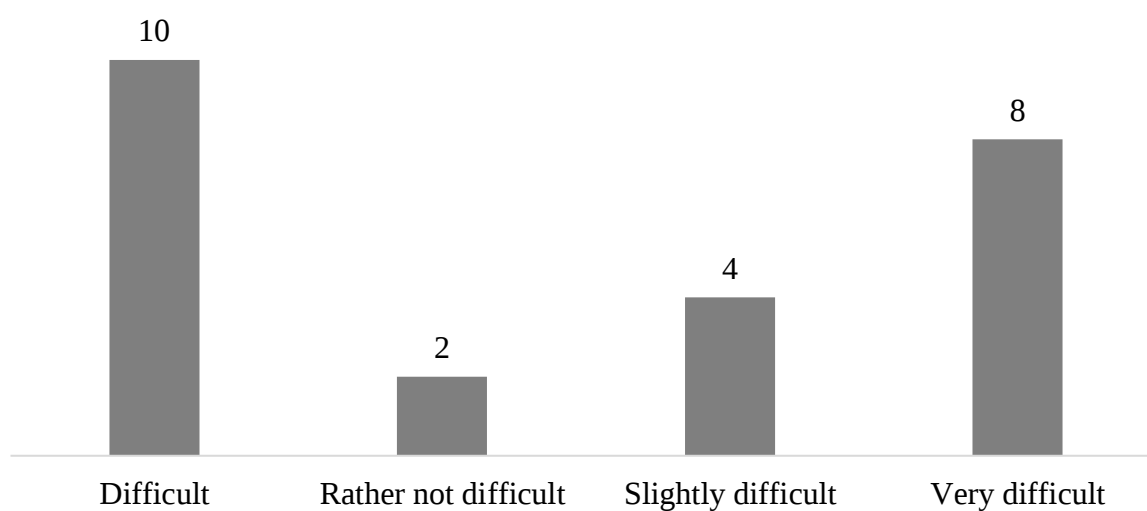


Figure 16: How do you rate the financing problems during the early stage development?

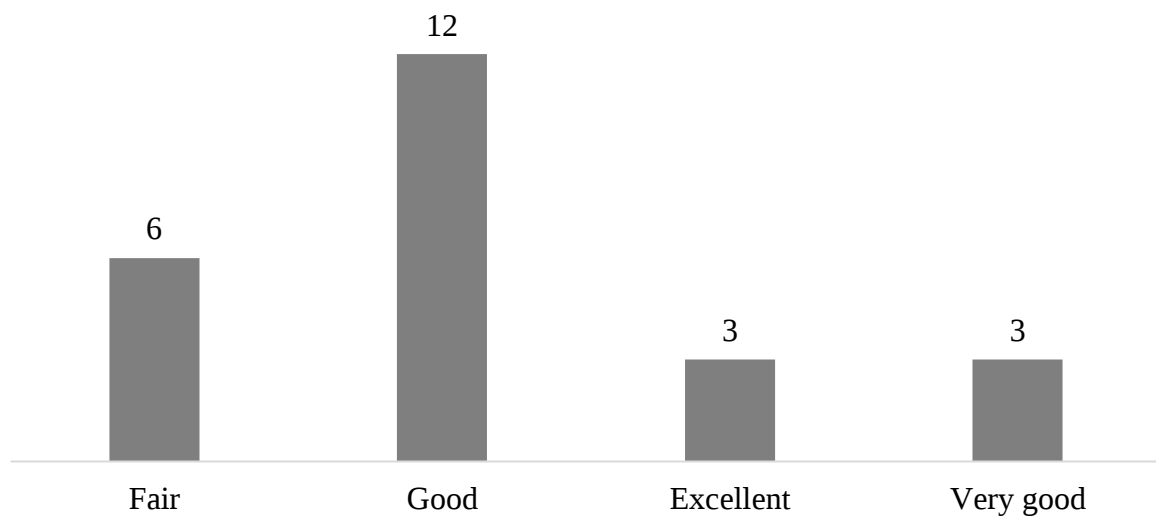


Figure 17: How would you rate the startup's current traction?

Cronbach's Alpha	Number of Items
-0.19	2

Note. The value is negative due to a negative average covariance among items.

Figure 18: Cronbach's Alpha coefficient for Experiences Venture Building Industry Experiences

Cronbach's Alpha	Number of Items
0.665	10

Figure 19: Cronbach's Alpha coefficient for Network

Cronbach's Alpha	Number of Items
---------------------	-----------------

0.697

9

Figure 20: Cronbach's Alpha coefficient for Network

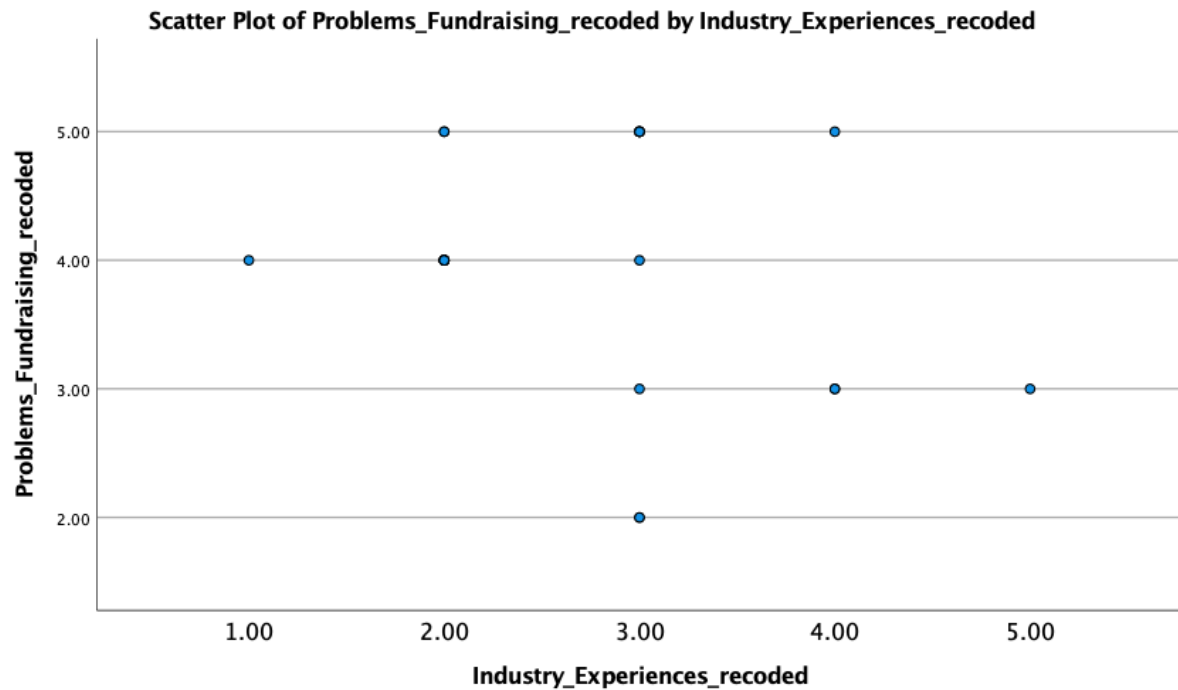


Figure 21: Scatter Plot Problems Fundraising towards Industry Experiences

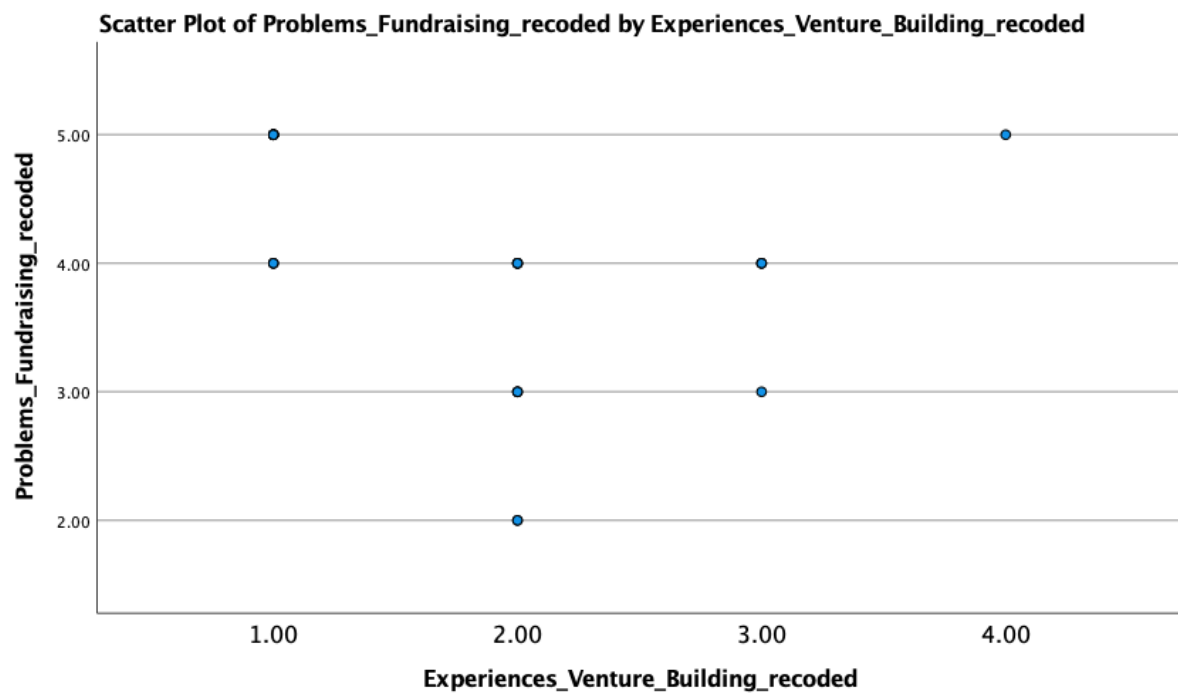


Figure 22: Scatter Plot Problems Fundraising towards Experiences Venture Building

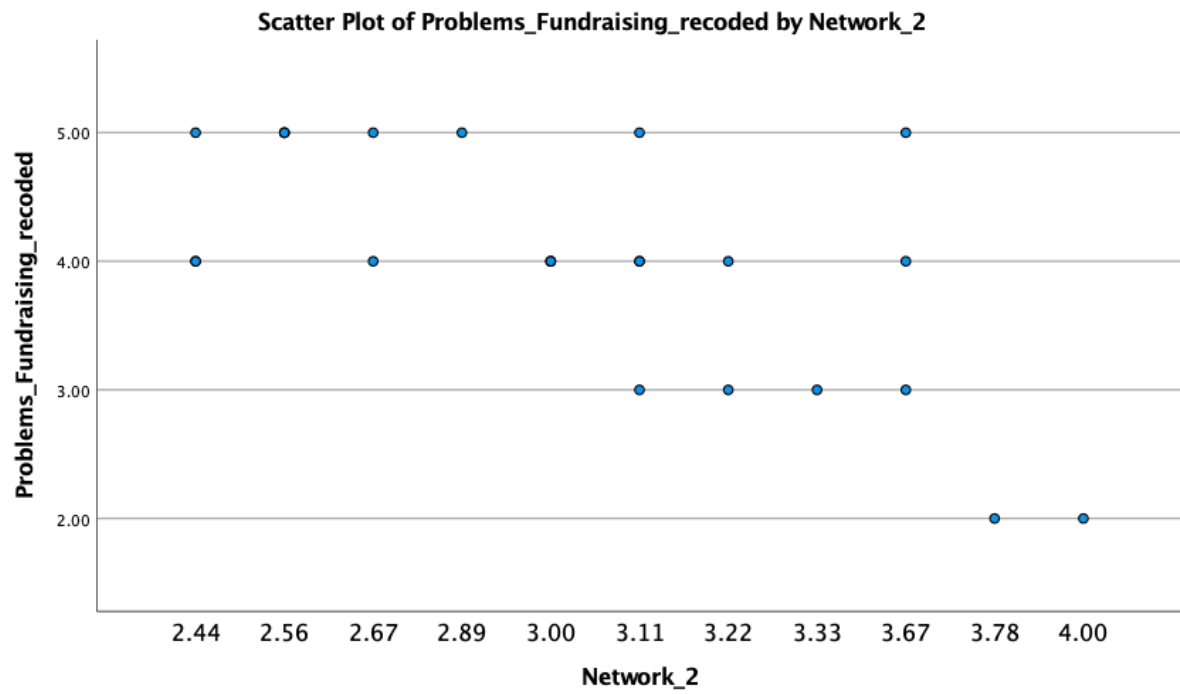


Figure 23: Scatter Plot Problems Fundraising towards Network

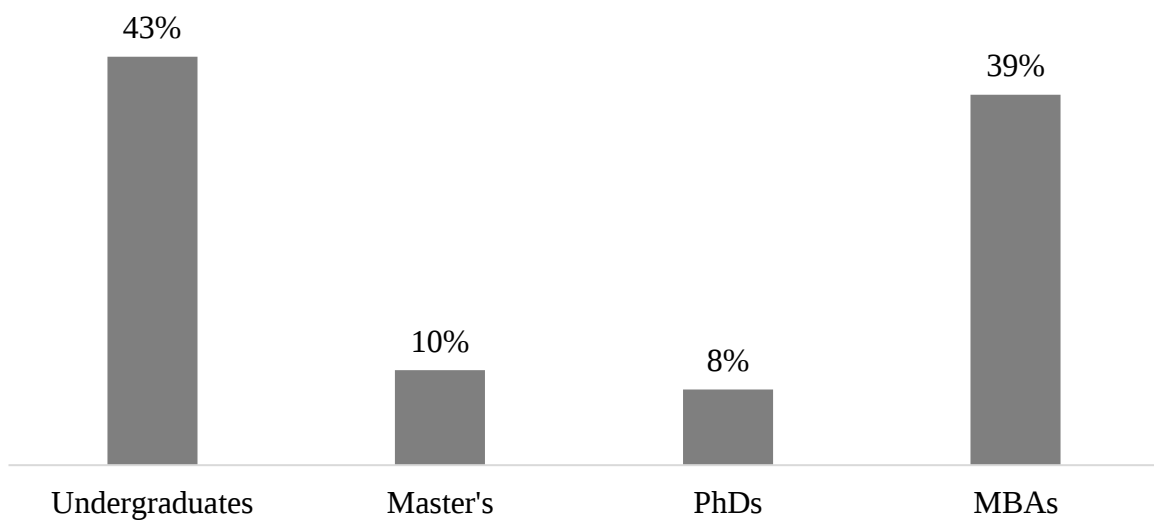


Figure 24: Group Receiving Investment Breakdown

