# 'Entrepreneurial Identity Aspirations' of Students of the University of Twente

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### ABSTRACT

While the University of Twente has been named 'Most entrepreneurial University in the Netherlands' for the fourth time in a row, it is important to understand what contributes to the 'entrepreneurial identity' of the UT. The purpose of this research is to find out what professional identity aspirations students of the University of Twente have, and whether there is a relationship between these students' professional identity aspirations and Entrepreneurship Societies on the University of Twente. This research adopts studies of Farmer, Chemers, and Watt in the process, which have contributed to an enhanced Qualtrics survey with relevant and important questions regarding the entrepreneur- and engineer identity (and the combination of both) of students of the University of Twente. On the basis of this survey, relationships between the entrepreneurial identity aspirations of the students of the University of Twente and these students' belongingness to Entrepreneurship Societies have been explored. After analyzing the date, we can determine that students of the UT differ a lot in their professional identity aspirations. Being part of an Entrepreneurship Society was constructed as having a positive relationship with students' entrepreneurial identity aspirations. General thoughts regarding male/female entrepreneurs have been confirmed, as male students have stronger entrepreneurial identity aspirations than female students. Moreover, expectations regarding study directions' relationship with professional identity aspirations, and in particular Entrepreneur Identity Aspirations, have been confirmed due to this study. Further research should be done with larger samples from different universities. This will make it possible to get a more detailed picture of the relationship between Entrepreneurship Societies and a students' Entrepreneurial Identity Aspirations.

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#### Keywords

Convenience Sample; Engineer Identity; Entrepreneurial Identity; Entrepreneurial Identity Aspirations; Entrepreneurship Societies (ESs); Professional Identity Aspirations (PIAs); Technology Entrepreneur Identity;

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## 1. INTRODUCTION

The University of Twente has been named 'Most entrepreneurial university in the Netherlands' for the fourth time in a row (2013, 2015, 2017, 2019), and one of the main reasons for this success is that their students think of themselves as entrepreneurs (info@utwente, 2019). Some of these young entrepreneurs get supervision of Entrepreneurship Societies (ESs), like Novel-T. These ESs provide students with knowledge and contacts, and help these students in the progress of starting and/or running a business on their own or with a team. In this study, we want to analyze whether students that belong to such an ES have a higher degree of Entrepreneurial Identity than students that do not belong to an ES.

Until now, it has not been clarified if and how a students' Professional Identity Aspirations (PIAs), and especially these students Entrepreneurial Identity Aspirations, and their belongingness to an ES are related. Getting insights into this relationship is of scientific and practical interest, as it will provide the UT with a more in-depth view of their students' PIAs and these students' belongingness to ESs, and gives the UT the opportunity to plan scenarios to develop the PIA that is least common around students and grow from a technological university to a more all-round university. In this study, the focus is mainly on the relationship between students' Entrepreneurial Identity Aspirations and these students' belongingness to an ES. Therefore, the following research question is formulated:

"Do students that belong to an Entrepreneurship Society (ES) have a higher degree of Entrepreneurial Identity than students that do not belong to an ES?"

To investigate the lead question of this research, the following methods have been leveraged. Firstly, a Systematic Literature Review (SLR) was conducted to provide a complete and coherent overview of the topic of PIAs and ESs. Secondly, quantitative data collection, in the shape of a Qualtrics survey, was done to confirm or invalidate the formulated hypothesis aimed at answering the lead research question. After the data is collected, several regression analyses and a bivariate Pearson Correlation will be conducted to test the relationships between the two variables 'Entrepreneurial Identity Aspirations' and 'ES belongingness'. All in all, with these data collection methods, I expect to provide a complete overview of the relationship between the two variables, and be able to answer the research question of this study.

## 2. THEORETICAL BACKGROUND

## 2.1 **Professional Identity Aspirations**

The PIAs of students of the University of Twente consists of several differing PIAs. It is of importance to understand what professional identity means, and what the PIAs are composed of. Professional identity is critical to a person's sense of self; it is about connecting with roles, responsibilities, values, and ethical standards unique to a specific profession (Goltz & Smith, 2014). The article also states that the professional identity may differ by profession, and that it is also about beliefs, attitudes and understandings about one's profession (Adams, Hean, Sturgis, & Clark, 2006). The aspirations that influence a person's professional identity are related to their personal beliefs and feelings; how they feel related to, or are attracted by, a specific profession. It is about their personal aspirations and what profession they see themselves carrying out in the near future. In this research, PIAs consist of three different components, which are Engineering Identity aspirations, Entrepreneurial Identity aspirations, and Technology Entrepreneur Identity aspirations.

#### 2.1.1 Engineering Identity Aspirations.

Engineering Identity is the personal meanings students develop from their experiences with engineering that shapes how students understand the profession, interpret the rules governing the profession, and the negotiation of fit with their interests, values, and beliefs (Watt, Maxey, Brackin, & Trachtenberg, 2019). Additionally, students' Engineering Identity is something they develop their entire life. This Engineering Identity is shaped by several factors, e.g. personal motivation or aspirations to become an engineer regarding their future job (Watt, Maxey, Brackin, & Trachtenberg, 2019).

In this study, to find out what PIAs students of the UT have, and whether they want to become either an entrepreneur, an engineer, or a combination of both (technology entrepreneur), this section of the ProComm Conference is very advantageous for this research and data collection, for the reason that it includes several questions regarding the Engineering Identity (Watt, Maxey, Brackin, & Trachtenberg, 2019). These relevant questions can be found in Appendix 1.1.

## 2.1.2 Entrepreneurial Identity Aspirations

An individuals' PIAs can have a major impact on a students' future and whether they become an entrepreneur. This section in the book "Entrepreneurship Theory and Practice, also states a relevant difference which should be taken in mind in my research. It describes the concept of "possible selves" as a counterpart to the current self, and describes possible selves as cognitive manifestations of enduring goals, aspirations, motives, fears, and threats (Farmer, Yao, & Kung-Mcintyre, 2011). These represent not what someone is but what he or she should become. The relevance of this knowledge is sufficient, as this study analyzes the possible selves of students of the UT, and whether they have the aspirations to become an engineer, entrepreneur, or a technology entrepreneur.

Additionally, as the research goal is to find out what professional identity aspirations students of the UT have, and whether they want to become an entrepreneur, an engineer, or a combination of both (technology entrepreneur). this section of the book "Entrepreneurship Theory and Practice" is very advantageous for this research and data collection, for the reason that it includes several questions regarding the Entrepreneurial Identity (Farmer, Yao, & Kung-Mcintyre, 2011). These relevant questions can be found in Appendix 1.2.

## 2.2 Entrepreneurship Societies

ESs have gained an important role on promoting entrepreneurship among students (Siivonen, Peura, Hytti, Kasanen, & Komulainen, The Construction and Regulation of Collective Entrepreneurial Identity in Student Entrepreneurship Societes, 2019). This section in the "International Journal of Entrepreneurial Behavior and Research" provided information about how ESs could influence students' PIAs. According to this, considerations has been made whether ESs on the University of Twente (UT), like Novel-T, might play an important role on the PIAs of students of the UT, and the UT's success in becoming the most entrepreneurial university in the Netherlands for the fourth time in a row. On the basis of this article, a question relevant for the research survey has been composed, which can be found in Appendix 1.3.

### 2.3 Systematic Literature Review

A systematic literature review is the review of a clearly formulated question, in this case the research question, and it uses systematic and precise methods to find, select, and critically review relevant research, and to collect and analyze data from the literature that are included in the SLR (Siddaway, 2017). A SLR is of high importance when you perform a research based on existing (scientific) literature, and is conducted to get a deeper reflection of existing literature and can be used as a comparison mechanism of what has been done and may still be missing.

The two questions guiding this systematic literature review could be described as 'what is known about Entrepreneurship Societies in relation to students' professional identity aspirations?' and 'what is known about the concept of professional identity aspirations?'.

#### 2.3.1 Search Strategy

For the search of literature, the database SCOPUS were employed. Additionally, Web of Science and Google Scholar have been used to find literature not showed in the database search. Web of Science and SCOPUS are article databases of the UT and provide a broad and in-depth exploration of articles among multiple journals and books. These databases of the UT have been used for the reason that they provide access to a large amount of articles and contain quality search filters to refine results.

Narrowing the search requires inclusion and exclusion and has been done by search for keywords in the title and filtering the search on the basis of document type, subject area, publication language and document type. The general inclusion criteria for this literature review are: documents/papers referring to the trait "Entrepreneurial Identity", "Engineering Identity", "Technology Entrepreneur Identity", and/or "professional identity aspirations" within their title, keywords or abstract. Secondly, keywords referring to identity and aspirations were added, since here lies the main focus of the literature review. The following keywords have been applied: 'identity', 'aspirations', and 'professional identity'. Thirdly, the publication language has been selected, including Dutch and English, for the reason that only these publication languages present relevant information that could be understand when carrying out this research. Next, the applicable subject areas have been selected, including Social Sciences, Psychology, Engineering, and Business, Management and Accounting, for the reason that only these fields of study (subject areas) are in line with the field and topic of this research. Finally, the document types have been selected, including Article, Book Chapter, Conference Paper and Book, for the reason that these document types could provide relevant and useful information for this research. Other inclusion criteria that could have been applied were source title and publication year. However, based on the limited amount of available research based on the five literature section criteria, the choice has been made to not apply these selection criteria.

#### 2.3.2 Practical Screen

A graphical representation of the practical screen can be found in in Figure 1 on the right. The initial search combining Entrepreneurial Identity, Engineer Identity and professional identity aspirations in Scopus resulted in 280 documents. After applying the second layer of personality traits, 67 documents remained. Next, the publication language got filtered, which reduced the document results to 62. Finally, 47 documents remained after applying the fourth layer of criteria, "subject areas".

After filtering for the for the applicable and relevant document types, 45 document results remained. It was found that a large amount of the document results came from health journals. Since this content is not relevant for this research, a sixth criteria were applied regarding sources. The following journals and books were used as criteria: 'International Journal of Entrepreneurial Behaviour and Research', 'International Journal of Entrepreneurship and Innovation', and 'Entrepreneurial Identity: The Process of Becoming an Entrepreneur'. This resulted in a total of 10 relevant papers. Out of these 10 documents, three were already provided by the UT to help during the starter phase of this research. Two of these three articles, the ones from Watt and Farmer, have been mentioned in Subchapter 2.1 of the "Theoretical Background".



Figure 1: Graphical Representation of the Practical Screen

### 2.3.3 Analysis of Articles

When performing an analysis of articles in a SLR, a certain structure is needed. According to Okoli and Schabram, it is the aim of a SLR to provide distinctive steps which ensure a complete and reasonable overview of the current state of the art (Okoli & Schabram, 2010). This includes several points of analysis, like the **status of current knowledge, the justification for new research**, and **quality description and criticism**. Next, these steps will be applied and provide an overview of the different outcomes. The articles found were considered in closer detail in order to be able to assess their relevancy and utility towards PIAs and ESs. To get an insight of the articles in closer detail, take a look at Appendix 2.

### 2.3.3.1 The Status of Current Knowledge

There is a high amount of variety between different professional identity aspirations (PIAs). In this study, three of them are of relevancy, namely Entrepreneurial Identity, Engineer Identity and Technology Entrepreneur Identity. As the purpose of this research is to determine what PIAs student of the UT have, and whether there is a relationship between these students' Entrepreneurial Identity and their belongingness to an ES, the structure of this research needs to be understood, and relevant information on how to determine students' PIAs needs to be acquired. All of the three articles of Farmer, Watt, and Chemers, were based on professional identity and professional identity aspirations, and contained knowledge on the analysis of a persons' or students' PIAs. It has been found that a persons' strength of Entrepreneurial Identity aspirations is influenced by their prior start-up experience, and the stronger their aspirations, the likelier it is that they show entrepreneurial behaviors (Farmer, Yao, & Kung-Mcintyre, 2011). What starts this whole relationship, is a persons' "Entrepreneur Role Congruence". This is characterized by a persons' perceptions of entrepreneur role characteristics and self-perceived characteristics. To determine these characteristics and the strength of Entrepreneurial Identity aspirations, several Entrepreneurial Identity Aspiration items have been composed (*see Appendix 1.2*). The current knowledge on Entrepreneurial Identity mention that to a possible self, if you desire identity to be an entrepreneur, this would potentially have powerful effects on your entrepreneurial activity, particularly at start-up phase.

Secondly, there is the current knowledge on Engineering Identity. Same as counts for the other PIAs, Engineering Identity is shaped by personal factors. A students' identification as an engineer is strongly influenced by their sense of belonging, motivation, and persistence to pursue a career in engineering (Watt, Maxey, Brackin, & Trachtenberg, 2019). To determine whether students' see themselves as engineers in general, the article of Watt provided this study with relevant questions on an Engineering identity scale (*see Appendix 1.1*).

Finally, there is the current knowledge on Entrepreneurship Societies. Despite of the fact that the current knowledge on ESs is very little, one article from the "International Journal of Entrepreneurial Behavior and Research" provided relevant and useful information. Where this whole research is connected with a students' Entrepreneurial Identity and, as mentioned before, a persons' desire to have the identity of being an entrepreneur has powerful effects on their entrepreneurial activity (e.g. start-ups), the influence of an ESs on a persons', or students', Entrepreneurial Identity could be significant. ESs provide the student with a sense of belongingness, and makes them feel part of a community of entrepreneurs. However, ESs should not only be seen as societies that inspire students to consider entrepreneurship as part of their future job, but also as societies that provide students with a network of contacts (Siivonen, Peura, Hytti, Kasanen, & Komulainen, The Construction and Regulation of Collective Entrepreneurial Identity in Student Entrepreneurship Societes, 2019).

#### 2.3.3.2 Justification for New Research

Whether ESs are correlated to the degree of Entrepreneurial Identity is yet a question that cannot be answered. Studies based on the relationship between a students' belonginess to an ES and their degree of Entrepreneurial Identity is a field of study that has not been examined before. Moreover, this study could provide the UT with a more in-depth view on their and the students' Entrepreneurial Identity (Aspirations) and the relationship between Entrepreneurial Identity Aspirations and ES belongingness. A paper that comes close and contains current knowledge on this aspect was the article in the "International Journal of Entrepreneurial Behavior and Research", which is shortly described in chapter 2.2. As mentioned, it has been found that a persons' strength of Entrepreneurial Identity Aspirations is influenced by their prior start-up experience, and the stronger their aspirations, the likelier it is that they show entrepreneurial behaviors. In this relationship, start-up experience is described as an important variable, which justifies the idea behind this study. ESs are all about guiding you through the phases of creating a business and a network. They offer coaching to the starting entrepreneurs to develop their business skills and think of next steps in realizing a successful business. This makes this study interesting; to see whether students that belong to an ES (Entrepreneurship Society) have a higher degree of Entrepreneurial Identity than students that do not belong to an ES.

#### 2.3.3.3 Quality Description and Criticism

When critically reviewing the quality of the articles found, one factor becomes distinct. The studies used during data collection all contain questions related to a persons' PIA, and in this case their Engineering Identity, Entrepreneurial Identity, or Technology Entrepreneur Identity. The researchers of these studies have never reflected on how the items for the questionnaires were selected. Also, the measurement is based on a self-completion test, which is considered not to be objective.

However, to be taken in consideration, Watt, Farmer and Chemers are professional and experienced researchers with a lot of advanced scientific research papers. Studies on their behalf are known for providing trustworthy knowledge on the case.

Respectively, critical points on the study of Entrepreneurial Identity in Student ESs are the lack of additional research to prove whether the knowledge is objective. Secondly, when data and methods are mentioned in the paper, no tables or graphs of analysis are given to support the statements. However, the paper is supported by many references of other experienced researchers.

## 2.4 Hypotheses

An ES is a business development platform designed to connect founders and investors. The goal of an ES is often to create a synergistic environment that maximizes networking, deal flow and engaging conversation (TES, 2020). ESs are meant to connect start-ups and young entrepreneurs to provide these young entrepreneurs with supervision and a network. Additionally, an ES gives the students a sense of commitment and makes them feel part of a collectivity/community. Students work together, which will mitigate the pressures of being entrepreneurial and taking charge of building your own life. ESs might come in handy for students, as to help them with the transition of moving from a student life filled with parties to a more serious life of working. Therefore, you should not only see ESs as societies that inspire students to consider entrepreneurship as part of their future job, but also as societies that provide students with a network of contacts (Siivonen, Peura, Hytti, Kasanen, & Komulainen, The Construction and Regulation of Collective Entrepreneurial Identity in Student Entrepreneurship Societies, 2019).

Based on personal experience at Novel-T, being part of an ES gives you the feeling that you are part of a group of entrepreneurial students, where you come up with ideas together and work together to an outcome, which will result in students having more Entrepreneurial Identity Aspirations. Additionally, if you make the choice of being part of an ES, you are most likely to already have a high degree of Entrepreneurial Identity Aspirations. Moreover, from personal experience at Novel-T, people work together and provide each other with a network of contacts. Such a network will eventually benefit you and helps you with developing your idea or innovation. Therefore, the following hypothesis is constructed:

"Students that belong to an ES (Entrepreneurship Society) have a higher degree of Entrepreneurial identity than students that do not belong to an ES."

## **3.** METHODOLOGY

## 3.1 Research Design

This study acquired its findings by using a Qualtrics survey. By using a quantitative data gathering method, in this case the Qualtrics survey, it was possible to reach a large audience and gather a high amount of respondents. The chosen quantitative method in this study is a self-completion survey, accessible via a URL link that forwards you to the survey. This method has been chosen for the reason that it is a good way to address a large and sufficient sample. Additionally, by letting respondents fill in a survey, you can research multiple variables at once. Other advantages regarding a survey contain: reduction of bias error and anonymity for the respondent, which could result in an increasing reliability of the response (Phellas, Bloch, & Seale, 2011). However, since one of the main concerns is to keep the survey short as you do not want to give the respondent the feeling it takes a lot of time, it is difficult to insert all the concepts that have to be tested. Therefore, a pre-test of the Qualtrics survey was done among students to check and evaluate where the survey could use some improvements. More information and results regarding the pre-test will be provided in chapter 3.6.

### **3.2 Population & Sampling**

The sample analyzed in this study was retrieved from students enrolled at the UT. Based on historical numbers and the growing rate of the UT, this university offers more than 10,000 students an education (UT, High Tech, Human Touch, 2016) (UT, Annual Reports University of Twente, 2018). Solely UT students have been included in the study, as it was concluded to only focus on the UT for the reason that students from the UT are easily accessible. Secondly, this study is based on the Entrepreneurial Identity of the UT, their students' PIAs, and these students' belongingness to an ES, which makes including students from other universities irrelevant for this study. The sampling method chosen in our research is a form of non-random sampling method, called convenience sampling.

#### 3.2.1 Convenience Sample

When acquiring participants for a research, two types of sampling methods can be used: random sampling and nonrandom sampling. In this study, a convenience sampling method has been used that constitutes non-random (non-probability) sampling. Convenience sampling does not contain that a sample of a fixed size is selected at random from a list, with all members of the population having the same probability of being selected, independently of all others. It actually contains the contrary; sample members are not being selected at random from the population but they are selected because it was convenient and they were easily accessible (Sedgwick, 2013). Therefore, not everyone in the population has an equal probability to take part, or being selected.

One often mentioned issue related to sampling is the presence of outliers. This is particularly the case for non-random, or non-probability sampling, of which convenience sampling is the most popular. The reason therefore is the high possibility of self-selection, which rules out any outliers. The effect of outliers is often analyzed to make the best possible estimates on the case and approach the true parameters of the population as precise as possible (Farrokhi & Mahmoudi-Hamidabad, 2012). These findings are also applicable to this study. There was a high amount of self-selection, and participants were selected for the reason that they were easily accessible. However, this does not negatively influence this research, as this study is not based on estimating the true parameters of the population, but only of students at the UT.

## **3.3 Data Collection**

The collection of data has been done by several distribution channels. First, personal contacts have been approached via direct messages and asked to fill in and forward the survey to their personal contacts as well. Among these contacts were students of the UT, members of student associations and UT based business associations like the DSIF. The purpose of this approach is to create a "snowball effect", where each respondent forwards the link to other students. By this, it was expected to reach a high amount of students, which would increase the convenience sample. The online survey has been created by using Qualtrics. Secondly, students have been approached via social media, and especially the DSIF Facebook page. During the data collection phase, several student and business associations were contacted, which are based at or near the UT. The DSIF positively responded to the request of distributing the survey on their social media network. Therefore, a personal and direct message has been created, including a link to the survey and the request to forward the message to fellow students. Thirdly, prof.dr.ir P.C de Weerd - Nederhof and K. Sigurdsson have been contacted, and they distributed the same direct message, including the link, to their students of the 4th module. Finally, a request to fill in and share the survey was posted on LinkedIn and has been shared by prof.dr.ir P.C de Weerd - Nederhof. By this, it was expected to reach a high amount of student which would increase the convenience sample. Some bias is involved in the convenience sample, since direct friends and class mates are more likely to respond on the request.

## 3.4 Common Method Bias

One of the main sources of reach error has been considered to be the common method variance bias, mainly for the reason that it threatens to interfere with the causality amongst constructs which result in the possibility of manipulating interpretations (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). When collecting data via a survey, there is always the risk of bias by self-reported data. Therefore, self-reported data must always be handled with care in regard to common method variance bias (Chen, Reilly, & Lynn, 2005) (Podsakoff & Organ, Self-reports in Organizational Research: Problems and Prospects, 1986). However, in this case the variables regarding PIAs and ES belongingness, among other variables, are strictly personal and can only be self-reported. Indicating the fact that all the reported data remained private, there would be no reason for students to report false or biased data.

### 3.5 **Operationalization**

In total, the survey contained 9 blocks with together 32 questions; 17 measuring the main concepts, as well as 15 additional questions for control and information purposes, including aspects of gender, type of study, and consent (*see Appendix 3*)

Based on the reliability and validity of previous research by Watt, Farmer and Chemers, qualitative well-formed measurement scales/questions have been selected for the measurement of the main concepts: Entrepreneurial Identity, Engineer Identity and Technology Entrepreneur Identity. These questions, which can be found in Appendix 1, measured the students' PIAs from different points of view. Like, whether students see themselves becoming one of the identities (entrepreneur, engineer or technology entrepreneur); what students think about the identity and whether this would fit them well; whether they think of themselves as an engineer, entrepreneur or technology entrepreneur.

3.5.1 Control Variables

To control the outcomes for possible cause and effect, the relations will be controlled for nationality, gender, study direction, degree level, the three PIAs, and students' belongingness to an ES. Of these number of variables, the Entrepreneurial Identity aspirations of a student and a students' belongingness to an ES are of highest importance, as these need to validate the purpose of the study. Since the unit of analysis in this research is UT students, a variable for being a UT student needed to be included. Anyone who was not currently studying at the UT would then be excluded from the data analysis.

## 3.6 Pre-test

Before the data collection starts to the initial sample, a pre-test is considered an important step to make sure the survey is of high quality. A pre-test is the running of your survey through a series of tests to check for potential problems (Vannette, 2018). Following this principle, the pre-test of the survey was conducted after the creation of the survey and before the data collection started to its fullest extent. The first run, or pre-test of the survey, was considered valuable, as it helped to improve several aspects of the survey. The pre-test helped to provide feedback and gave the opportunity to improve parts of the survey where necessary, based on the given feedback on any ambiguities. Additionally, a pre-test ensures that the distribution and data collection of the survey is working without technical errors.

For the pre-test, 4 students of the University of Twente have been asked to fill in the survey and hand back their feedback. The entire survey was tested in the exact format as it would have been distributed to the convenience sample. The style of pre-testing chosen was a "pilot studies", and this means that the final version of the survey has been tested on a small sample of the target population of this study, which enhanced a sense of the kind of responses that will be received and issues that might arise during the official survey period. When performing a "pilot studies" pretest, several evaluative questions should be added to the survey. The feedback from the test sample can be found in Table 1 below.

**Table 1: Feedback and Adaptions** 

Feedback	Adaption
The concept of Entrepreneurship Society could be better explained in order to give a proper answer. Right now, I was doubting what the definition was.	A clear definition of Entrepreneurship Societies has been given before the questions regarding "ES belongingness". Additionally, some examples have been given to make the description clearer. For an overview of the full definition, see Appendix 3.7.
Perhaps a short introduction of the professional identity aspirations would help. I might have answered differently to the first entrepreneur questions if I knew that questions about technology entrepreneur would come.	A short notice has been implemented before the section regarding PIAs, mentioning where the next couple of questions are about, and what PIAs will be questioned. For an overview of the full notice, see Appendix 3.3.

## 4. DATA ANALYSIS

## 4.1 Preliminary Data Analysis

Initially, 56 (N=56) respondents replied on the survey. The online survey was publicly accessible through social media and close network contacts for precisely one month, from May 11th till June 11th. Several respondents did not meet the inclusion criteria, as they were not students of the University of Twente or had not answered all of the questions. Therefore, the final sample consisted of 48 students, indicating a total drop-off rate of 14.3%.

The initial descriptive statistics showed that the final sample consists of 34 males (70.8%) and 14 females (29.2%), of which 6 were master students (12.5%) and 42 were bachelor students (87.5%). Furthermore, 19 students (39.6%) are enrolled in a study in the direction of Social Sciences and Humanities (SSH), while 29 students (60.4%) are enrolled in a study in the direction of Mathematics, Informatics, Natural Sciences, Technology (MINT).

From this can be concluded that the majority of the students that responded are male. Only a small percentage of the students is studying for their Master, while the majority of the students responded study for their bachelor's degree. Moreover, more than half of the students are enrolled in a MINT related study, which can be contributed to the fact that the UT is from origin a technical university.

Two other demographics relevant for this study are nationality and age. The analyzed data shows that the majority of the students are Dutch (79.2%), followed by German (6.3%). The remainder of the sample were all international from varying countries like Italy, Greece, United Kingdom, Bulgaria, New Zealand and Poland. The age of the students that responded was on average 21.08 years, with a minimum of 18, a maximum of 23, and a SD of 1.235. A minimum age under the 18 was in this research almost not possible, as 18 is the average minimum age to start at a university in the Netherlands (Mandos, 2018).

Other characteristics show that 27.1% of the respondents already start or is in the process of starting an entrepreneurial venture. Moreover, 12.5% of the respondents are part of, or work with, an ES, from which the most mentioned ES is Novel-T. An overview of the statistics on the basis of frequency tables is given in Appendix 4.

## 4.2 Statistical Analysis

The hypothesis of this research only concerns one model. This model is concerned with solely the relation between students' belongingness to an ES and their degree of Entrepreneurial Identity. For the concept of Entrepreneurial Identity, the variable 'EntID Total' has been used to correlate against the variable 'ES Belongingness'. The variable regarding ES belongingness was answered with a yes, which is a '1' within the data analysis, or a no, which is a '2' within the data analysis. For the variable regarding Entrepreneurial Identity Aspirations ('EntID Total'), six questions have been asked to the respondents which could be answered on a 5-scale from '1', which is labelled as 'Strongly Agree', to a '5', which is labelled as 'Strongly Disagree'. The lower the score of EntID\_Total of the respondents, the stronger the students' Entrepreneurial Identity Aspirations are. To be able to write conclusions at the end regarding how strong a students' Entrepreneurial Identity Aspirations are, the mean sum score of the variable 'EntID Total were calculated and then divided into three categories: "Strong Entrepreneurial Identity Aspirations", "Medium Entrepreneurial Identity Aspirations", and "Weak Entrepreneurial Identity Aspirations. This division of strength in Entrepreneurial Identity Aspirations would simplify the analysis and the conclusions at the end of the research, so these three

categories could be seen as exploratory factors for the analysis and results. Based on the six questions asked related to Entrepreneurial Identity, and the option of answering from 1 to 5 (strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, and strongly disagree), where 1 is strongly agree and 5 is strongly disagree, the answers were formatted into the three categories. Where a respondent scored between 1-12, where a score below 6 is not possible, he or she was labelled as a student with strong Entrepreneurial Identity Aspirations. A score between 12-18 was labelled as medium Entrepreneurial Identity Aspirations, and finally, a score between 19-30 was labelled as weak Entrepreneurial Identity Aspirations. The applicable analysis for this Model is a standard simple regression analysis. Following from this analysis, a bivariate Pearson correlation number has been given which describes how well the degree of Entrepreneurial Identity can be predicted from a students' belongingness to an ES (Pallant, 2005) (Celine, 2013). Additionally, a Model Summary including the correlation value and the Adjusted R Square, and an ANOVA table have been given to elaborate more on the relationship, or correlation, between the two variables.

## 4.3 Assumptions

Prior to the analyses, certain statistical assumptions and conditions were made and checked to see whether they have been met. When you fit lines to data, it only requires a check for violation of the assumptions of linearity and Homoscedasticity, also referred to as equal variance assumption. Of course, to check the relationship on linearity, the quantitative data condition needs to be met. When making inferences about the data and the coefficients of the line, more assumptions have to be met, which are the independence assumption and the normal population assumption, and conditions regarding sample size (De Veaux, Velleman, & Bock, 2016). When performing a regression analysis, the sample size of the regression should include at least 10 observations per independent variable (Maxwell, 2000). As in this study the sample size consists of 48 valid samples, the sample size condition is met for the regression analysis.

#### 4.3.1 Linearity of the Model

For this model, it is difficult to prove the assumptions of linearity between 'EntID Total ' and 'ES Belongingness'. The reason therefore is that the variable 'ES belongingness' is a dichotomous variable (yes/no), or binary categorical variable, with two possible values (1 = yes and 2 = no). So, before the model will be tested for linearity, this error in analysis needs to be avoided by creating dummy variables, which are created to assign numerical value to levels of categorical variables (University of 2014). The Southampton. new dummv variable 'ES Belongingness Dummy Variable' still contains two values. However, '0' is now labelled as 'yes', and '1' is now labelled as 'no'.

From Figure 2 on the right can be noticed that there is a relationship between the two variables 'EntID\_Total' and 'ES\_Belongingness", as most of the students who score high on Entrepreneurial Identity questions, which means a low degree of Entrepreneurial Identity, do not belong to an ES. In contrast, some of the students who score relatively low on the questions regarding Entrepreneurial Identity, Aspirations, which means a high degree of Entrepreneurial Identity, belong to an ES. Of the students that take part within an ES, five of them have strong Entrepreneurial Identity Aspirations (2x6; 2x7; 1x9), and one these students has medium Entrepreneurial Identity Aspirations as he scored 14 on the questions relating Entrepreneurial Identity as that people that belong to an ES, are most likely to have strong Entrepreneurial

Identity Aspirations. Of course, there are still students with strong or medium-strong Entrepreneurial Identity Aspirations that do not belong to an ES, but from the data analysis in this study can be determined that when a student belongs to an ES, he or she has strong or medium-strong Entrepreneurial Identity Aspirations.



Figure 2: Scatterplot EntID\_Total - ES Belongingness

From Table 2 can be seen that the Correlation between the two variables has a value of r = .503. If the value would be near 1, then it is said to be a perfect correlation. If the coefficient value (r) lies between  $\pm$  0.50 and  $\pm$  1, then it is said to be a strong correlation (Statistics Solutions, 2020). Where the coefficient value in this relationship between the two variables is r = 0.503, there can be indicated that there is a strong relationship between the two variables.

#### Table 2: Correlation EntID\_Total - ES Belongingness

ES\_Belongingness EntID\_Total

ES Belongingness	Correlation	1	.503
EntID_Total	Correlation	.503	1

Overall, we it can be assumed that there is linearity and a strong correlation between the two variables within this model.

#### 4.3.2 Method of Testing Final Assumptions

When analyzing the collected data of our respondents in SPSS, there is a way to test the final four assumptions in one linear regression analysis. Respectively, the four assumptions are: the OLS Assumption, Homoscedasticity, Independence Assumption, and Normality Assumption. The way this has been done is by performing a linear regression analysis with the dependent and all the independent variables.

- To test the first assumption of Homoscedasticity, the "residual" and "predicted value" variable of the regression analysis between the dependent and independent variables will be used. Additionally, the residuals (Y) will be plotted against the predicted values (X). From this can be noticed whether for a value of X, the predicted value Y is increasing.
- To test the second assumption regarding OLS contains that the expected mean error of the regression model is zero. Therefore, you have to save the unstandardized residuals

and predicted values. Eventually, when these two new variables are saved, it is possible to check whether the sum of the residuals is zero.

- Thirdly, a test regarding the Independence Assumption (no 3) autocorrelation) has been done. Autocorrelation can be defined as the degree of correlation between the values of the same variables across different observations in the data (Statistics Solutions, 2020). The Independence Assumption contains the matter that the errors in the true underlying regression model must be independent of each other, but as usual, there is no way to be certain that the Independence Assumption is true. An option to test the Independence Assumption is a Durbin-Watson analysis. However, here it is relevant to know whether you deal with cross sectional data or panel data. Cross sectional data is collected at a particular time, where panel data is collected over a period of time (Polachek & McCutcheon, 1983). In this study, as the data collection period was 1 month, there is panel data. Therefore, it is allowed to perform a Durbin-Watson analysis on the data.
- Finally, for the Normality Assumption, a normal probability plot is plotted to test whether there are any major outliers within the residuals.

#### 4.3.3 Homoscedasticity of the Model

To test the Model on Homoscedasticity, the predicted value and the residual value will be used. The residuals, in this case Y, will be plotted against the predicted values, in this case X. From this, it is possible to determine whether the variance of the errors is constant. So, the idea behind Homoscedasticity is that the residuals value does not increase with increasing values of independent variables. However, before tests can be run for the Model, a new variable had to be computed as the squares of the residuals are needed here. This variable has been labelled as 'sqres'.

To test the Homoscedasticity of the Model, a linear regression analysis has been performed. The results provided an ANOVA table from which the Homoscedasticity between the variables can be determined. If there would be Homoscedasticity, the Pvalue, or Sig., should be higher than 0.05 (Research HUB, 2019).

#### Table 3: ANOVA Table Results Model 1

P-value (Sig.)

Regression	.141
When the ANOVA table in Tab	ble 3 is being checked, there can
be clearly noticed that the P-va	lue, or Sig., is higher than 0.05
(141 > 0.05) Therefore the	null hypothesis (He) can be

be clearly noticed that the P-value, or Sig., is higher than 0.05 (.141 > 0.05). Therefore, the null hypothesis (H<sub>0</sub>) can be supported, and there can be assumed that there is Homoscedasticity between the variables in this Model.

#### 4.3.4 Ordinary Least Squares (OLS) Assumption

To test whether the mean error of the residuals was zero for this Model, the SPSS file has been exported to Excel (*see Appendix* 4). After all the residuals of the 48 respondents were selected, the sum described that the mean error of all the residuals was zero. Therefore, the OLS Assumption has been proven for this Model.

#### 4.3.5 Independence Assumption

The Independence Assumption contains the matter that the errors in the true underlying regression model must be independent of each other. In this study, as the collected data is panel data, the Durbin-Watson Statistic is being used, which is a test for autocorrelation in the residuals from a regression analysis (Kenton, 2019). The value of the Durbin-Watson statistic will always be between 0 and 4.

- Value from 0 to less than 2: Positive autocorrelation
- Value of 2.0: No autocorrelation detected in the sample
- Value from 2 to 4: Negative autocorrelation

## Table 4: Durbin-Watson Value Model 1

Model	Durbin-Watson		
1	2.265		

Table 4 contains a Durbin-Watson value of 2.265. This value is above 2.0, which indicates there is a negative autocorrelation. However, the Durbin-Watson value is close to 2.0, and therefore there is no problem with autocorrelation (Kenton, 2019).

#### 4.3.6 Normality Assumption

The Test of Normality in Table 5 shows a P-value of 0.200 for the Kolmogorov-Smirnov test, and a P-value of 0.400 for the Shapiro-Wilk test. As both values are higher than 0.05 (.200 > 0.05 & .400 > 0.05), the null hypothesis can be supported. This means there can be assumed that the data is normal.

#### **Table 5: Test of Normality Model 1**

	Kolmogorov- Smirnov	Shapiro-Wilk
	Sig.	Sig.
Jnstandardized Residual	.200	.400

# 4.3.7 Overview of the Results after Assumption Testing

For the reason that is has been proven that there are no problems with the assumptions of this model (*see Table 6*), further data analysis can be continued and results can be given.

#### Table 6: Overview of the Assumption Testing Results

	Model
Linearity	$\checkmark$
Homoscedasticity	$\checkmark$
OLS	$\checkmark$
Independence	$\checkmark$
Normality	$\checkmark$

## 5. **RESULTS**

## 5.1 The Relationship Between 'Entrepreneurial Identity Aspirations' and 'ES Belongingness'

The findings of this research include the hypothesis regarding the main research question. Additionally, some elaboration will be given on several control variables, and what these control variables' relationship is with students' Entrepreneurial Identity Aspirations.

The research question of this study is constructed around the relationship between Entrepreneurial Identity Aspirations of students at the UT and these students' belongingness to an ES. The hypothesis is tested by the means of a simple linear regression analysis.

#### H1: "Students that belong to an ES (Entrepreneurship Society) have a higher degree of Entrepreneurial identity than students that do not belong to an ES."

The results of the regression analysis for the hypothesis in Table 7 indicate a statistically significant relationship between the dependent variable 'Entrepreneurial Identity Aspirations' and the independent variable 'ES Belongingness' (F = 15.545, P = .000).

 Table 7: ANOVA Table Model 1

Model	F		Sig.	
1	Regression	15.545	.000	

This indicates that there is indeed a relationship between the predictor variable 'ES Belongingness' and the outcome variable 'Entrepreneurial Identity Aspirations'.

In the Model Summary (*see Table 8*) it can be noticed that the Adjusted R Square of this Model has a value of .236. This indicates that 23.6% of the variance in the dependent variable 'Entrepreneurial Identity Aspirations' can be explained by the independent variable 'ES Belongingness'.

Table 8: Model 1 Summary

Model	r	Adjusted R Square
1	.503	.236
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Moreover, the correlation value (r) within Table 8 indicates that there is a strong relationship between 'Entrepreneurial Identity Aspirations' and 'ES Belongingness'. Most of the students who score high on Entrepreneurial Identity questions, which means a low degree of Entrepreneurial Identity, do not belong to an ES. In contrast, some of the students who score relatively low on the questions regarding Entrepreneurial Identity Aspirations, which means a high degree of Entrepreneurial Identity, belong to an ES. From this can be determined that students that belong to an ES have strong or medium-strong Entrepreneurial Identity Aspirations. Of course, there are still students with strong or medium-strong Entrepreneurial Identity Aspirations that do not belong to an ES, but from the data analysis in this study can be determined that when a student belongs to an ES, he or she has strong or medium-strong Entrepreneurial Identity Aspirations. So, based on the findings, there is enough evidence to support the hypothesis. H1 will be supported.

#### 5.2 Control Variables

There are two variables that deserve some more attention in this study regarding their relationship with the Entrepreneurial Identity Aspirations of students of the UT. These variables are 'gender' and 'study direction'. The reason that these variables have been chosen for further interest is that results of their relationship could be of theoretical interest for the UT, as this provides the UT with more knowledge towards which gender is more likely to have higher Entrepreneurial Identity Aspirations and which study direction do students chose when they are having strong Entrepreneurial Identity Aspirations.

#### 5.2.1 Gender

Before the relationship between 'Gender' and 'Entrepreneurial Identity Aspirations' has been tested, the variable 'Gender' has been recoded into a Dummy Variable for the reason that the variable was categorical.

From figure 3 can be noticed that there is indeed a correlation between the two variables. Male students from the UT appear to have overall stronger Entrepreneurial Identity Aspirations than female student from the UT.



Figure 3: Scatterplot EntID\_Total - Gender

Moreover, from Table 9 can be noticed that the correlation between the two variables is r = .570, which indicates a strong relationship. The negative Adjusted R Square of .310 indicates that 31% of the variance in the dependent variable 'Entrepreneurial Identity Aspirations' can be explained by the independent variable 'ES Belongingness'.

Table 9: Model Summary EntID_Total - Gender				
Model	r	Adjusted I Square		
1	.570	.310		

Based on the findings can be determined that the variable 'Gender' does have a strong relationship with the variable 'Entrepreneurial Identity Aspirations. This is in line with scientific research regarding female and male entrepreneurs. According to research of woman-owned businesses by American Express, woman-owned businesses only represent 4.6% of all firms, and woman own 4 out of 10 businesses in the U.S. (American Express, 2018). This can be supported by personal experience from Novel-T, where the majority of the young entrepreneurs were male.

#### 5.2.2 Study Direction

Before the relationship between 'Study Direction' and 'Entrepreneurial identity Aspirations' has been tested, the variable 'Study Direction' has been recoded into a Dummy Variable as the variable was categorical.



Figure 4: Correlation EntID\_Total - Study Direction

From figure 4 can be noticed that there is correlation between the two variables, however, it appears to be weak. Students with strong or medium-strong Entrepreneurial Identity Aspirations appear to choose more often for a study in the direction of Social Sciences and Humanities (SSH) than a study in the direction of Mathematics, Informatics, Natural Sciences & Technology (MINT), as the linear line and the R<sub>2</sub> Linear indicate.

Moreover, from Table 10 can be noticed that the correlation between the two variables 'Entrepreneurial Identity Aspirations' and 'Study Direction' is r = .099. This indicates a weak relationship between the two variables. The negative Adjusted R Square of -.012 means insignificance of the explanatory variable. However, the results might chance, or be improved, with the increase in sample size.

#### Table 10: Model Summary EntID\_Total - Study Direction

Model	r	Adjusted R Square
1	.099	102

Based on the findings can be determined that the variable 'Study Direction' does have a weak relationship with the variable 'Entrepreneurial Identity Aspirations.

#### 6. **DISCUSSION**

## 6.1 Key Findings of Hypothesis Testing

The central goal of this research was to explore the relationship between the Entrepreneurial Identity Aspirations of students from the UT and their belongingness. Additionally, relationships have been explored between Entrepreneurial Identity Aspirations and gender, and between Entrepreneurial Identity Aspirations and study direction. Overall, the hypothesis was supported and further relationships between Entrepreneurial Identity Aspirations and the two control variables have been confirmed. The following section aims at explaining these results by linking it to general knowledge and existing literature.

Based on the hypothesis, it can be stated that there is a relationship between Entrepreneurial Identity Aspirations and ES belongingness. It was already expected that students that are part of an ES like Novel-T or DSIF, have overall strong Entrepreneurial Identity Aspirations. Being part of an ES develops your aspirations towards Entrepreneurship even more, as these ESs often have supervisors that inspire students with networks and accompany them in their journal of their business (Siivonen, Peura, Hytti, Kasanen, & Komulainen, The Construction and Regulation of Collective Entrepreneurial Identity in Student Entrepreneurship Societes, 2019). From the results can be determined that the relationship between the two variables is very strong. Therefore, it can be told that students of the UT that belong to an ES, have a higher degree of Entrepreneurial Identity than most students that do not belong to an ES.

Research also shows Entrepreneurial Identity Aspirations to have a relationship with respectively gender and study direction. In this study, male students are argued to often possess stronger Entrepreneurial Identity Aspirations than female students. This is in line with the scientific study that there are more male than female entrepreneurs (American Express, 2018).

As already expected, students that follow a study in the direction of SSH possess stronger Entrepreneurial Identity Aspirations that students that follow a study in the direction of MINT. The obvious reason for this is that SSH is the study direction students will choose when they have more Entrepreneurial Identity Aspirations, where MINT is the study direction students will choose when they have more Engineering Identity Aspirations.

## 6.2 **Theoretical Implications**

The current study has been able to make several theoretical implications. The findings of the current research are important to the field of entrepreneurship. It explains the relationship between Entrepreneurial Identity Aspirations and ES belongingness, which describes how important ESs can be for students and young entrepreneurs regarding their personal development but also in proving them with the knowledge and practical experience to begin and/or run their own business. Besides that, it explains the influence gender and study direction can have on a student's Entrepreneurial Identity Aspirations, and it supports the scientific studies and general thoughts of males having stronger Entrepreneurial Identity Aspirations than females.

In more practical sense, the results of this study should be taken into consideration by the UT, other universities, ESs, and maybe even high schools to reach children that already have strong Entrepreneurial Identity Aspirations and help them developing their knowledge and experience on a young age. Awareness among universities is essential, especially because of the impact ESs belongingness might have on a students' life, as it can bring them lots of opportunities, knowledge, experience, networks, and maybe even a successful business. By being aware of this study and the relationships explored, universities can act more promptly towards of how much value being part of an ES can be for young entrepreneurs.

#### 6.3 Limitations & Future Research

This research, like any other research, is not without its limitations. This section will describe the main limitations and argue for improvements for future research.

First, it was not possible to continue with the original sampling method of an SRS. After composing an SRS Plan, annual reports and faculty numbers of the UT have been checked. However, within these documents, there were no percentages of male and female students on the UT but only a percentage of gender division of the alumni of the UT. Additionally, it was contacted that there were no documents available that would be able to provide this information.

Secondly, concerning the small valid sample size of 48 students, future research should contain more student samples. This would make it possible to provide more detailed results on this study.

Finally, this study has only been done on student samples from the UT. Although these students were the unit of analysis in this study, and the group offers a relatively homogenous group, the generalizability of the results is questionable. Researching students from other universities, instead of the technical university of Twente, might generate different results.

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## **APPENDIX**

## 1. Survey Questions

#### 1.1 Engineering Identity Aspirations

- In general, being an engineer is an important part of my selfimage.
- 2) I have a strong sense of belonging to the community of engineers.
- 3) I have come to think of myself as an engineer.

## 1.2 Entrepreneur Identity Aspirations

- 1) I often think about becoming an entrepreneur.
- 2) I would like to see myself as an entrepreneur.
- 3) Becoming an entrepreneur would be an important part of who I am.
- 4) When I think about it, the term "entrepreneur" would fit me pretty well.
- 5) I am always thinking about becoming an entrepreneur.
- 6) It is important for me to express my entrepreneurial aspirations.

## 2. SLR

## 1.3 ES Belongingness

 "Are you part of, or do you work with an Entrepreneurship Society (ES) on the UTwente? And if so, which society is this?"

## 1.4 Technology Entrepreneur Identity Aspirations

- 1) I often think about becoming a technology entrepreneur.
- 2) Becoming a technology entrepreneur would be an important part of who I am.
- When I think about it, the term "technology entrepreneur" would fit my aspirations pretty well.
- 4) I am always thinking about becoming a technology entrepreneur.
- 5) It is important for me to express my technology-based entrepreneurial aspirations.

Authors	Article Title	Year Published	Addressed Issues	Problem Statement/ Research Goal	Methodological Philosophy	Findings
Chemers, M.M.; Zurbriggen, E.L.; Syed, M.; Goza, B.K.; Bearmen, S.	The Role of Efficacy and Identity in Science Career Commitment Among Underrepresented Minority Students	2011	The influence of science support experiences on commitment to science identity	What is the role of efficacy and identity in science career commitment	Quantitative	Several questions relevant to my research and data collection method; can be found in Appendix 1.4
Farmer, S.M.; Yao, X.; Kung- Mcintyre, K.	The Behavioral Impact of Entrepreneur Identity Aspiration and Prior Entrepreneurial Experience	2009	The impact of an individual's aspiration to become an entrepreneur on engagement in nascent or gestational entrepreneurial activities	What impels some - but not others- towards entrepreneurial action and keeps them going	Quantitative	Several questions relevant to my research and data collection method; can be found in Appendix 1.2
Watt, A.; Maxey, K.; Trachtenberg, J.; Brackin, P.	Engineering Identity Formation and Communication in a Digital Age	2019	Investigation of what today's students think about communication's role in an engineer career, and about related aspects of their engineering identity	What do nowadays students think of communication's role in an engineer career, and what describes their engineering identity best	Quantitative	Several questions relevant to my research and data collection method; can be found in Appendix 1.1
Gruber, M.; MacMillan, I.C.	Entrepreneurial Behavior: A Reconceptualization and Extension Based on Identity Theory	2017	Proposes a reconceptualization that emphasizes the "identity relevance" of entrepreneurial behaviors, and views founders as behaving in ways that deem appropriate	Measuring entrepreneurial behavior with identity theory, and wat contains identity theory	Quantitative	Identity theory admits a much broader perspective on entrepreneurial behavior. Entrepreneurial behaviors are considered to be identity relevant
Yitshaki, R.; Kropp, F.	Entrepreneurial Passions and Identities in Different Contexts: A Comparison between	2016	Examination of entrepreneurial passion and components of entrepreneurial identity in two different	Explore what the relationship is between passion and identities in two different contexts, high-tech	Qualitative (interviews with 45 high-tech entrepreneurs	Passion is a dynamic motivational construct that is associated with entrepreneurs' self- concept of their role

	High-tech and Social Entrepreneurs		contexts, high-tech and social entrepreneurship	entrepreneurship and social entrepreneurship	and social entrepreneurs)	identities. The interrelations between entrepreneurial passion and self- concepts of role identities are perceived differently among entrepreneurs who operate in different contexts.
Wang, W.T.; Lai, W.Y.; Lu, C.T.	Learning from Others Via Team Conflicts: Exploring the Impact of Individual Entrepreneurial Characteristics on the Construction of Entrepreneurial Identity	2019	Challenges remain if entrepreneurship educators try to understand the dynamics behind the formation of an individual entrepreneurial identity	Explore the relationship between individual entrepreneurial characteristics, interpersonal conflicts and the construction of an individual entrepreneurial identity	Quantitative	Individuals' entrepreneurial identity is a potentially, rather than a fixed personal trait, that can change over time. Additionally, the formation of and variation in individual entrepreneurial identities can be influenced by educational efforts devoted to entrepreneurship learners in a learning-by-doing team-based educational setting, dependent on interactions between individuals' entrepreneurial characteristics and their experience with conflict resolution
Jones, R.; Latham, J.; Betta, M.	Narrative Construction of the Social Entrepreneurial Identity	2007	Examines the process by which the social entrepreneurial identity can be constructed through narrative, concentrating specifically on the construction of the identity of the ideologically inclined social-activist entrepreneur	How does the identity construction work through the process of "positioning through divisioning"; and what is the narrative construction of identity	Qualitative (in the form of interviews)	The social entrepreneur constructs his identity through crafted divisions based on oppositional and appositional principles of setting apart and bringing together (a claim of similarity).
Siivonen, P.V.; Peura, K.; Hytti, U.; Kasanen, K.; Komulainen, K.	The Construction and Regulation of Collective Entrepreneurial Identity in Student Entrepreneurship Societies	2019	Provides a critical investigation of how collective identity is constructed and regulated by board members and other active members of student entrepreneurship societies (ESs)	Identify how collective identity is constructed and regulated by board members and other active members of student ESs	Qualitative (in the form of interviews with 18 board members and other active members of two ESs affiliated with two universities located in different regions of Finland)	An Entrepreneurship Society (ES) gives the students a sense of commitment and makes them feel part of a collectivity/communi ty. Students work together, which will mitigate the pressures of being entrepreneurial and taking charge of building your own life. ESs might come

						in handy for students, as to help them with the transition of moving from a student life filled with parties to a more serious life of working. Therefore, you should not only see ESs as societies that inspire students to consider entrepreneurship as part of their future job, but also as societies that provide students with networks/contacts
Werthes, D.; Mauer, R.; Brettel, M.	Cultural and Creative Entrepreneurs: Understanding the Role of Entrepreneurial Identity	2017	Provides an overview of the research in the (development of) entrepreneurial identity of entrepreneurs in the cultural and creative industries	Explore whether and how entrepreneurs in the cultural and creative industries develop an entrepreneurial identity	Qualitative (longitudinal multiple case study analysis with a process approach; explores eight entrepreneurs from norther Germany, all located in the same city	Cultural and creative entrepreneurs do develop an entrepreneurial identity and incorporate their cultural and creative identity into that entrepreneurial identity whereas self- reflection, communication with other entrepreneurs and entrepreneurial experience are the main drivers in the identity development
Chasserio, S.; Pailot, P.; Poroli, C.	When Entrepreneurial Identity meets Multiple Social Identities	2014	Provides an overview of the research in the multiple social identities of Woman Entrepreneurs (WE)	Explore how WE do identity work in relation to specific identity regulations. How is the entrepreneurial identity process of women built through both confrontation and synergy with other social identities	Qualitative (in the form of interviews with 41 French WE)	WE are able to deal with numerous and various identities. Entrepreneurial identity of these WE can be enriched by their social experiences

## 3. Qualtrics Survey Items

## 3.1 Information and Consent

Information and Consent

Block Options ∨

TITLE OF STUDY Entrepreneurial Identity



Consent

## PRINCIPAL INVESTIGATOR

Rico Wensink Bachelor Student IBA +316 40271817 r.j.wensink@student.utwente.nl

## PURPOSE OF STUDY

You are being asked to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. The purpose of this study is to identify to what degree students aspire to become entrepreneurs or have other professional identity aspirations

### STUDY PROCEDURES

Survey

#### RISKS

None. You may decline to answer any or all questions and you may terminate your involvement at any time if you choose.

#### BENEFITS

For participants: helps with understanding entrepreneurial Identity for the scientific community: helps to understand entrepreneurial identity

#### CONFIDENTIALITY

Your responses to this survey will be anonymous. Please do not write any identifying information on your survey. We assign code names/numbers for participants. Keeping notes, interview transcriptions, and any other identifying participant information on a secure drive in the personal possession of the researcher.

#### COMPENSATION

None

#### CONTACT INFORMATION

If you have questions at any time about this study, or you experience adverse effects as the result of participating in this study, you may contact the researcher whose contact information is provided on the first page. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with the Primary Investigator, please contact the University Twente Ethics Committee.

#### VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

	Taking part in the study
	I have read and understood the study information, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.
	<ul> <li>Yes</li> <li>No</li> </ul>
Q11 \$	I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason. Yes No
Q12	I understand that taking part in the study involves taking part in a survey. Selected participants may be invited to an interview with audio recording. Audio will be destroyed, anonymous transcripts will be saved. Yes No
Q13	I understand that information I provide will be used for research and class room discussion. Yes No
Q14	I understand that personal information collected about me that can identify me, such as [e.g. my name or where I live], will not be shared. Yes No

## 3.2 Demographics

▼ Den	nographics	Block Options
age	How old are you (in years)?	
gender	<ul> <li>What is your gender?</li> <li>Male</li> <li>Female</li> <li>Other or prefer not to say</li> </ul>	
nationality	What is your nationality?	
Q24	Do you study at the University of Twente? <ul> <li>Yes</li> <li>No</li> </ul>	
study	What is your study?	

direction	<ul> <li>Which of these options describe your study direction best?</li> <li>Social Sciences and Humanities</li> <li>Mathematics, Informatics, Natural Sciences, Technology (MINGT)</li> </ul>
degree	What is the degree level that you currently work on? <ul> <li>Bachelor</li> <li>Master</li> </ul>
ent_experi	Did you already start or are you in the process of starting an entrepreneurial venture? Yes No

3.3 Information Note PIAs

Block 9 Block Options ~

In the next couple of questions, you will be asked how you think about yourself and your professional identity aspirations. The first questions are about your 'Entrepreneur' identity aspirations, the second list of questions are about your 'Engineering' identity aspirations, and the third list of questions are about your 'Technology Entrepreneur' identity aspirations.

## 3.4 Entrepreneur Identity Aspirations

✓ Entrepreneur identity aspiration

Block Options 🗸

# Q1

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The following questions ask how you think about yourself and your future professional identity aspirations. We want to understand how much you think that becoming an entrepreneur is part of who you are. Note that there are no right or wrong answers.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I often think about becoming an entrepreneur.	0	0	0	0	0
I would like to see myself as an entrepreneur.	$\circ$	0	0	$\bigcirc$	0
Becoming an entrepreneur would be an important part of who I am.	0	0	0	0	0
When I think about it, the term "entrepreneur" would fit me pretty well.	0	0	0	0	0
I am always thinking about becoming an entrepreneur.	0	0	$\circ$	0	0
It is important for me to express my entrepreneurial aspirations.	0	0	0	0	0

## 3.5 Engineer Identity Aspirations

Engineering identity aspiration

Block Options ∨

Q2

iG

Q3

Ū.

iQ

The following questions ask how you think about yourself and your future professional identity aspirations. We want to understand how much you think that becoming an engineer is part of who you are. Note that there are no right or wrong answers.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
In general, becoming an engineer is an important part of my self-image.	0	0	0	0	0
I have a strong desire to belong to the community of engineers.	0	0	0	0	$\bigcirc$
I would like to think of myself as an engineer.	0	$\circ$	$^{\circ}$	$\circ$	$^{\circ}$

## 3.6 Technology Entrepreneur Identity Aspirations

Technology Entrepreneur identity aspiration

Block Options  $\,\,{\scriptstyle\checkmark}\,$ 

The following questions ask how you think about yourself and your future professional identity aspirations. We want to understand how much you think that becoming technology entrepreneur is part of who you are. Note that there are no right or wrong answers.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I often think about becoming a technology entrepreneur.	0	0	0	0	0
Becoming a technology entrepreneur would be an important part of who I am.	0	0	0	0	0
When I think about it, the term "technology entrepreneur" would fit my aspirations pretty well.	0	0	0	0	0
I am always thinking about becoming a technology entrepreneur.	0	0	$\circ$	0	0
It is important for me to express my technology- based entrepreneurial aspirations.	0	0	0	0	0

## 3.7 Entrepreneurship Societies (ESs) UTwente

Entrepreneurship Societies UTwente (ESs)

Block Options 🗸

Ľ	The next two questions are about whether you are part of an Entrepreneurship Society (E An Entrepreneurship Society is a business development platform designed to connect for and investors. Its goal is often to create a synergistic environment that maximises network deal flow and engaging conversation. Think here for example of business associations like DSIF & KIVI, and UT companies like NovelT.	S). Inders king,
	Are you part of, or do you work with an Entrepreneurship Society (ES)?	
	) Yes	
ľ	Νο	
4	f you do, which society is this?	
ľ		
1		
3.8	Personal View	
	ersonal view Block Op	otions ~
Q	In general, do you have a clear view on what it means to be an entrepreneur? Please sha thoughts below.	otions ~
□ Q Č	In general, do you have a clear view on what it means to be an entrepreneur? Please sha thoughts below.	are your
۵ ک ۵ ک ۵	In general, do you have a clear view on what it means to be an entrepreneur? Please shat thoughts below.	are your

## 3.9 'Thank You' Note



## 4. Demographics and Frequency Tables

#### Statistics Nationality of the respondent Cumulative Percent Age of the respondent Valid Percent Frequency Percent Ν Valid 48 Valid 38 Dutch 79.2 79.2 79.2 Missing 0 German 3 6.3 6.3 85.4 Mean 21.08 British 2 4.2 4.2 89.6 Median 21.00 Italian 2.1 2.1 91.7 1 Std. Deviation 1.235 Polish 1 2.1 2.1 93.8 Range 5 1 2.1 2.1 Bulgarian 95.8 Minimum 18 Greek 2.1 97.9 1 2.1 Maximum 23 New Zealand 1 2.1 2.1 100.0 Total 48 100.0 100.0

# Which of these options describes the respondents' study direction best

		Frequency	Percent	Valid Percent	Cumulative Percent		
Valid	Social Sciences and Humanities (SSH)	19	39.6	39.6	39.6		
	Mathematics, Informatics, Natural Sciences, Technology (MINT)	29	60.4	60.4	100.0		
	Total	48	100.0	100.0			

### Did the respondent already start or is in the process of starting an entrepreneurial venture

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	13	27.1	27.1	27.1
	No	35	72.9	72.9	100.0
	Total	48	100.0	100.0	

## Are you part of, or do you work with and Entrepreneurship Society

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	6	12.5	12.5	12.5
	No	42	87.5	87.5	100.0
	Total	48	100.0	100.0	

# 5. OLS Assumption Excel Sheet

RES_12	Gender1	ES_Belongi	PRE_EntID	RES_EntID_	ES
-0,02228	0,00	1,00	17,50000	3,50000	
-0,06181	1,00	1,00	17,50000	-0,50000	
0,02275	1,00	1,00	17,50000	6,50000	
-0,07279	1,00	1,00	17,50000	-2,50000	
0,04069	0,00	1,00	17,50000	7,50000	
0,06009	1,00	1,00	17,50000	8,50000	
-0.04498	0,00	1.00	17,50000	1,50000	
0.14103	0.00	0.00	8,16667	-2.16667	
-0.07279	0.00	1.00	17.50000	-2.50000	
0.06009	1.00	1.00	17,50000	8,50000	
-0.07717	0.00	1.00	17.50000	-6.50000	
-0.05413	1.00	1.00	17.50000	0.50000	
0.12709	1.00	1.00	17.50000	11,50000	
-0.07461	0.00	1.00	17,50000	-7.50000	
-0.05413	1.00	1.00	17,50000	0.50000	
0.54763	0.00	0.00	8,16667	5,83333	
-0.07608	0.00	1.00	17 50000	-3 50000	
-0.04498	0,00	1,00	17,50000	1 50000	
-0,04436	0,00	1,00	17,50000	4 50000	
-0,00874	1.00	1,00	17,50000	9,50000	
-0,03430	1,00	1,00	17,50000	2,50000	
-0,07791	0,00	1,00	17,50000	-4,50000	
-0,07461	0,00	1,00	17,50000	-7,50000	
0,12709	0,00	1,00	17,50000	11,50000	
0,18673	0,00	0,00	8,16667	-1,16667	
-0,05812	0,00	1,00	17,50000	-10,50000	
0,18673	0,00	0,00	8,16667	-1,16667	
-0,07827	0,00	1,00	17,50000	-5,50000	
-0,06508	0,00	1,00	17,50000	-9,50000	
-0,07279	0,00	1,00	17,50000	-2,50000	
0,14103	0,00	0,00	8,16667	-2,16667	
-0,06181	0,00	1,00	17,50000	-0,50000	
-0,04498	0,00	1,00	17,50000	1,50000	
-0,07057	0,00	1,00	17,50000	-8,50000	
0,02275	1,00	1,00	17,50000	6,50000	
-0,07791	0,00	1,00	17,50000	-4,50000	
-0,02228	1,00	1,00	17,50000	3,50000	
-0,06804	0,00	1,00	17,50000	-1,50000	
-0,06804	0,00	1,00	17,50000	-1,50000	
-0,06804	0,00	1,00	17,50000	-1,50000	
-0,07608	0,00	1,00	17,50000	-3,50000	
-0,07279	0,00	1,00	17,50000	-2,50000	
-0,05413	1,00	1,00	17,50000	0,50000	
-0,07827	0,00	1,00	17,50000	-5,50000	
-0,00874	1,00	1,00	17,50000	4,50000	
0,08096	1,00	1,00	17,50000	9,50000	
-0,06181	0,00	1,00	17,50000	-0,50000	
0,28252	0,00	0,00	8,16667	0,83333	
-0,06804	0,00	1,00	17,50000	-1,50000	
	0.00	000 0	aunti An	Sum o	00000
Aver	age: 0,00	000 C	ount: 48	Sum: 0	,00000