

EFFECTS OF PROJECT-BASED
LEARNING ON ENTREPRENEURSHIP
INTENTION AND ITS ANTECEDENTS:
A MIXED-METHOD APPROACH

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Summary

The German term *Bildung* cannot be fully expressed by the English term *education* but rather is “a kind of umbrella term” (T. Autio, 2014, p. 18) in a broad sense. The term describes a central concept in educational sciences but also includes ideas like nurture and socialization. The term *Bildung* has a long tradition; it discussed early on in connection with the term research in the sense of ‘education through scholarship’ (*Bildung durch Wissenschaft*) (Humboldt, 1810/1993). While the learner is inherently part of educational measures, the importance of the individual who is educated is pointed out by Rütter (2008) among others: his concept of human’s education first of all emphasizes a man’s personhood.

The education provided by universities serves both individual students and society as a whole. The benefit to the latter is mainly achieved because the qualifications provided by universities are primarily focused on maintaining the innovative capacity and adaptability of society and the economy (Wissenschaftsrat, 2015). To achieve this, educational goals must be defined to include knowledge, skills, qualifications, abilities, and competencies that learners should have achieved upon completion of a particular program (Tenorth and Tippelt, 2012). Thus, a distinction between knowledge, qualifications, and competencies is evident for the assessment of learning goals. Nowadays, there is a special focus on competencies (Erpenbeck, 2012).

Knowledge, qualifications, and competencies can be developed in different learning environments. These can be differentiated into classroom-based and work-integrated learning, among others, with Action Learning as a variant (Rothwell, 2010) described in detail by Revans (1989 & 2017) with focus on experiences (Dewey, 1938/1994 & 2000). This builds a connection to pedagogical methods that seem suitable for Action Learning: inquiry-based (Huber, 2009) and project-based learning (Tippelt, 1979).

The Steinbeis University combines inquiry-based and project-based learning and was established in 1998 to facilitate knowledge transfer between academia and industry. The university inter alia comprises two faculties: Leadership and Management, and Technology and Engineering. The university uses the so-called *Projekt-Kompetenz-Studium* (PKS), literally translated to ‘project-competency-

studies'. This is a special form of Action Learning, which in turn is a special expression of work-integrated learning (Faix & Mergenthaler, 2015). The PKS is organized into a theoretical part (50%) and a real project (50%) implemented in an organization. The project the student works on is normally an innovative new business project defined by the student, the providing organization, and Steinbeis University.

Gaining experience in innovative project is essential, as innovation is intensively seen as the main aspect to generate long-term growth for organizations (Tucker, 2008), regions, and entire countries (Tidd & Bessant, 2021). Joseph Schumpeter is considered as the "forefather of entrepreneurship" (Karmarkar et al., 2014, p. 160) and the "prophet of innovation" (McCraw, 2009). These two 'nicknames' demonstrate the relationship between the terms entrepreneurship and innovation. S. Shane and Venkataraman (2000) see entrepreneurship as the realization of value and profit for organizations by identifying and exploiting business opportunities. This may also occur within an existing company and is then called intrapreneurship. In a narrower perspective, entrepreneurship has been defined solely as the creation of new ventures.

To explain entrepreneurial behavior, some studies suggest that personality traits have the best potential (Eastman et al., 2001). However, there has been a lot of criticism of this personality trait approach. Instead, behavioral approaches are suggested (Gartner, 1988; Rauch, 2014), as intentions are considered a better predictor of behavior than attitudes, beliefs, or other psychological or sociological variables (N. F. Krueger & Carsrud, 1993).

The connection between entrepreneurship, innovation, and education is emphasized in strategic papers by the German Council. They place the focus of higher education on aiming to educate professionals who are able to solve challenges related to technical, economic, or societal change (Wissenschaftsrat, 2015). From this, entrepreneurship education (EE) programs have emerged. Research has identified four important characteristics: 1) an active learning approach (for example through project- or problem-based learning), 2) providing opportunities for reflection, 3) a competency-based assessment, and 4) interdisciplinary content and thinking; these elements are fulfilled by the PKS of Steinbeis University. The project focus therefore is considered to have a positive influence on the development of entrepreneurship intention (EI).

Several articles, reviews, and meta-analyses have attempted to confirm the effectiveness of EE programs (Bae et al., 2014; Martin et al., 2013; Nabi et al., 2017). However, previous research has used various intention models and 'ad hoc research instruments' to assess their effectiveness. This leads to inconsistencies in study results (Chandler & Lyon, 2001). Additionally, limited attention seems to have been paid to the importance of specific educational variables, such as program design and pedagogical approach (Fayolle et al., 2006). Furthermore, few studies have combined EE and action research in higher education (Taylor & Pettit, 2007).

Regarding behavioral intention, Ajzen (1988) first pointed out that intention describes the purpose to try to perform a certain behavior, then formulated of the theory of planned behavior (Ajzen, 1991). This theory includes three antecedents of intention: attitude toward the behavior (ATB; the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question (Ajzen, 1991)); subjective norms (SN; the influence of normative beliefs of important others (for example, friends or family) about a certain behavior and the degree to which someone tends to follow these beliefs); and perceived behavioral control (PBC; as the perceived ease or difficulty of performing a behavior). These antecedents predict intentions, and additionally PBC is directly related to the behavior under consideration (Ajzen, 1991). With regard to entrepreneurship, several additions have been made by scholars over the years to the general concept that has been validated by N. F. Krueger et al. (2000) and N. F. Krueger (2009).

As noted above, educational programs can influence the antecedents of intention identified in the theory of planned behavior. The effectiveness of EE programs is usually evaluated in terms of changes to this intention (Graevenitz et al., 2010). However, "the entrepreneurial intent literature has not resulted in cumulative knowledge because the various perspectives have been pursued in isolation from other perspectives [...]. Future work on entrepreneurial intentions should attempt to integrate and reduce the number of alternative intention models" (Shook et al., 2003, p. 386). To overcome this incommensurability and to provide a standard instrument for measuring EI, Liñán & Chen (2009) developed the entrepreneurial intention questionnaire (EIQ). Despite this, to date there are no conclusive findings on the relationship between EE and EI (Aparicio et al., 2019).

This research aims to fill some of the research gaps. First, a systematic literature review (SLR) was conducted to analyze current research on the effectiveness of EE programs. Special attention was given to program design and duration, selection of participants, and their field of study. In addition, the SLR included the extent to which studies included entrepreneurial behavior as an outcome. Two databases were selected for the SLR and a total of 64 articles were analyzed. The results show that there is no consensus regarding the effectiveness of EE in developing EI, nor regarding the role of any antecedents. The SLR revealed that research has mainly focused on EE programs offered at the undergraduate level. Thus, the existing research hardly addresses the programs aimed at graduate students, such as MBAs (Rodrigues et al., 2010; Souitaris et al., 2007). Only about 11% of the studies compared the EI of engineering and business students, and they did not reach a consensus on which group is superior. Given the wide variety of didactical methods and foci of the available programs, it is surprising that about 87% of the EE studies do not mention any pedagogical framework. Not even the duration of the EE program is regularly mentioned. Furthermore, 95% of the studies analyzed in the SLR do not consider whether intentions lead to behavior.

Against this background, the impact of the project-based, work-integrated EE program at Steinbeis University was evaluated in the form of an exemplary case analysis. The aim was to determine whether this EE program has an influence on the development of EI and its antecedents (ATB, SN and PBC), as well as on the entrepreneurial activities of the participants. It was hypothesized that EI is positively influenced by EE through ATB, SN, and PBC. Furthermore, it was assumed that work experience, gender, and having self-employed parents influence the development of EI, and that there was a difference between business students and engineering students. Finally, the theory of planned behavior suggests that performed entrepreneurial activities depend on EI, antecedents and EE. A cross-sectional survey was conducted among applicants, students, and graduates of Steinbeis University using the EIQ developed by Liñán and Chen (2009), and a list of 18 activities associated with starting a new business (Rauch and Hulsink, 2015). The sample consists of 124 participants, with 21 selected as founders (people who had founded an own company). Factor analysis showed that the items measuring PBC and SN can be clearly distinguished. However, ATB and EI items load onto the same factor, thus, ATB was excluded from the following analyses. The quantitative results show that EI did not increase over the course of the

EE program. Rather, there is a statistically significant, negative relationship—entrepreneurship education caused a lower level of entrepreneurship intention. Furthermore, EE did not influence SN and PBC. Although it was shown that PBC is a reliable predictor of EI, there was no influence of SN on EI. No differences were found for work experience, field of study, and self-employed parents. However, as postulated, gender had an effect, as males showed higher EI. Regarding entrepreneurial activities, it was shown that higher EI and higher PBC lead to more entrepreneurial activities. However, there was no difference in the number of activities taken when comparing applicants, students and graduates. Overall, these results for the theory of planned behavior model suggest that there is a likelihood of an omitted mediator, which is in line with Heuer and Kolvereid (2014) who stated that the theory is at least not complete.

To some extent, these unexpected quantitative results required further research. Since almost all studies in the SLR used a quantitative methodology, the call by Ahmed et al. (2017) for qualitative approaches was followed in order to investigate the influence of the Projekt-Kompetenz-Studium on the development of students' EI in depth. More specifically, different interpretations of entrepreneurship were considered to understand how these might influence the impact of EE programs, taking contextual factors into account. In addition, the qualitative part focused on the personality traits and competencies that may be crucial for a potential entrepreneur to make a link to intrapreneurial behavior. The final objective was to give recommendations for EE programs.

Focus group discussions were considered appropriate as a methodology because these groups bring together participants with different opinions and experiences. The qualitative part also includes the founders' perspective, which to the best of the authors' knowledge has not been done before in the context of theory of planned behavior and EE. Four focus group discussions with a total of 15 participants were conducted and analyzed using content analysis, following Kuckartz (2018). The interviewees revealed remarkable differences in entrepreneurship definitions, not only

for the aspect of intrapreneurship, but also whether copycat start-ups¹ are comparable to high-tech start-ups. Regarding the antecedents of intention, social media was found to strongly influence, which has not been discussed in the literature so far. Regarding SN, the possibility of actively shaping a positive environment emerged, potentially providing an explanation for the missing relationship between SN and EI in the quantitative sample. For PBC, several important aspects were revealed. First, networks that can positively influence PBC emerged as important. This aspect also included the interest of starting a new business together with a co-founder. Second, the role of experience was discussed. Third, crises have an important role, as they are beyond personal control. When it comes to EI, the interviewees pointed out that having a business idea that leads to high motivation is crucial, and that one's opinion about individual failure can also influence one's EI. Whether EI translates into behavior was also discussed intensively, with whether external support is given and whether the first steps taken lead to the hoped-for results raised as key points. In terms of relevant personality traits, some new aspects emerged, most notably, resilience and legal consciousness. The latter was seen as a source of high mental pressure.

When specifically focusing on the EE program offered by Steinbeis University, the integrated project was discussed as offering valuable practical experience, broad perspectives with results indicating positive impact on the company offering the project and participants learn about intrapreneurial opportunities. Thus, the program positively contributes to the development of creative individuals, who think and act entrepreneurially as well as intrapreneurially.

This thesis ends with giving recommendations on how to improve the *Projekt-Kompetenz-Studium* offered by Steinbeis University in terms of content and activities that can be offered (for example, hackathons). Furthermore, general recommendations are made such as the need to define entrepreneurship and the intended outcomes of EE programs more precisely, as well as to include strategies for dealing with crises or tense economic situations. The importance of intrapreneurship is highlighted as this can be a valuable educational outcome in terms of innovation.

¹ A copycat is a startup or company whose idea has been taken over by another company or startup and only slightly modified, if at all. It is therefore an imitator of an existing idea (Herzog, 2016).

Zusammenfassung

Der deutsche Begriff *Bildung* kann nicht vollständig durch den englischen Begriff *education* ausgedrückt werden, sondern stellt „eine Art Oberbegriff“ dar (T. Autio, 2014, S. 18, eigene Übersetzung). Er beschreibt ein zentrales Konzept der Bildungswissenschaften, schließt aber auch Erziehung und Sozialisation ein. Der Begriff Bildung hat eine lange Tradition und wurde schon früh mit dem Begriff Forschung in Zusammenhang gebracht – im Sinne von Bildung durch Wissenschaft (Humboldt, 1810/1993). Während der Lernende naturgemäß Teil einer Bildungsmaßnahme ist, wird die besondere Bedeutung des Individuums z.B. von Rütter (2008) hervorgehoben: Sein Konzept der Bildung des Menschen betont vor allem dessen Persönlichkeit.

Die von Hochschulen vermittelte Bildung dient sowohl dem einzelnen Studierenden als auch der Gesellschaft. Letzteres wird vor allem dadurch erreicht, dass die von Hochschulen vermittelten Qualifikationen auf den Erhalt der Innovations- und Anpassungsfähigkeit ausgerichtet sind (Wissenschaftsrat, 2015). Dazu müssen Bildungsziele definiert werden, die Lernende nach Abschluss eines Studiums erreicht haben sollen; dies umfasst Wissen, Fertig- und Fähigkeiten sowie Kompetenzen (Tenorth & Tippelt, 2012). Für die Bewertung von Lernzielen ist eine Unterscheidung zwischen Wissen, Qualifikationen und Kompetenzen sinnvoll, wobei heutzutage der Fokus auf die Kompetenzen gelegt wird (Erpenbeck, 2012).

Wissen, Qualifikationen und Kompetenzen können in verschiedenen Lernumgebungen erworben werden. Diese lassen sich unter anderem in klassische und berufsintegrierte Ansätze unterscheiden, wobei Action Learning eine berufsintegrierte Variante (Rothwell, 2010) darstellt, die von Revans (1989 & 2017) präzise beschrieben wurde. Bei diesem pädagogischen Ansatz liegt ein besonderes Augenmerk auf den Erfahrungen, die in in einem Bildungsprogramm gemacht werden (Dewey, 1938/1994 & 2000). Didaktische Methoden, die in diesem Zusammenhang erfolgsversprechend erscheinen, sind insbesondere das forschende Lernen (Huber, 2009) und das projektorientierte Lernen (Tippelt, 1979).

Die 1998 gegründete Steinbeis-Hochschule verbindet forschendes und projektorientiertes Lernen und verfolgt das Ziel den Transfer zwischen Wissenschaft und Wirt-

schaft zu fördern. Die Hochschule besteht unter anderem aus den zwei Fakultäten Leadership & Management und Technology & Engineering und wendet das sogenannte Projekt-Kompetenz-Studium (PKS) an. Dabei handelt es sich um eine besondere Form des Action Learning – als besondere Ausprägung des berufsintegrierten Lernens (Faix & Mergenthaler, 2015). Das PKS gliedert sich in einen theoretischen Teil und ein reales Projekt, das in einem Unternehmen durchgeführt wird. Bei den Projekten, die die Studierenden individuell bearbeiten, handelt es um innovative Projekte.

Das Sammeln von Erfahrungen bei der Durchführung innovativer Projekte ist von großer Bedeutung, da Innovationen als Grundlage für langfristiges Wachstum von Organisationen (Tucker, 2008), Regionen und Ländern (Tidd & Bessant, 2021) angesehen wird. Joseph Schumpeter wird als „forefather of entrepreneurship“ (Karmarkar et al., 2014, p. 160) und “prophet of innovation” (McCraw, 2009) bezeichnet, was die Beziehung zwischen den beiden Begriffen hervorhebt. S. Shane und Venkataraman (2000) sehen Entrepreneurship als die wertschöpfende Realisierung von Geschäftsmöglichkeiten, indem diese erkannt und genutzt werden. Dies kann auch innerhalb eines bestehenden Unternehmens geschehen und wird dann als Intrapreneurship bezeichnet. In engeren Definitionen wird Entrepreneurship ausschließlich als die Gründung neuer Unternehmen bezeichnet.

Um individuelles unternehmerisches Verhalten zu betrachten, verweisen einige Studien auf das Erklärungspotenzial von Persönlichkeitsmerkmalen (Eastman et al., 2001). Dieser Ansatz wird jedoch stark kritisiert. Stattdessen werden verhaltenswissenschaftliche Ansätze vorgeschlagen (Gartner, 1988; Rauch, 2014), wobei genauergesagt Intentionen als besserer Prädiktor für Verhalten genutzt werden können, als Einstellungen, Überzeugungen oder andere psychologische oder soziologische Variablen (N. F. Krueger & Carsrud, 1993).

Die Verbindung von Entrepreneurship, Innovation und Bildung wird in Strategiepapieren des Deutschen Wissenschaftsrats deutlich. Darin wird der Fokus der Hochschulbildung auf das Ziel gelegt, Fachkräfte zu bilden, die technische, wirtschaftliche oder gesellschaftliche Herausforderungen lösen (Wissenschaftsrat, 2015). So entstanden Programme für Entrepreneurship Education (EE), die folgenden Merkmale aufweisen sollten: 1) einen aktiven Lernansatz, zum Beispiel durch projekt- oder problembasiertes Lernen, 2) Fokus auf und Gelegenheit zur Reflexion, 3) ein kompetenzbasiertes

Bewertungsverfahren und 4) interdisziplinäre Inhalte und Denkweisen. Diese Elemente sind Teil des PKS der Steinbeis Hochschule. Daher wird angenommen, dass der einzigartige Projektfokus dieses pädagogischen Ansatzes einen positiven Einfluss auf die Entwicklung von Entrepreneurship Intention (EI) hat.

Mehrere Artikel, Reviews und Meta-Analysen haben versucht die Wirksamkeit von EE-Bildungsprogrammen auf die Ausprägung von EI zu bestätigen (Bae et al., 2014; Nabi et al., 2017). In der bisherigen Forschung wurden jedoch unterschiedliche Intentionsmodelle und Forschungsinstrumente zur Bewertung der Wirksamkeit von EE eingesetzt, was zu inkonsistenten Ergebnissen geführt hat (Chandler & Lyon, 2001). Die Bedeutung der Gestaltung des Programms sowie dessen pädagogischer Ansatz wurde scheinbar vernachlässigt (Fayolle et al., 2006). Darüber hinaus gibt es bisher nur wenige Studien, die sich spezifisch mit EE-Programmen beschäftigen, bei denen aktive Lernansätzen an Hochschulen umgesetzt werden (Taylor & Pettit, 2007).

Mit Blick auf Intentionen wies Ajzen (1988) darauf hin, dass Intention beschreibt, ob ein bestimmtes Verhalten angestrebt wird. Daraufhin formulierte er die Theorie des geplanten Verhaltens (Ajzen, 1991). Diese Theorie umfasst drei Variablen, die als Vorläufer gelten: Einstellung zum Verhalten (attitude toward the behavior, ATB) als Grad der positiven oder negativen Bewertung des Verhaltens (Ajzen, 1991); subjektive Normen (subjective norms, SN) beschreiben, inwiefern Freunde und Familienmitglieder das Verhalten gutheißen und ob jemand dazu neigt, diesen Überzeugungen zu folgen; wahrgenommene Verhaltenskontrolle (perceived behavioral control, PBC) beschreibt, ob die Durchführung eines Verhaltens als einfach oder schwierig empfunden wird. Diese drei Vorläufer prognostizieren resultierende Intention, wobei die wahrgenommene Verhaltenskontrolle darüber hinaus in direktem Zusammenhang mit dem beabsichtigten Verhalten steht (Ajzen, 1991). Im Hinblick auf Entrepreneurship haben Wissenschaftler:innen mehrere Ergänzungen vorgenommen, während das Konzept von N. F. Krueger et al. (2000) und N. F. Krueger (2009) validiert wurde.

Wie bereits erwähnt, können Bildungsprogramme die Vorläufer von Intention, die in der Theorie des geplanten Verhaltens identifiziert wurden, beeinflussen. Die Wirksamkeit von EE-Programmen wird meist auf Basis der Veränderung dieser Intention bewertet (Graevenitz et al., 2010). Allerdings „resultierte die Literatur zu unternehmerischen Intentionen bislang nicht in gebündeltem Wissen, da verschiedene Perspektiven isoliert

verfolgt wurden [...]. Zukünftige Arbeiten über unternehmerische Intentionen sollten versuchen, die Anzahl der verschiedenen Modelle zu reduzieren“ (Shook et al., 2003, S. 386, eigene Übersetzung). Um diese Unzulänglichkeiten zu überwinden und um ein Standardinstrument zur Messung bereitzustellen, entwickelten Liñán & Chen (2009) den Fragebogen zur unternehmerischen Intention (Entrepreneurial Intention Questionnaire, EIQ). Dennoch gibt es bisher keine finalen Erkenntnisse über den Zusammenhang zwischen EE und EI (Aparicio et al., 2019).

Die vorliegende Arbeit hat zum Ziel, einige dieser Forschungslücken zu schließen. Zunächst wurde eine systematische Literaturrecherche durchgeführt, um den aktuellen Forschungsstand zur Wirksamkeit von EE-Programmen zu analysieren. Besonderes Augenmerk wurde dabei auf das Design des Programms, dessen Dauer, die Auswahl der Teilnehmenden und deren Studienrichtung gelegt. Darüber hinaus ging es um die Frage, inwiefern die Studien unternehmerisches Verhalten einbezogen haben. Für die Literaturanalyse wurden zwei Datenbanken ausgewählt und insgesamt 64 Artikel ausgewertet. Die Ergebnisse zeigen, dass es weder einen Konsens über die Wirksamkeit von EE auf die Entwicklung von EI gibt, noch über die Rolle der Vorläufer ATB, SN und PBC. Die Literatur zeigt außerdem, dass sich die Forschung hauptsächlich auf EE-Programme im Rahmen des Erststudiums konzentriert hat; Programme für Master-Studierende werden kaum betrachtet (Rodrigues et al., 2010; Souitaris et al., 2007). Nur rund 11 % der analysierten Studien verglich die EI von Studierenden der Ingenieur- und der Wirtschaftswissenschaften, ohne jedoch einen Konsens zu erzielen, bei welcher Gruppe die EI ausgeprägter ist. In Anbetracht der großen Vielfalt didaktischer Methoden und Schwerpunkte ist es erstaunlich, dass etwa 87 % der Studien den pädagogischen Ansatz nicht erwähnt haben. Sogar die Dauer des EE-Programms wurde oft nicht erwähnt. Darüber hinaus berücksichtigten 95 % der analysierten Studien nicht, ob aus der Intention ein Verhalten resultiert.

Vor diesem Hintergrund wurde die Wirkung des projektbasierten, berufsintegrierten EE-Programms der Steinbeis Hochschule in Form einer exemplarischen Fallanalyse evaluiert. Genauer gesagt sollte herausgefunden werden, ob die EE einen Einfluss auf die Entwicklung von EI und deren Vorläufer, ATB, SN und PBC, sowie auf die unternehmerischen Aktivitäten der Teilnehmenden eines Masterstudiums hat. Die Hypothesen besagen, dass die EI positiv von EE beeinflusst wird. Des Weiteren wurde

angenommen, dass Berufserfahrung, Geschlecht und die Tatsache, ob jemand selbständige Eltern hat, die Entwicklung der EI beeinflusst. Außerdem wurde ein Unterschied zwischen Studierenden der Wirtschaftswissenschaften und Studierenden der Ingenieurwissenschaften vermutet. Schließlich wurde angenommen, dass unternehmerische Aktivitäten von der EI, den Vorläufern (ATB, SN und PBC) sowie von der EE abhängen.

Studienbewerber:innen, Studierende und Absolvent:innen der Steinbeis Hochschule wurden im Rahmen einer Querschnittserhebung mit dem Entrepreneurial Intention Questionnaire von Liñán und Chen (2009) befragt. Außerdem wurde eine von Rauch und Hulsink (2015) entwickelte Liste mit 18 Aktivitäten, die in Zusammenhang mit der Gründung eines neuen Unternehmens stehen, verwendet. Die Stichprobe umfasste 124 Teilnehmende, von denen 21 als Gründer:innen identifiziert wurden. Die Faktorenanalyse ergab, dass sich die Items zur Messung von PBC und SN deutlich voneinander unterscheiden lassen. Die ATB- und EI-Items laden jedoch auf denselben Faktor. Aufgrund dieser Analyse wurde ATB von den nachfolgenden statistischen Messungen ausgeschlossen.

Die quantitativen Ergebnisse zeigen, dass die EI im Verlauf des EE-Programms nicht ansteigt. Vielmehr besteht ein negativer und signifikanter Zusammenhang. Somit führt die projekt-basierte EE zu einer niedrigeren Ausprägung von EI. Außerdem konnte kein Einfluss von EE auf die Vorläufervariablen SN und PBC gezeigt werden. Obwohl bestätigt wurde, dass PBC ein Prädiktor für EI ist, gab es keinen Einfluss von SN auf EI. Für Berufserfahrung, Studienfach und selbständige Eltern wurden keine Unterschiede festgestellt. Allerdings wiesen Männer, wie angenommen, eine höhere EI auf. Hinsichtlich des unternehmerischen Handelns zeigte sich, wie angenommen, dass sowohl höhere EI als auch höheres PBC zu mehr unternehmerischen Handlungen führen. Die Anzahl dieser Handlungen unterscheidet sich jedoch nicht, wenn man Bewerber:innen, Studierende und Absolvent:innen vergleicht. Alles in allem deuten diese Ergebnisse darauf hin, dass es einen weiteren Mediator geben könnte. Dies ist im Einklang mit Heuer und Kolvereid (2014), die feststellten, dass die Theorie zu geplantem Verhalten vermutlich nicht vollständig ist.

Diese zu einem gewissen Grad unerwarteten quantitativen Ergebnisse erforderten weitere Untersuchungen. Da fast alle Studien (ca. 94 %) der Literaturanalyse eine

quantitative Methodik angewendet haben, wurde der Forderung von Ahmed et al. (2017) nach qualitativen Ansätzen gefolgt, um den Einfluss des PKS auf die Entwicklung der EI von Studierenden tiefer zu erforschen. Genauer gesagt wurden unterschiedliche Interpretationen von Entrepreneurship betrachtet, um zu verstehen, inwiefern diese die Wirkung von EE-Programmen beeinflussen könnten, wobei auch kontextuelle Faktoren berücksichtigt wurden. Der qualitative Teil konzentrierte sich zusätzlich auf Persönlichkeitsmerkmale und Kompetenzen, die für eine:n Gründer:in ausschlaggebend sein könnten. Dabei wurde auch eine Verbindung zu innovativem Verhalten innerhalb von Unternehmen hergestellt. Abschließend bestand das Ziel darin, Empfehlungen für EE-Programme zu geben.

Methodisch wurden Fokusgruppendifkussionen als angemessen erachtet, da Teilnehmende mit unterschiedlichen Meinungen und Erfahrungen zusammenkommen. Hier wurde auch die Perspektive von Gründer:innen einbezogen, was in diesem Kontext nach bestem Wissen der Autorin zuvor noch nicht durchgeführt wurde. Es wurden vier Fokusgruppendifkussionen mit insgesamt 15 Teilnehmenden durchgeführt und mittels Inhaltsanalyse nach Kuckartz (2018) ausgewertet. Die Befragten zeigten deutliche Unterschiede in Bezug auf mögliche Entrepreneurship-Definitionen, zum Beispiel, ob Copycat-Gründungen² mit Hightech-Start-ups vergleichbar sind. Auch der Aspekt des Intrapreneurships wurde hier diskutiert. Für ATB wurde eine hohe Relevanz sozialer Medien aufgedeckt, die die Einstellung zum Thema Gründung beeinflusst. Dieser Aspekt wurde in der Literatur bisher nicht diskutiert. Für SN zeigte sich, dass man als angehende:r Gründer aktiv ein positives Umfeld gestaltet kann, wodurch sich der Einfluss von Familie und Freunden reduziert. Dies liefert eine Erklärung für fehlende Zusammenhänge in der quantitativen Stichprobe. Auch diese Möglichkeit wurde bislang kaum in der Literatur betrachtet. Beim Thema PBC zeigten sich verschiedene wichtige Aspekte. Erstens kam die Bedeutung von Netzwerken zur Sprache, die die PBC positiv beeinflussen können. Dies beinhaltet auch die Einbindung weiterer Gründer:innen. Beides verbessert die Einschätzung eine Unternehmensgründung erfolgreich gestalten zu können. Zweitens

² Hierbei handelt es sich um ein Nachahmer-Start-up, dessen Idee von einem anderen Unternehmen übernommen und, wenn überhaupt, nur leicht verändert wurde (Herzog, 2016).

wurde allgemein die Rolle von Erfahrung erörtert, wobei betont wurde, dass die Erfahrungen, die man als Angestellte:r sammelt, niemals echte Gründungserfahrungen abbilden können. Drittens wurden Krisen als entscheidender Faktor diskutiert, da diese außerhalb der persönlichen Kontrolle liegen, aber einen außerordentlichen Einfluss auf den Geschäftserfolg haben können. In Bezug auf die EI wiesen die Interviewten darauf hin, dass die Geschäftsidee ausschlaggebend für die Motivation ist. Darüber hinaus beeinflusst die individuelle Einstellung zum Scheitern die Entrepreneurship Intention. Ob EI zu Verhalten führt, wurde in Abhängigkeit davon diskutiert, ob externe Unterstützung und finanzielle Ressourcen gegeben sind und ob die ersten Schritte in Richtung Gründung zu den erhofften Ergebnissen führen. In Bezug auf relevante Persönlichkeitseigenschaften ergaben sich einige neue Aspekte. Vor allem die Themen Resilienz und Rechtsbewusstsein wurden diskutiert. Letzteres wurde als Ursache für hohen psychischen Druck angesehen.

Für das EE-Programm der Steinbeis Hochschule wurde das integrierte Projekt als praxisnah und perspektivenreich diskutiert, das zudem die Möglichkeit bietet relevante Erfahrungen zu sammeln und unternehmerische Kontakte zu knüpfen. Außerdem zeigten die Diskussionen, dass dieses EE-Programm einerseits positive Auswirkungen auf das projektgebende Unternehmen hat. Andererseits lernen die Teilnehmenden die Möglichkeiten für Intrapreneurship kennen. Damit trägt das Programm positiv zur Entwicklung kreativer Menschen bei, die unternehmerisch handeln können, sei es in einem eigenen Unternehmen oder in bestehenden Organisationen.

Abschließend werden Empfehlungen gegeben, wie das Projekt-Kompetenz-Studium an der Steinbeis Hochschule inhaltlich noch weiter verbessert werden könnte und welche Aktivitäten, z.B. Hackathons, zusätzlich angeboten werden könnten. Darüber hinaus werden allgemeine Empfehlungen gegeben, z.B. dass Entrepreneurship im Rahmen von Programm-Evaluationen genau definiert werden muss und dass die angestrebten Ergebnisse eines Bildungsprogramms festgelegt werden müssen. Das Curriculum eines EE-Programms sollte darüber hinaus um Inhalte ergänzt werden, wie mit Krisen oder angespannten wirtschaftlichen Situationen umgegangen werden kann. Nicht zuletzt wird die Bedeutung von Intrapreneurship diskutiert, da dies im Hinblick auf Innovation ein wertvolles Bildungsergebnis sein kann.

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List of abbreviations

Approx.	Approximately
Asymp.	Asymptotic
ATB	Attitude toward behavior
CBE	Competency-based Education
CI	Confidence intervals
Coeff.	Coefficient
df	Degrees of freedom
EBC	Experienced-Based Curriculum
EC	European Commission
EE	Entrepreneurship education
e.g.	example given
EI	Entrepreneurship Intention
EIQ	Entrepreneurship Intention Questionnaire
et al.	et alia
etc.	et cetera
EU	European Union
FIBAA	Foundation for International Business Administration Accreditation
GDP	Gross domestic product
H	Hypothesis
http	Hypertext transfer protocol
i.e.	id est

JCR	Journal Citation Report
KMK	Kultusministerkonferenz
LLCI	Lower-level confidence interval
LOC	Locus of control
M.A.	Master of Arts
MBA	Master of Business Administration
MBE	Master of Business Engineering
M.Sc.	Master of Science
MSE	Mean squared error
N	Total number
OECD	Organization for Economic Cooperation and Development
p	Probabilitas
p.	Page
PBC	Perceived behavioral control
PhD	Doctor of Philosophy
PKS	Projekt-Kompetenz-Studium (project-competency-studies)
R-sq	R-squared
SD	Standard deviation
se	Standard error
SER	Study and examination regulations
Sig.	Significance
SIBE	School of International Business and Entrepreneurship
SMT	School of Management and Technology

SLR	Systematic literature review
SN	Subjective norms
SPSS	Statistical Package for the Social Sciences
TGC	Talent growth curriculum
TPB	Theory of planned behavior
TRA	Theory of reasoned action
UAE	United Arab Emirates
ULCI	Upper-level confidence interval
WBT	Web-based training

INTRODUCTION

1 Overview and Structure of This Thesis

This short chapter briefly describes the thematic baseline and the structure of this thesis as well as the underlying research to provide guidance throughout the reading of the different parts.

Chapter 2 deals with the themes and theories that are relevant for this research. First of all, the educational framework is introduced focusing on the tertiary educational system in Germany and its history based on the ideal of education through scholarship (*Bildung durch Wissenschaft*; Humboldt, 1810/1993). Then, the importance of defining educational goals as well as the assessment of learning goals is presented while differentiating between knowledge, qualifications and competencies. Next, two learning environments are presented: classroom-based learning and work-integrated learning with Action Learning as variant (Rothwell, 2010) that was precisely described by Revans (1989 & 2017) with focus on experience (Dewey, 1938/1994, 2000). This builds the connection to educational methods that seem suitable in this context, comprising inquiry-based learning (Huber, 2009) and project-based learning as described by Tippelt (1979) for the German context. The part on education ends with the introduction of Steinbeis University, which comprises inter alia two faculties: Leadership and Management, and Technology and Engineering. Steinbeis University makes use of the *Projekt-Kompetenz-Studium* (PKS), literally translated project-competency-studies. This is a form of Action Learning, which is in turn a special expression of work-integrated learning (Faix & Mergenthaler, 2015). The projects that the students work on are mainly innovative new business projects.

The next section of chapter 2 deals with the relationship between the topics of innovation and entrepreneurship, while also considering the term intrapreneurship. Innovations are the main driver to generate long-term growth for organizations (Tucker, 2008), while entrepreneurship is defined by S. Shane and Venkataraman (2000) as the realization of value and profit, thus demonstrating the strong relation of both terms. Behavioral approaches allow assessment of whether someone is or acts entrepreneurial (Gartner, 1988; Rauch, 2014), while intentions can be used as a better predictor of behavior than attitudes, beliefs, or other psychological or sociological variables (N. F. Krueger & Carsrud, 1993). Furthermore, personality

traits and competencies expressed by entrepreneurs are discussed. One focus of higher education is to educate professionals who are then able to find solutions for challenges associated with technical, economic, or societal change (Wissenschaftsrat, 2015). This is why entrepreneurship education (EE) gained importance. Several articles, reviews, and meta-analyses have tried to confirm the effectiveness of respective EE programs (Bae et al., 2014; Martin et al., 2013; Nabi et al., 2017). However, it seems like research has paid limited attention to the importance of specific educational variables, such as program design and pedagogical approach (Fayolle et al., 2006).

One well known theoretical approach to deal with intentions and their realization is the theory of planned behavior (TPB): Ajzen (1991) described three intentional antecedents, namely attitude toward the behavior (ATB), the degree to which a person has a favorable or unfavorable evaluation of the behavior in question; subjective norms (SN), which are influenced by normative beliefs of important others (for example, friends or family) and the degree to which someone tends to comply with these beliefs; and perceived behavioral control (PBC), which describes the perceived ease or difficulty of performing a given behavior. However, “the entrepreneurial intent literature has not resulted in cumulative knowledge because the various perspectives have been pursued in isolation from other perspectives [...]. Future work on entrepreneurial intentions should attempt to integrate and reduce the number of alternative intention models.” (Shook et al., 2003, p. 386).

Chapter 3 ends this theoretical part with the derivation of the research questions based on research gaps that have been identified. There is also a short outline how these questions will be answered.

Chapters 4 to 7 of this thesis build a comprehensive systematic literature review (SLR). The objectives of the review are presented at the beginning, followed by the search strategy and the selection procedure to include studies into the review. The findings of this literature review contain quantitative comparisons as well as a content analysis. For example, the review reveals several contradictory results for all the theory of planned behavior variables. There is no consensus stating an exclusively positive effect of EE on entrepreneurship intention (EI). Instead, several studies fail to demonstrate any effect or even report a negative influence of EE on EI. Inconsistent results are also found for the antecedents attitude toward the

behavior, subjective norms, and perceived behavioral control. These results are subsequently discussed to derive implications for the empirical part of this thesis. Such research should especially take care to provide relevant information regarding design and duration of the respective EE program. Furthermore, the systematic literature review reveals that almost all studies (about 94%) have solely applied a quantitative methodology. Thus, the author follows the call made by Ahmed et al. (2017) for qualitative approaches through designing a mixed-method approach for the empirical part of this thesis.

Chapter 8 of this thesis comprises the quantitative section and starts with a short theoretical introduction to develop several research hypotheses. Next, the author describes the methodological approaches taken to test these hypotheses. This thesis performs a case analysis with the aim to evaluate the effectiveness of a project-based learning pedagogy by means of the exemplary approach realized at Steinbeis University, which has a project-based and work-integrated didactic approach. Specifically, this is performed by conducting a cross-sectional survey among applicants, students, and graduates from Steinbeis University. The survey assessed the influence of Steinbeis University's specific educational program on the development of EI, entrepreneurial behavior, and its antecedents. To overcome the incommensurability reported in literature, a standard instrument was used for measuring EI, namely the entrepreneurial intention questionnaire (Liñán & Chen, 2009). The results comprise descriptive statistics as well as the testing of theory of planned behavior variables, including a mediation analysis. The main finding is that EE has a negative influence on EI that is statistically significant. The other results are presented and discussed subsequently while referencing to current literature.

Chapter 9 continues the empirical part by presenting the qualitative analysis. It begins with a description of the research objectives, namely to deeply explore the influence of the *Projekt-Kompetenz-Studium* from Steinbeis University on the development of students' EI and its antecedents. In doing so, the author aims to explain the results described in the previous, quantitative chapter. The research design is based on focus group discussions, which are appropriate as those groups bring together participants with different opinions and experiences. One group consisted exclusively of founders (those who have founded an entrepreneurial endeavor), which allows comparison of their perspectives with those of participants

who have not founded something (yet). The findings reveal that EE brings to light the challenges of being self-employed. Additionally, new important aspects of subject norms are revealed, as well as the influence of the general economic situation in terms of PBC. All the qualitative results are presented by means of thematic clusters. The chapter ends with discussing and summarizing the most important findings.

The results of the empirical analyses are discussed holistically in **chapter 10** by connecting the insights gained in the qualitative interviews with the quantitative questionnaire results while also considering the findings of the systematic literature review.

Chapter 11 gives recommendations regarding the design of EE programs in general and for Steinbeis University in particular as part of its practical contribution, while also considering the topic of intrapreneurship. In **chapter 12**, the author presents the scientific contributions made by this research, followed by a critical reflection regarding the used research design (**chapter 13**). Finally, this thesis ends with an outlook regarding where future research would contribute to the scholarly knowledge.

THEORETICAL PART

2 Theoretical background

2.1 Educational framework: Terms and Concepts

2.1.1 (Higher) Education in Germany

This research deals with a specific pedagogical approach offered by a German higher education institution. As the English word 'education' does not completely denote what the translated German term *Bildung* comprises, some introductory explanations are necessary. The term has a long history to consider and is in this sense solely used in the German language without linguistic equivalent in any other country (Raithel et al., 2009). *Bildung* can be seen "as a kind of umbrella term" (T. Autio, 2014, p. 18) in a broad sense. The term describes a central concept in educational sciences but also includes concepts like nurture and socialization. *Bildung* and pedagogy are furthermore linked to culture, structures, and policies (Alexander, 2000).

The origin and the varying usage of the term has caused contradictory opinions and thus critical discussions in the past (Rütter, 2008). As a result, there is no definition which is generally accepted. Indeed, an unambiguous definition would contradict the broad approach of the concept of education to a certain extent (Dörpinghaus & Uphoff, 2011).

In an interview on August 15th, 2011, Heinz-Elmar Tenorth said: "Bildung is what remains if we forget everything that we ever learned in school" (Tenorth, 2011, own translation). Onto this, Jung and Pinar (2016, p. 39) added "specifically the individual's capacity for freedom accomplished in part through individuation." Another viewpoint was formulated by T. Autio (2014, p. 18): "Bildung can be referred to as a theory of education with a two-layer sense and with a broader meaning than the English 'education'."

The German term *Bildung* furthermore can be distinguished into a general and a vocational approach. Vocational education and training have functional orientations and are driven by adapting people to work contexts. The two concepts are polarized but now show signs of moving closer together. The transformation of the world of

work in terms of complexity, holism, and organization requires changes of competencies. Nowadays, to improve performance in professional work, more generalizable competencies are needed. A complex and demanding professional profile requires broad skills such as methodological, personal, and social skills, built in an integrative manner. These skills become increasingly important as the rate of change in knowledge accelerates (Schelten, 2005).

A contemporary view on general education (*Allgemeinbildung*) was elaborated on by Klafki, who is renowned as “one of the most distinguished contemporary scholars in Didaktik tradition” (Westbury, 2000, p. 16). Klafki (2000, p. 103) summarized his topical view on general education in the following points:

- “*Allgemeinbildung* as *Bildung* for all to develop the capacity for self-determination, participation, and solidarity.
- An outline and the critical discussion of the general as that which concerns us all in our epoch, and
- *Bildung* of all the dimensions of human capacities that we can recognize today.
- *Allgemeinbildung* must even now also be understood as political *Bildung*, as a capability for active participation in a process of ongoing democratization.”

Regarding the history of German universities, the Humboldtian concept of ‘unity of teaching and research’ (*Einheit von Lehre und Forschung*) has been very influential. Starting in the late 19th century, the idea that universities should transmit knowledge by means of education as well as by conducting scientific research gained popularity. The interplay of teaching and research within higher education institutions is widely used to this day (Bommel, 2015).

The way for this was paved by Immanuel Kant, who proposed an ideal of ‘rigorous science’ entailing a novel concept of ‘scientific education’ (*wissenschaftliche Bildung*). This ideal stipulated that the human mind would become more harmonious by methodically exploring the totality of human knowledge and one’s own personality (Bommel, 2015; Tenorth, 2013).

Wilhelm von Humboldt (1767–1835) was convinced that the totality of human knowledge had not been fully explored. Therefore, science must be seen as something not yet completely discovered, and also never to be completely

discovered. As a consequence, he postulated that scientific research is an integral part of academic practice (*Wissenschaft als Forschung*) and that research is the measure to achieve the highest educational end, called 'scientific education' (*wissenschaftliche Bildung*) (Humboldt, 1964). From this, the ideal of 'education through scholarship' (*Bildung durch Wissenschaft*) emerged (Humboldt, 1810/1993). In the 20th century, the Humboldtian university ideal came to fruition (Pasternack, 2019). As a consequence, philosophical faculties at German universities reorganized themselves. "It was here that scholars and students were offered scope to educate their minds by exploring the harmonious and coherent totality of human knowledge through disinterested research." (Bommel, 2015, p. 3). The curricula of those faculties aimed for an encyclopedic breadth that included both the humanities and the natural sciences. Within this framework, students had the chance to participate in advanced, inquiry-based learning to acquire scientific education guided by scientific specialists (Bommel, 2015).

The focus on one's mind or the element of personality in this context was further developed by Rütter (2008) among others. His concept of human education first of all emphasizes a man's 'personhood' (*Personalität*) and that being a person inevitably means that "each human being is a person" (Rütter, 2008, p. 178, own translation). A further component of his concept describes the person's overall potential, comprising the entirety of a person's inherent potentials. Finally, someone's personality is shaped through a lifelong process of taking action and realizing the entire person's potential. Thus, 'being a personality' is furthermore based on the appreciation by others (Rütter, 2008):

"What is general of education? ...'Education' stands for the process by which a person actualizes one's own person potential and thus gradually forms one's own personality. A person takes this path throughout one's live, step-by-step through the various phases of one's live, through social situations and thus through communication, interaction and collaboration, through conflict and collision with other persons and through crises in one's struggle for life....In brief, 'education' stands for 'personality'. Because, what a person develops from his personal (internal and external) potential – creatively from intellectual act to intellectual act, throughout one's entire life and one's

struggle for life – that is one’s personality.” (Rütter, 2008, p. 303, own translation)

As the Humboldtian educational ideal still is of high importance (Nida-Rümelin, 2014; Tenorth, 2013), contemporary educational researchers such as Tippelt (2013) deal with the interrelations, commonalities and differences between various concepts. He created a connection between Kant’s and Humboldt’s ideas and concluded that the basis for every human being’s ability to make decisions, solve problems, resolve conflicts, and perform creative determination is scrutinizing one’s own rationality in a critical way. Thus, this ambitious objective is essential for a holistic concept of education (Tippelt, 2013).

This contemplation of one’s own mind is not the only possible impetus for reflection, but probably the strongest, without which one cannot speak of education. Humboldt gave this reflection three dimensions: the self-reflection of science as a mode of knowledge; the self-reflection of the subject by means of science; and the reflection on the common good, which is to be promoted by it (Huber, 2009). The importance of reflection, with regard to each person’s responsibility to serve the common good, is also evident from Kotter’s (1998) and Kouzes and Posner’s (2017) contend that reflection is a key factor when it comes to the development of leadership (J. V. White & Guthrie, 2016).

It was the ancient Greeks (for example, Socrates) who first stated that the process of reflection plays an important role when it comes to learning (Daudelin, 1996). In the 19th and 20th, the concept achieved widespread acceptance as John Dewey (1859-1952)—a well-known American philosopher and educational reformer—demonstrated the relation among experience, reflection, and learning. Reflection is explained as an educational objective (Dewey, 1910). Viewed as connected circles, learners continue to develop with each loop they take (Kolb, 1984) as Figure 1 shows.

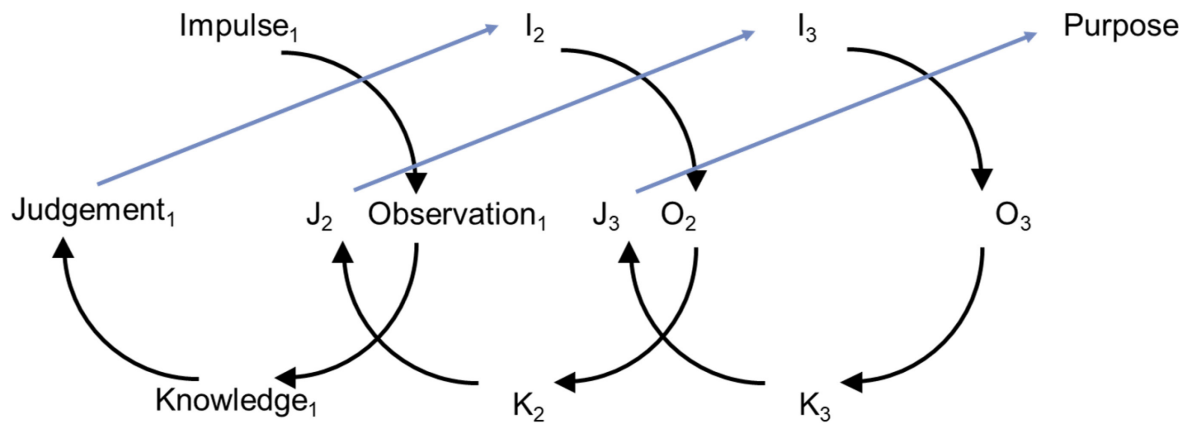


Figure 1 John Dewey's concept of learning cycles based on Kolb (1984)

In other words: "Reflection is the process of stepping back from an experience to ponder, carefully and persistently, its meaning to the self through the development of inferences; learning is the creation of meaning from past or current events that serves as a guide for future behavior." (Daudelin, 1996, p. 39).

2.1.2 Tertiary Education and the Bologna Reform

As 'scientific education' is seen as the highest educational end (Humboldt, 1810/1993), it is not exclusively but is primarily tertiary education that is influenced by this educational ideal.

"Tertiary education—provided by universities and other higher education institutions—is the level of education following secondary schooling. It is seen to play an essential role in society, by fostering innovation, increasing economic development and growth, and improving more generally the wellbeing of citizens." (eurostat, 2023)

"Tertiary education builds on secondary education, providing learning activities in specialized fields of education. It aims at learning at a high level of complexity and specialization. Tertiary education includes what is commonly understood as academic education but also includes advanced vocational or professional education. It comprises [...] short-cycle tertiary education, Bachelor's or equivalent level, Master's or equivalent level, and doctoral or equivalent level, respectively. The content of programs at the tertiary level is more

complex and advanced than in lower [...] levels. [...] Typically, programs at this level are theoretically-based but may include practical components and are informed by state of the art research and / or best professional practice.” (UNESCO, 2012, 46&51)

The education provided by universities serves the individual student as well as the whole society. The latter mainly takes place as the qualification provided by universities primarily focuses on the preservation of the ability to innovate and the adaptability of society and economy (Wissenschaftsrat, 2015). “From the individual perspective, a university degree is designed to most of all open professional and personal development options.” (Wissenschaftsrat, 2015, p. 48f, own translation).

This focus on the individual is also apparent within the defined aims of the Bologna Reform in 1999. Its measures should achieve a paradigm shift in the educational sciences away from the traditional teaching-centered approach to a studies- and learning-centered approach. This means that the teacher’s input is no longer the focal point of educational activities and rather the learner’s output, specifically the learning results, become more important. Therefore, it became necessary to include descriptions of these learning outcomes, specified workload (expressed in credit points), and clear assessment criteria to all study modules.

Another measure of the Bologna Reform was the Europe-wide introduction of Bachelor’s and Master’s degrees. As this research project deals with the education of Master’s students, Table 1 below shows the profile of graduates as defined by the Ministers of Education and Cultural Affairs (Kultusministerkonferenz [KMK] (Secretariat of the Standing Conference), 2005). As presented, this profile on the one side specifies the required knowledge and understandings of a Master’s graduate. The other side shows the abilities developed through and the actions one can take after completing a Master’s degree, which also comprise the independent acquisition of new knowledge and abilities.

Table 1 Profile of Master's graduates defined by the KMK (2005)

Knowledge and Understanding	Ability
<p>Master's graduates have demonstrated knowledge and understanding that is usually based on the Bachelor's level, and significantly deepened and expanded it.</p>	<p>Master's graduates can also apply their knowledge and understanding as well as problem-solving skills in new and unfamiliar situations or in a broader or multi-disciplinary context.</p>
<p>They are in the position to define and interpret the specific features, limits, terminology and doctrines of their fields.</p>	<p>Master's graduates can integrate knowledge and handle complexity.</p>
<p>Their knowledge and understanding are the basis for the development and/or application of independent ideas. This can be application- or research oriented.</p>	<p>Master's graduates can also make scientifically based decisions even on the basis of incomplete or limited information while taking into account social, scientific and ethical findings.</p>
<p>They have a broad, detailed and critical understanding of knowledge that is up-to-date in one or more specialized areas.</p>	<p>Master's graduates can independently acquire new knowledge and ability.</p>
	<p>Master's graduates can carry out self-directed independent research and/or application-oriented projects.</p>
	<p>Master's graduates can clearly and unambiguously communicate their conclusions—based on the current level of research and application—and the underlying information and motivation they are based on, both to specialists and lay people.</p>
	<p>Master's graduates can exchange knowledge, ideas, problems and solutions with scholars and laypersons at scientific level.</p>
	<p>Master's graduates can take prominent responsibility in a team.</p>

To summarize what has been thus far described regarding the German educational background, the primary educational mission is to promote “personalities with exceptional individuality so that they can use their acquired knowledge and skills to shape the world, provide services in their own interests and in the interest of society, and to consciously want to and be able to take responsibility in business as well as in public and private life” (Spoun et al., 2005, p. 293, own translation).

Having already necessarily dealt with several educational terms such as ‘knowledge’ and ‘abilities’, which can be misleading as the term ‘education’ is itself, the next section of this thesis provides a comprehensive overview regarding the terms that are decisive when evaluating the success of learning and educational activities.

2.1.3 Educational Goals

Educational goals are (more) general in comparison to the learning objectives and learning outcomes that are defined for every module and course within a program and thus constituting a curriculum (N. Schaper et al., 2012).

2.1.3.1 Knowledge and Qualifications

Knowledge can be tested in written, oral or practical form. Especially regarding the massification in the tertiary educational system (in 2021 there were around 220 million students in the world, more than double the 100 million in 2000 (World Bank, 2021)), these practices have not lost significance. However, higher education institutions should emphasize that students not only memorize knowledge, but also ensure that the acquisition of knowledge leads to a deeper understanding with regard to its content, context, and relevance (Faix & Mergenthaler, 2015).

Teichler (2020) define qualifications as the clearly demarcated interplay of knowledge in the narrower sense, skills and abilities that a person must have to realize and fulfill professional tasks. The possession of qualifications is awarded by for example, a university degree, a diploma or a certificate. However, participants of respective programs only demonstrate their knowledge and skills in an arranged and thus artificial situation. For the ability to apply the acquired knowledge and skills in a new situation—which is especially the case when it comes to innovation—the concept of competence becomes important (Faix & Mergenthaler, 2015).

“Highly competent individuals are necessarily highly qualified.”
(Erpenbeck, 2012, p. 17, own translation)

2.1.3.2 The Concept of Competencies

The term competency has been shaped in the field of linguistics (Chomsky, 1968) and psychology (Piaget, 1973). During the 1970s the term was also used for pedagogy (H. Roth, 1972). Nowadays, there has been a large inflation in the use of the concept of competency (Zlatkin-Troitschanskaia & Seidel, 2011), thus it is not surprising that there is no general definition.

Competencies can be conceptualized as encompassing three types of characteristics: traits, skills, and knowledge (Lau et al., 2000). Similarly, Erpenbeck et al. (2017, p. 366, own translation) state that “competencies are based on knowledge, constituted by values, disposed as abilities, consolidated by experiences, realized by a person’s will.” Furthermore, Erpenbeck et al. (2017) point out, that competencies are the prerequisite to manage complex, ambiguous and problematic situations that require concrete action. These situations demand that the person evaluates or generates knowledge in its context in order to know what to do and to finally execute the action. In brief, competency is the “disposition to self-organized action”, especially when new and non-routine situations must be handled (Erpenbeck et al., 2017).

Erpenbeck and Heyse (2021)³ distinguish between the following four classes of competencies, which are also documented in Faix and Mergenthaler (2015, pp. 115–116):

1. Technical and methodological competency:

The disposition of a person to act in a way that is mentally and physically autonomous when solving problems, that is, creatively solving problems using professional and instrumental knowledge, skills and expertise and meaningfully classifying and evaluating knowledge. This includes a disposition for methodically and

³ The first edition was published in 2003.

autonomously shaping actions, tasks and solutions as well as creatively developing the methods themselves.

2. Personal competency:

The disposition of a person to act reflectively and autonomously, that is, to accurately assess his/her own abilities and develop productive attitudes, values, motives, and self-images, to unfold his/her own talents, motivation, performance objectives, and creatively develop and learn both inside and outside of the work environment.

3. Social-communicative competency:

The disposition of people to organize themselves so that they can communicate and cooperate with others, that is, creatively discuss and work out solutions with them, to orient themselves in a group and in relationship to others and to develop new plans, tasks and goals.

4. Competency to take action and make decisions:

Disposition of a person to take active and comprehensive action, in particular the capacity to integrate one's own emotions, motivations, skills, and experience and all other competencies—technical and methodological, personal and social communication—into one's own drive to succeed.

On to these four classes of competencies, Bird (1993) added another relevant type regarding business success: entrepreneurial competency. According to her, such a competency is demonstrated by individuals who found ventures, transform them and manage organizational opportunities and resources. This competency comprises qualities of knowledge, skills, traits, self-images, motives, and social roles, which result in the confinement, endurance and expansion of the venture (Bird, 1993). In a similar sense, Mitchelmore and Rowley (2010) see two means through which competencies can positively affect entrepreneurial performance. One is that competent entrepreneurs better utilize venture opportunities. The other is that venture strategy is positively influenced by management competencies. Entrepreneurs demonstrating high management competency can implement venture strategies effectively. Furthermore, competencies acquired through socio-economic factors like previous business experience, educational background,

finance from banks, and other informal sources, are important factors for start-up success (Basu & Goswami, 1999).

2.1.3.3 Integrating Knowledge, Qualifications, and Competencies into a Curriculum

Based on the understanding of competencies outlined in chapter 2.1.3.2, Faix and Mergenthaler (2015) developed an architecture to connect knowledge, qualifications, and competencies while also integrating their conceptual relations complemented by interiorized rules, values, and norms based on the comprehensive work of Erpenbeck (2012). This framework illustrated in Figure 2 below shows that knowledge can be acquired using, for example, self-studies, web-based trainings (WBTs), and seminars. Qualification can be achieved by building up learning communities or seminars, including discussions. Finally, competencies require the opportunity to learn from experience, for example, through realizing projects in companies (Faix & Mergenthaler, 2015).

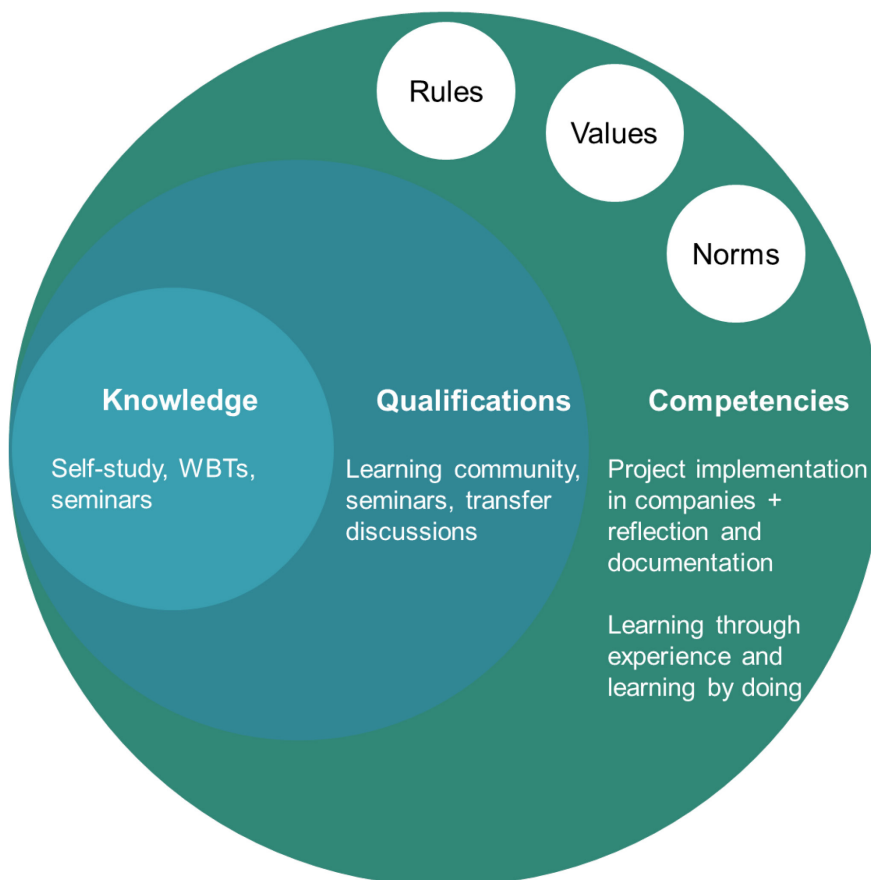


Figure 2 Knowledge, qualifications and competencies as curriculum elements based on Faix and Mergenthaler (2015, p. 163)

2.1.4 Assessment of Learning Achievements

One of the most popular taxonomies to assess cognitive learning goals comprises knowledge, understanding, applying, analyzing, synthesizing, and evaluating (Bloom, 1976).

In a certain sense, the massification of higher education world-wide only allows the level of knowledge to be used to check, whether and how much positive change occurred in a learner due to the educational processes. To some extent, this kind of measurement still has its place. However, Faix and Mergenthaler (2015) emphasize that knowledge is only one element of an education that aims for shaping all the constituent parts of an individual's personality. However, the educational assignment of universities comes to the fore at a relatively late stage of a person's life. Thus, it is maybe not possible to develop 'deeper layers' of the personality through them. Educational practice as well as research are mainly convinced that core personality changes are difficult to achieve in adults while knowledge, competencies, and abilities can change throughout a person's lifetime (G. Roth, 2011). With regard to being a personality (Rütter, 2008), the appreciation by others obviously can be obtained by having good results in knowledge tests. However, this passing of an exam probably does not lead to a long-lasting sense of achievement:

“Sustained appreciation is experienced by individuals whose actions contribute lasting benefit to a community; innovations of all kinds are among the things that create such benefit. Such action is in turn the result of the synergistic interaction of a person's entire complement of mental and spiritual components. In short, this means that if education is to develop human beings in their entirety, then measuring educational achievement must be methodically designed to make these holistic developments visible, and if possible, objectifiable.”
(Faix & Mergenthaler, 2015, p. 160)

To holistically measure the achievement of learning goals it is necessary to 1) use classical queries of knowledge (what does one know) and 2) assess actions (what is one able to do), while keeping in mind that such assessments should consider the past as well as the present. Furthermore, questions focusing on self-reflection arise (Faix & Mergenthaler, 2015).

Competencies that describe achievements gain importance, as the application of knowledge has the greatest value. Relating such competencies to the taxonomy proposed by Bloom (1976) makes it possible to validate the effectiveness of an educational program, as demonstrated in Figure 3 below.

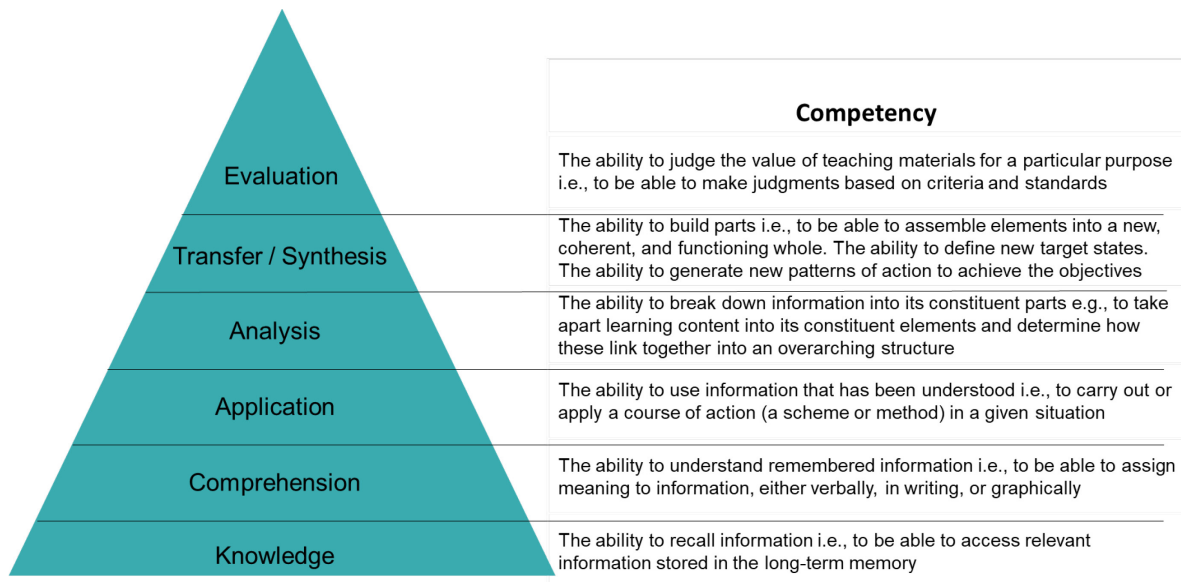


Figure 3 The taxonomy of learning objectives related to employability based on Mergenthaler (2009) and related competencies based on Bloom (1976)

2.1.5 Competency-based Education

Based on the aforementioned explanations, the constitution of a so-called competency-based education (CBE) occurred, which is “an alternative path to traditional higher education programs” (Kisgen, 2017, p. 17). Focusing on actions taken by a learner requires the integration of measurements that include all phases of an activity: informing, analyzing, planning, deciding, carrying out, monitoring, and finally, evaluating (Faix & Mergenthaler, 2015).

It is necessary to emphasize the meaning behind the concept of ‘competencies as dispositions for actions.’ Only the realization of a disposition, more precisely the action one is able to perform based on the competency, is relevant (Erpenbeck et al., 2017). Therefore, the strong connection between competency and motivation to act is obvious: „I shall argue that it is necessary to make competence a motivational concept“ (R. W. White, 1959, p. 317). Demonstrated performance depends on motivational aspects comprising also “ethical, volitional, and/or social components” (Weinert, 2001, p. 62). Voorhees (2001) recognizes a considerable gap between

intentions and actions when thinking about educational goals. In this sense, he also draws upon the Conceptual Learning Model of the U.S. Department of Education, arguing that it is the demonstration that leads to the assessment of performance (see Figure 4).

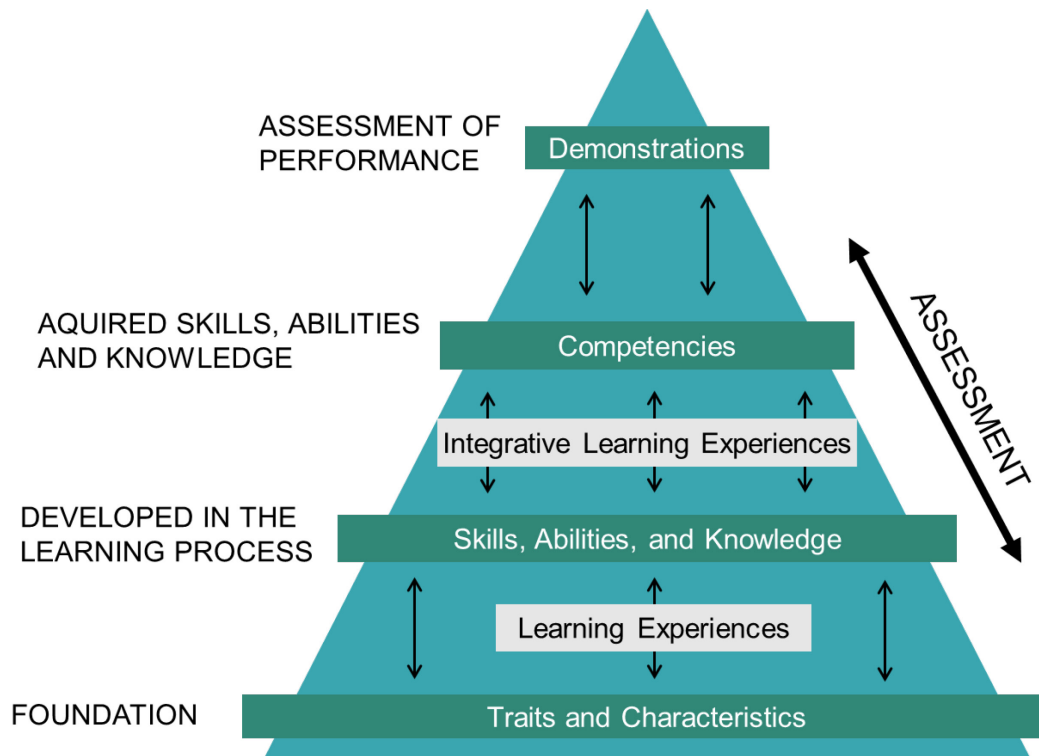


Figure 4 Conceptual Learning Model of the U.S. Department of Education (Voorhees, 2001, p. 9)

Complex, ambiguous, and problematic situations demand someone to evaluate or generate contextual knowledge in order to know what to do. People decide to make use of their disposition in order to find a solution for new and non-routine tasks (Erpenbeck et al., 2017). Doing so means that an individual “can actively shape life and the world” (Faix & Mergenthaler, 2015, p. 129).

Due to the strong connection between the concepts of competencies and performance, several researchers argue that competency-based and performance-based education is used synonymously (Thompson, 2017). This is in line with literature showing no single definition for competency-based education: rather, it has been defined in various ways. Le et al. (2014, p. 1) see competency-based education as “an evolving field with no universally shared definition of what makes a model ‘competency-based’.” Gervais (2016) emphasizes effort toward the

assessment as a key element when evaluating learning mastery required for the degree.

“Nevertheless, CBE may also be conceived as a kind of umbrella term that embraces various methodologies, leading to competency development such as problem-based learning, project-based learning, work-integrated learning, experience-based learning, action learning etc.” (Kisgen, 2017, p. 111)

The next chapters here elaborate on these concepts in detail in order to understand which learning formats and educational methods best suit the aim of developing creative personalities through competency-based education.

2.1.6 Learning Environments

The next sections deal with different learning environments. Learning can occur traditionally within classroom-based activities. Alternatively, to enable transfer to real-life contexts, learning can be integrated into work. In this context, action-based learning represents a special form of work-integrated learning.

2.1.6.1 Classroom-Based learning

Instruction-oriented teaching methods, such as lectures, focus on the delivery of content by a lecturer or teacher (Speth, 1994). These methods enable a systematic and structured way to transfer knowledge to a large number of learners in an efficient manner. The learners have a rather receptive attitude. This concept reflects the behaviorism⁴ approach that “assumes learning is primarily the passive transfer of knowledge from the teacher to the student” (Nabi et al., 2017, p. 280). In this way, Neergaard et al. (2012) determine that higher education often focuses on knowledge acquisition rather than applying deeply experiential approaches and seeking for the collaboration of students.

⁴ For more information on behaviorism, please see for example, Ertmer and Newby (1993), Corbett (2005) or Boghossian (2006).

Despite focusing on schools rather than on higher education institutions, Goodlad (2004) anecdotally describes a typical setting of a traditional classroom instruction and involved students: “Not *how* but *what* to learn dominated consistently, [...] not seeking solutions to problems identified by them as important and meaningful. Instead, they were moderately busy on assignments predetermined by teachers. In general, the subject matter studied appeared to be remote from daily concerns and interest [...]” (Goodlad, 2004, p. 13).

In a study covering one century of traditional classroom practices, Cuban (1993) describes instructions ranging from teacher-centered to student centered approaches. Teacher-centered curricula mainly consist of teachers’ monologues, instructions given to the whole class rather than for small groups or individuals, and the time being determined by the teacher while mainly using textbooks (Cuban, 1993). The student-centered curricula that were present were describes as “students exercise a substantial degree of responsibility for what is taught, how it is learned, and for movement within a classroom” (Cuban, 1993, p. 7). He furthermore claims that many new and effective classroom practices are difficult to realize due to structural frameworks. For example, constructivist learning is difficult to adapt for mass lectures (Pasternack, 2019).

Instruction-reliant pedagogy restricts the usage of action-oriented methods or the promotion of cognitive skills, leading to the problem that action competence can hardly develop (Schmidt & Tippelt, 2005). Thus, traditional learning approaches have been questioned regarding their effectiveness in providing rich learning environments (Perkins, 1998), which has formed the basis for constructivist learning approaches that “assume [...] that learning involves actively participating in the construction of new understanding” (Nabi et al., 2017, p. 280). However, there are several researchers arguing that the art of good teaching combines instruction and constructivist approaches (Blömeke et al., 2007; Pfäffli, 2015).

2.1.6.2 Work-Integrated learning

As we have seen, educational settings often lack clear wordings and definitions. This is also the case for the concept of work-integrated or work-based learning. Work-based learning is defined by Boud et al. (2001, p. 4) as “university programs

that bring together universities and work organizations to create new learning opportunities in workplaces.”

The term ‘work-integrated learning’ implies three things according to Faix and Mergenthaler (2015):

1. It expresses the fact that the place of learning coincides with the place where the work is being done.
2. *Integrated* implies that the work place is not the only place of learning.
3. There is a systematical linkage between both.

“In short, cooperative learning or dual education means the systematic integration of knowledge acquisition and transfer through systematic cooperation between the two teachers: the educational institution and the business” (Faix & Mergenthaler, 2015, p. 158). This view is also shared by Schmidt and Tippelt (2005) and Tippelt and Reich-Claassen (2010), who state that this method systematically connects two places of learning with each other. Generally, five types of work-integrated learning can be distinguished (Rampersad, 2015):

1. Cooperative education
2. Work-based learning
3. Workplace learning program
4. Community service
5. Placement

Additionally, Action Learning is seen as a variant of work-integrated learning (Rothwell, 2010). Due to its relevance within this research, chapter 2.1.6.3 provides a deeper inside into this topic.

Finally, the term ‘dual education’ is common. Duality contains the acquisition of technical knowledge about work-related content, processes, and methods, as well as enculturating a learner into a community of practice to get familiar with thinking styles, know-how, beliefs, and ethical standards of organizations (Collins et al., 1989; Lave & Wenger, 1991). Dual education is not limited to the acquisition of knowledge. Instead, the learner can and must transfer acquired knowledge in

authentic situations. Learners must leave their protected environment, that is, their seminars, exercises, and case studies. Consequently, there is an opportunity for existential destabilization, which is the prerequisite for profound development of all elements of personality (knowledge, competence, temperament, identity, values, and virtues). This is in line with the belief that competencies get their meanings in the specific context in which they are used (Gulikers et al., 2018; Wesselink et al., 2017). Thus, the differences between experiences in authentic work conditions and classroom assignments are evident. The analysis of the federal-state conference “Perspectives for dual education in the tertiary sector” (Bund-Länder-Kommission für Bildungsplanung und Forschungsförderung [BLK], 2003, p. 11) sees dual degree programs characterized above all by the following:

- The workplace as a systematic element in addition to the university (or vocational college or academy)
- The workplace as the place where work processes are learned
- Contracts that bind students and companies (employment/training contracts)
- A cooperation agreement (contract) between the company and the university or vocational education institute—at the very least, this agreement stipulates the arrangements regarding the coordination of the learning phases in the company or university as well as admission to the program or university
- In addition to these formal elements, it is above all the aspect of duality that completely captures the concept and idea of the dual degree (Konegen-Grenier & Werner, 2001, p. 9)
- The educational or professional experience in a company is systematically and tightly linked, both formally as well as in terms of the curriculum, with undergraduate university studies, that is, theory and practice are systematically interwoven
- Companies and universities cooperate as educational partners to jointly support students

2.1.6.3 Action Learning

“[...] there can be no learning without action, and no (sober and deliberate) action without learning.” (Revans, 2017, p. 74)

Practice and literature show many forms of Action Learning (Cho & Egan, 2010) and Johnson (2010) adds that Action Learning can hardly be distinguished from other forms of active learning.

“Action Learning is a real-time learning experience in which organization-based projects are the principal learning tool and where learning is grounded in real organizational issues. Action Learning has two important purposes: to meet organizational need and to develop individuals and groups.” (Rothwell, 2010, p. 5)

“Action learning is a process that involves a small group working on real problems, taking action, and learning as individuals, as a team, and as an organization. It helps organizations develop creative, flexible and successful strategies to pressing problems.” (World Institute for Action Learning [WIAL], n.d.)

Action Learning⁵ brings people together to find solutions for problems and, in doing so, contributes to the development of both the individuals and the organization (Inglis, 1994). The starting point of Action Learning is the assumption that the learner is facing something unknown or new without readymade solution (Faix & Mergenthaler, 2015). Such learning activities use real-world projects, realized individually by each student, to acquire knowledge and competencies. Application of projects increases retention in several ways (Bacon & Stewart, 2006): students recognize that learned concepts vary depending on context and framework and subsequently establish connections between the content focused on and new settings, learners better retrieve knowledge when facing similar situations, and projects are characterized by choices that need to be made by students; these choices may enhance intrinsic motivation. Additionally, intensive dedication toward

⁵ The following text was analogously published in Windisch et al. (2021).

challenging—because innovative and open-ended—projects, demonstrates students' performance and talent (Faix & Mergenthaler, 2015).

Summarizing the principles of Action Learning, Revans (1989) developed an equation (see Figure 5) with 'Questioning Insight' as the essence of true Action Learning. "[...] there can be no learning without action, and no (sober and deliberate) action without learning" (Revans, 2017, p. 74). 'Questioning Insight' assumes that "asking questions is the key to beginning to think, to doing different things, and to doing things differently and learning" (Weinstein, 1995, p. 178) and leads to "the realization that the solution to the problem is unknown" (Dilworth & Willis, 2003, p. 17). Since repeated testing fosters retention, Action Learning within a project is directly related to the learning outcome. When projects are used as an active learning pedagogy, retention may increase for several reasons: First of all, students need to understand how concepts from theory or lecture can be applied in another context. In doing so, they establish links between the target content and the new context. Second, the project itself may provide indications to recognize when students encounter a similar situation later on. Therefore, projects often enable students to make decisions about the direction of their learning experience (Bacon & Stewart, 2006). Compared to traditional educational formats, Action Learning programs are considered as effective practical approach to enhance both individual and organizational outcomes, which is why Tushman and O'Reilly (2007) suggest that these programs provide a fertile ground for business schools and can bridge the gap between practical relevance and academic rigor. However, a central barrier that prevents the integration of academic research projects into the curriculum relates to the fact that the acquisition of technical knowledge in the curriculum is preferred over conceptual and inquiry-based learning (Griffiths, 2004).

$$A(L) = P + Q$$

A(L): Action Learning
P: Programmed Knowledge
Q: Questioning Insight

Figure 5 The Action Learning equation based on Revans (1989)

Literature identifies four features that outline the nature and the philosophy of Action Learning: the use of (1) real-world, (2) ill-defined problems that allow for the (3) execution (and not only the articulation) of envisaged solutions, mediated by a process of (4) reflection (Cho & Egan, 2009; Raelin, 2016; Scott, 2017; Tan et al., 2016; Yeo & Gold, 2011). Particular emphasizes lies on the aspect of reflection, as adults reflect again after some period of time when the problem is already dealt with. Thus, situations can be reevaluated and one ponders over other options of how the problem could have been solved (Schön, 1988, 1994). All these elements have been brought into a conceptual framework by Perusso et al. (2021) as shown in Figure 6 below. The authors therein add the elements of knowledge, skills, and attitudes as connected to reflection.

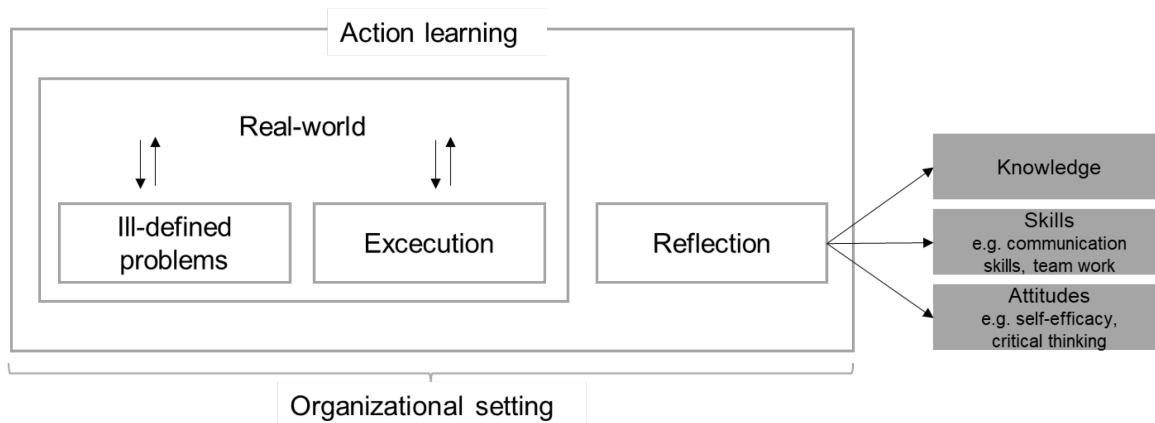


Figure 6 Wider conceptual framework of Action Learning based on Perusso et al. (2021, p. 182)

The epistemological base of Action Learning tends to be rooted in a form of pragmatism (in the philosophical sense this emphasizes the interdependency of knowing and doing) as articulated by Dewey (1938/1994) and Sennett (2009), among others. Actions are seen as the origin of all things and all knowledge (Schreier, 1994). Teaching in this sense largely means offering people the opportunity to have real and projective experiences. The art of teaching consists mainly of inspiring and supporting experience. New problems must be sufficiently big that they stimulate thinking; at the same time they must be small enough that they do not overwhelm the learner (Dewey, 2000).

“An ounce of experience is better than a ton of theory simply because theory only has relevance when it can be applied to actual experience and is accessible and verifiable.” (Dewey, 2011, p. 193)

2.1.7 Educational Methods

Regarding the aforementioned pedagogical elements, specifically the definition of educational goals, the planning of how these goals can be assessed, and which learning environment is chosen, the final question is which educational methods can be used to best accomplish these goals. Therefore, two popular options are described below.

2.1.7.1 Inquiry-Based learning

Higher education research has not yet precisely determined how widespread inquiry-based learning is at German institutions of higher education. Empirical surveys of this issue are lacking (Pasternack, 2019). Thus, the terms inquiry-based learning, research-based learning, and experiential learning⁶ are considered synonymous. The term inquiry-based learning encompasses universities' two main scopes—research and learning—that are usually institutionally separated (Wildt, 2009).

The ideal of 'education through scholarship' (Bildung durch Wissenschaft) originates from Wilhelm von Humboldt (Humboldt, 1810/1993), as described in chapter 2.1.1. The conceptual basis of inquiry-based learning is constructivist learning. The assumption is that individuals construct a subjective image of their environment, that students independently construct new knowledge as part of an active process, and as such, that educators act not as instructors, but as moderators and coaches. Learning thus involves participating in action to construct new knowledge (Nabi et al., 2017). In order to make university education possible at all (and not just school or vocational education), the experience of a research process is essential. Education through science requires an intensive, active engagement with how science is done (Brinckmann et al., 2002; Brunkhorst, 2002).

⁶ Wurdinger and Carlson (2010) state that the experiential learning theory refers to any learning that supports students in applying their knowledge and conceptual understanding to real-world problems or situations where the instructor directs and facilitates learning. Experiential learning has later been defined as a process whereby knowledge is created through the transformation of experience, as knowledge results from the combination of grasping and transforming experience (Kolb, 1984).

For inquiry-based learning, action means that learners conduct research themselves (Huber, 2014). More precisely, it is exactly this action that distinguishes inquiry-based learning from other forms of learning. The Bundesassistentenkonferenz (1970/2009) defined inquiry-based learning by: 1) independent selection of the topic, 2) defining the strategy independently, thus bearing the risks for errors, detours, and set-backs, 3) checking the results in terms of the hypotheses and methods, and 4) communicating and representing the result. Huber (2009) adds that experience and reflection on the process of a research project are crucial, as is aiming to gain knowledge that is of interest to third parties. Inquiry-based learning is related to project-based learning, although it is not necessarily about practical results (products) but, initially, about theoretical insights. Thus, inquiry-based learning can also be described as situated learning⁷ (Huber, 2009).

Inquiry-based learning can also be described as 'learning by scientific doing' or as 'learning by doing science', demonstrating the connection to John Dewey. Such learning comprises:

1. Students dealing with a real situation suitable to gain experience that the student is interested in for its own sake that allows them to perform coherent activity

⁷ The concept of situated learning assumes that learning and the acquisition of competencies do not occur in an individual's mind but are rather situated in a real-world setting. The individual participation in the communities of practice plays a vital role in the situated learning process (Ataizi (2012). The approaches of situated learning can be understood as a critical reaction to the dominant cognitive approaches (Mandl and Kopp (2006). One criticism is that the cognitive approaches often disregard the context-bound nature of inert knowledge and thus run the risk of imparting knowledge that can be applied in examination situations but is not used to solve practically relevant problems (Renkl et al. (1996). Learning situations, as it is assumed, should therefore be characterized by working on authentic tasks that involve diverse and complex interactions with the physical and social environment. Therefore, a key component is the social interaction in working and learning groups. In these groups, knowledge is ideally acquired jointly by the learners explaining facts to each other or by encountering different opinions in discussions (Stegmann et al. (2018). The situated learning approach focuses on the inclusion of authentic physical and social contexts which is mainly achieved through dual education programs. This text was analogously published in Windisch et al. (2021).

2. A real problem that is able to stimulate thought
3. Students possessing the knowledge and the ability to make the necessary observations to handle the problem
4. Students who can achieve possible solutions and who are committed to developing them in an orderly manner
5. Students who have the ability and the opportunity to test ideas through practical application, to clarify their meaning, and to independently discover their value (Dewey, 2000)

When this comprehensive opportunity is given, realizing research is not the only possible impetus for self-reflection without which we cannot speak of education, but is probably the strongest. Humboldt gave this reflection three dimensions: the self-reflection of science as a mode of knowledge, the self-reflection of the subject by means of science, and the reflection on the common good which is to be promoted through it (Huber, 2009).

“Authentic activities provide learners the motivation to acquire new knowledge, a perspective for incorporating knowledge into their existing knowledge, and an opportunity to apply their knowledge. In contrast to the passive reception of knowledge associated with conventional science learning, inquiry is active. As an authentic scientific practice, inquiry also provides a valuable context for science learning.” Edelson et al. (1999, p. 393).

Sengstag (2001) presented various precise suggestions on how research can be integrated in teaching: thought experiments, work with scientific publications, writing proposals, learning in and through internships, etc. In addition, Wildt (2009) has defined a systematic sequence for inquiry-based learning (see Figure 7 below). The underlying assumption of this process is Dewey’s concept of experience, which has been used by Kolb (1984) to set up an experiential learning cycle comprising four phases, as the inner cycle shows. Quite similarly, Rasmussen and Sørheim (2006) see experiential learning as a process in which knowledge develops through experiencing, reflecting, thinking, and acting.

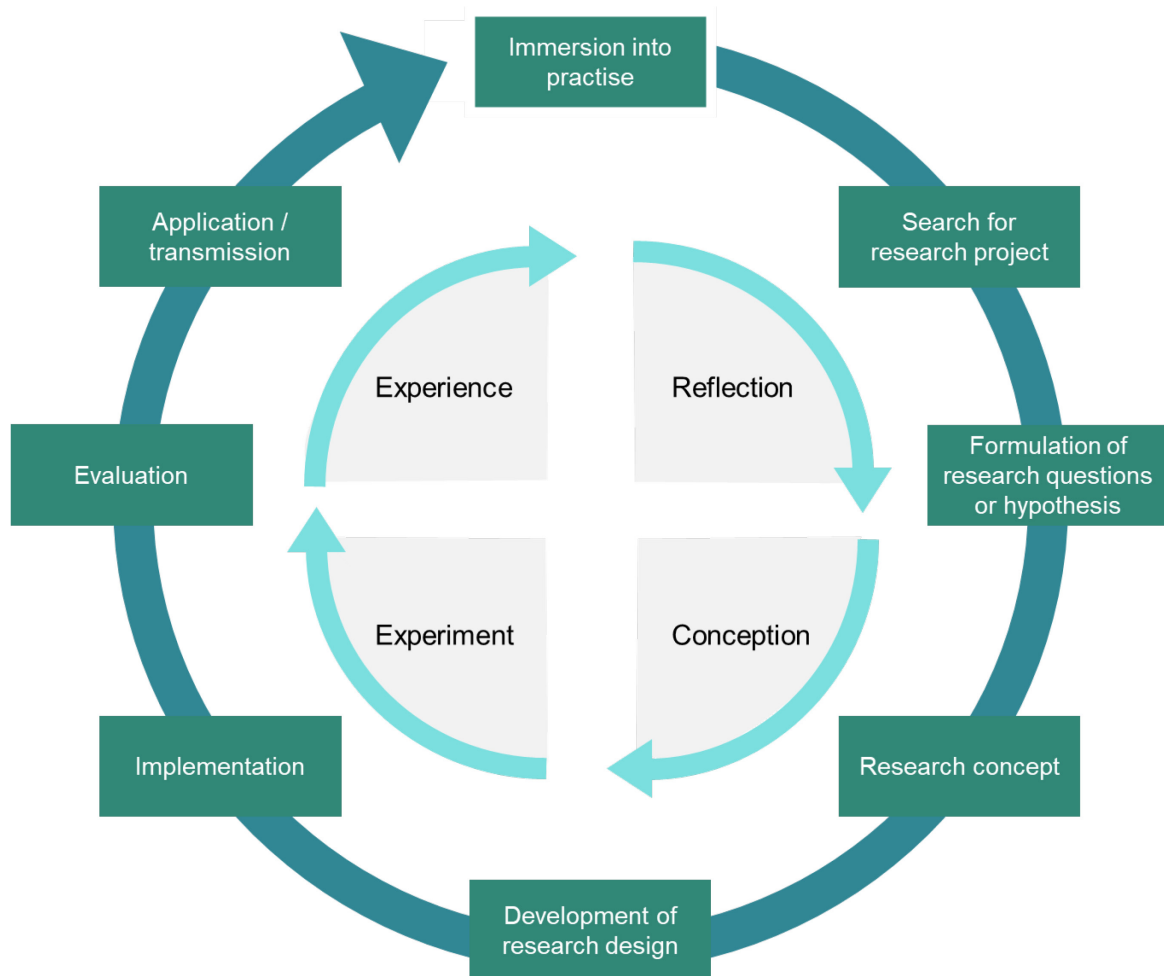


Figure 7 The learning cycle for a research process based on Wildt (2009, p. 6)

Tippelt (1979) proposed six general considerations for a learning setting to highlight the role of the research project within inquiry-based learning:

1. Scientific criteria take precedence over operational urgencies which may arise in practice for example, urgency to decide
2. The generation of pragmatic knowledge for immediate use is replaced by research based on sound methodology
3. Replacing partial and one-sided information with a sound theoretical basis and a broad information base
4. Scientific standards supersede the effectiveness of action (scientific standards mean consensus within a group (democratic principle), explication, legitimation of information's validity, and transparency of research methodologies)

5. The distinctive expertise of learners and / or researchers shall not be neglected
6. Comprehensibility and transparency in research are limitations for the fifth criterion

Briefly summarized, inquiry-based learning means two things: First, the learning material is not presented by the teacher, but is researched and explored by the learners themselves. Second, the subject of learning, that is, the student, experiences this research process as an educational experience (Dewey, 2000).

Inquiry-based learning is just not a luxury to be reserved only for science-related degrees or postgraduate studies, but a necessary element of complex qualifications (Huber, 2015). Yet, the idea of inquiry-based learning in undergraduate and Bachelor's degree programs is met with resistance (Huber, 2009).

Finally, Pasternack (2008) states that it is especially inquiry-based learning that effectively promotes the employability of graduates, as the competencies needed in highly qualified professions or professions with a high degree of uncertainty are exactly the same as those needed and practiced in research.

2.1.7.2 Project-Based learning

The concept of project-based learning was mainly developed by John Dewey (1859 – 1952) and William Heard Kilpatrick (1871 – 1965). The pragmatism⁸ developed by Dewey at the end of the 19th and beginning of the 20th century, placed action and experience into a fundamentally mediating position in relation to cognition. In doing so, the constructive side of the human view of reality was also emphasized, which is why pragmatism and constructivism have many overlaps (Hickman, 2004). Because action in pragmatism is seen as a prerequisite or goal of cognition, it is

⁸ The clear rootedness of the project approach in pragmatism requires its brief consideration. Pragmatism defines action as the origin of all things and utility as the measure of truth (Schreier (1994). It places human action and the significance of action processes for the discovery of knowledge at the center of knowledge discovery, and measures the value of knowledge by the benefit it has for human action and for the practice of life (Jank and Meyer (2000).

also the basis for all forms of learning (Reich, 2007). A project in the sense of Dewey and Kilpatrick always takes place as planned action, driven by personal motivation and integrated into a social surrounding. The intended educational goal is the maturity of the learner in democratic structures, and the development of personality (Reich, 2007).

A project can be seen as a comprehensive, on-off, time-limited activity for tackling novel, complex problems (Faix & Mergenthaler, 2015). In a project, students deal with a problem, which arises from an economic, social, ecological reality or from another sphere of the society (Speth, 1994; Zillober, 1984) and thus is related to the profession. Blömeke et al. (2007) suggest that such a project is authentic and close to reality, thus supporting the students' learning.

Project-based learning was first introduced as 'the project method' to engage students into hearty and purposeful activities by Kilpatrick (1918/1935). During the politically and pedagogically turbulent 1960s and 1970s, project-based learning was rediscovered and transferred to higher education didactics in response to the demand for project-based study programs (Stubenrauch, 1976). Tippelt (1979) conceptualizes project-based learning as a special form of inquiry-based learning and says that, under specified conditions, learners can comprehend a relevant, authentic, real-world problem and work on it thoroughly and in a carefully planned, purposeful, interdisciplinary, and independent manner by developing a proposed solution to the problem and putting it into action. Project-based learning was then further developed by Blumenfeld et al. (1991) and defined as a pedagogy that entails two components that are "a question or problem that serves to organize and drive activities; and these activities result in a series of artifacts or products, that culminate in a final product that addresses the driving question" (Blumenfeld et al., 1991, p. 371). In project-based learning the art of teaching consists mainly of inspiring and supporting experience. The traditional understanding of roles between teachers and learners disappear in favor of creating democratic forms of interaction (Kaminski, 1999)

Table 2 below summarizes several researchers' intensive dealings with project-based learning and the related elements or characteristics regarding program design or important aspects they have found.

Table 2 Characteristics of project-based learning

Characteristic	Source
<p>Student's 'drive'</p> <p>The project or problem is often defined by the students themselves as something they have interest in and depending on their experience.</p>	<p>Adderley et al. (1975) Jacobson et al. (2017) Thomas (2000) Weinstein (1999)</p>
<p>Acquisition of new knowledge or skills</p> <p>Students learn how to tolerate uncertainty within life situations by adapting and internalizing something new.</p>	<p>Hero and Lindfors (2019) Kaiser and Kaiser (1977) Thomas (2000)</p>
<p>Student autonomy</p> <p>Teaching consists mainly of inspiring and supporting experience. The traditional understanding of roles between teachers and learners has been overcome in favor of creating democratic forms of interaction. Projects incorporate student autonomy, choice, unsupervised work time, and responsibility to foster decision making.</p>	<p>Adderley et al. (1975) Faix and Mergenthaler (2015) Gudjons (2008) Helle et al. (2006) Jacobson et al. (2017) Kaminski (1999) Thomas (2000) Tippelt (1979)</p>
<p>Real-life challenges</p> <p>The focus lies on relevant, authentic open-ended problems or questions provided by companies or other organizations from an economic, social, or ecological reality, or from another sphere of the society.</p>	<p>Blömeke et al. (2007) DeFillippi and Milter (2009) Gudjons (2008) Hero and Lindfors (2019) Speth (1994) Thomas (2000) Tippelt (1979) Zillober (1984)</p>
<p>Results in a solution</p> <p>Students build novel products, services or processes and also thesis, reports, design plans, etc.</p>	<p>Adderley et al. (1975) Blumenfeld et al. (1991) DeFillippi and Milter (2009) Gudjons (2008) Hero and Lindfors (2019) Jacobson et al. (2017) Tippelt (1979)</p>
<p>Defined time-span</p> <p>The project provides a reasonable time to work on it. Thus, the student can evaluate the success at the endpoint.</p>	<p>Adderley et al. (1975) Faix and Mergenthaler (2015)</p>

<p>Interdisciplinarity</p> <p>A multi-dimensional and interdisciplinary way of thinking is necessary to handle real projects to approach them in their entirety.</p>	<p>Gudjons (2008) Tippelt (1979)</p>
<p>Action oriented</p> <p>First a solution is developed and proposed for the problem, then it is put into action.</p>	<p>Gudjons (2008) Tippelt (1979)</p>
<p>Well-planned</p> <p>Projects are central, not peripheral to the curriculum, which needs an adequate planning of educational measures.</p>	<p>Gudjons (2008) Thomas (2000) Tippelt (1979)</p>

Within a project-based approach, students deal with projects that must be sufficiently large to stimulate thinking; at the same time, the projects must be small enough that they do not overwhelm the learner (Dewey, 2000). Adding to the important elements of project-based learning, Weinstein (1999) point out that the best way to learn to do something (differently) is to focus exactly on that doing. This gives the opportunity to learn from that experience, its success or its failure, the mistakes that have been made, and to understand the reasons behind. Project-based learning gives the opportunity for a positive result even when a project has to be aborted, as adequate analysis and reflection into the cause of the failure is important. Indeed, such an emotional destabilization, which can also occur in irritating situations characterized by painful processes, leads to profound, existential concern initiating educational processes, for example, skill development and the interiorization of values (Faix & Mergenthaler, 2015).

Excursus: Problem-based learning

Problem-based learning was originally developed in medical school programs (Barrows & Tamblyn, 1980). Project-based learning is broader in scope than problem-based learning, which is often configured as a specific type of project focusing on problem definition and solution strategies (Barron & Darling-Hammond, 2015).

Problem-based learning follows “a curriculum development and instructional system that simultaneously develops both problem solving strategies and

disciplinary knowledge bases and skills by placing students in the active role of problem solvers confronted with an ill-structured problem that mirrors real-world problems” (Finkle & Torp, 1995, p. 1).

Some researchers even tend to equalize both pedagogies (problem- and project-based learning) (English & Kitsantas, 2013; Maudsley, 1999) although the work from Brassler and Dettmers (2017), as summarized below in Table 3, clearly shows the differences and adds onto the points described in Table 2 above.

Table 3 Distinctions of problem-based and project-based learning (Brassler & Dettmers, 2017)

Characteristics	Problem-based learning	Project-based Learning
Duration	Rather short-term	Rather long-term
Problem/Task	Ill-structured cases, open and narrow	Real-world, fully authentic tasks, open and narrow
Responsibility	(mostly) students	(mostly) teacher
Process	Following specific steps <ul style="list-style-type: none"> - Clarification - Problem statement - Brainstorming - Structuring - Definition learning objectives - Self-study - Post-discussion 	Following general steps <ul style="list-style-type: none"> - Task analysis - Identification of solutions - Implementation
Level of solution	Problem analyses (rather theoretical)	Problem solving (rather practical)
Teachers' role	Process-oriented supervisor / facilitator	Product-oriented supervisor / instructor
Outcome/Aim	Presentation of knowledge acquisition	'Tangible' products
Assessment	Individual & group assessments mainly based on learning	Individual & group assessments mainly based on product

2.2 Steinbeis University and its Didactical Approach

The Steinbeis Foundation for Economic Promotion was established in 1971 and stands for knowledge and technology transfer. It works in the spirit of Ferdinand von Steinbeis, who advocated innovation and improvement in industry as early as the 19th century. He promoted start-ups and was inspired by innovations from other countries. Above all, however, he advocated lifelong learning and the combination

of theory and practice, science, and business. He can therefore be seen as the founder of dual training (Jäckle-Wittmann & Alberti, 1986).

“Entrepreneurial knowledge and technology transfer that is based on market understanding is the hallmark of the Steinbeis Network”
(Steinbeis, 2013, p. 8, own translation)

In 1994, the idea was born to facilitate the transfer of knowledge in the spirit of Ferdinand von Steinbeis by founding a university. At the same time, the Steinbeis Academy for Corporate Management developed various courses of study in collaboration with other universities.

In cooperation with the Danube University Krems, the Steinbeis Academy for Corporate Management developed the Executive MBA program between 1993 and 1994, which ran its first courses from 1995 (Donau Universität Krems, 1996; Steinbeis Akademie für Unternehmensführung, 1994; Steinbeis-Stiftung für Wirtschaftsförderung, 1995). With special management courses, the program was primarily designed for entrepreneurs and managers from small and medium-sized enterprises (Korölus, 2000). The courses generally lasted two years and were based on the experiential learning approach by linking learning and work processes. The Krems method consists of 25% practical knowledge, 25% theory, 25% case studies and 25% application and is still used today at Danube University Krems. The application part is characterized by the implementation of a project in a company.

Steinbeis University was founded in 1998 as a wholly owned subsidiary of the Steinbeis Foundation for Economic Development. From 1998 to 2022, the university was recognized by the federal state of Berlin and since 2022 by the federal state of Saxony-Anhalt as a private university in independent sponsorship with the right of self-administration; the university is based in Magdeburg. The university also has two campuses in Berlin and Stuttgart.

2.2.1 The Structure of Steinbeis University

The academic area is divided into the departments Technology and Engineering, Leadership and Management, Business and Economics and Health and Social Affairs (see Figure 8). The departments of Steinbeis University are responsible for studies, teaching and research. They are headed by the Dean and the Faculty

Council. There are schools within the departments, which are responsible for the Master’s and MBA programs as well as the undergraduate Bachelor’s programs. The schools are the organizational units of the departments. Research, degree courses and other academic programs are carried out in these schools. The academic area of each school is managed by an academic director.

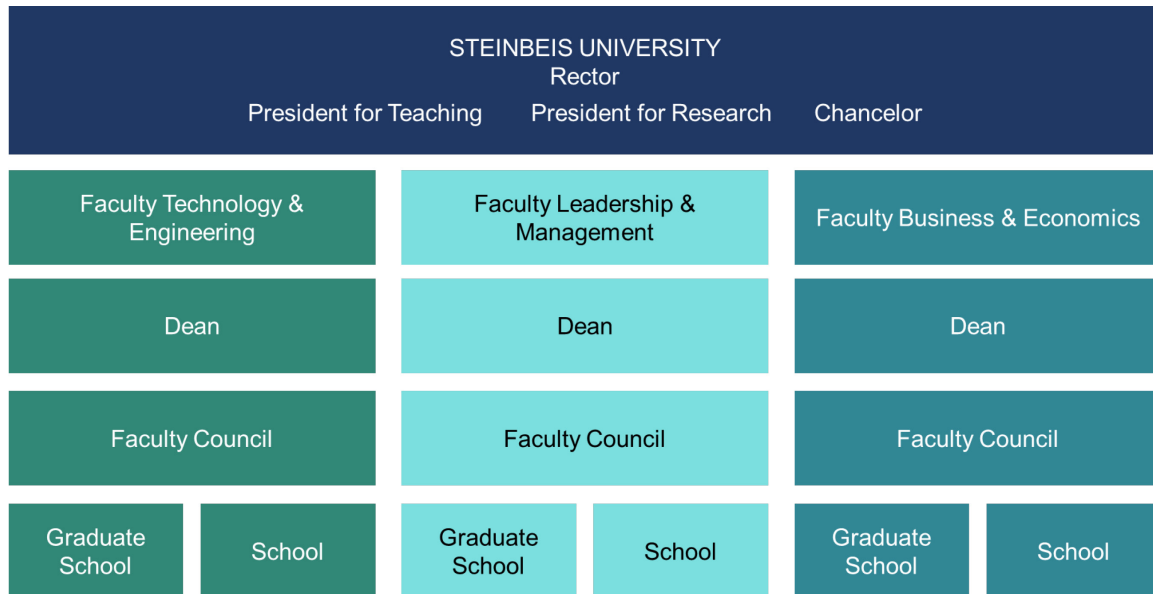


Figure 8 Simplified structure of Steinbeis University (own illustration)

2.2.2 Steinbeis School of International Management and Entrepreneurship

The Steinbeis Academy for Corporate Management was founded in 1993 and later merged into the Steinbeis Transfer Institute Business Administration and International Entrepreneurship. Today, this is the School of International Business and Entrepreneurship (SIBE). SIBE is the international business school of Steinbeis University.

SIBE offers Masters’ programs with a focus on leadership and management. This comprises a M.Sc. in International Management and a M.Sc. in Digital Leadership. Together with partners, SIBE also offers a Doctor of Business Administration. All programs are work-integrated, thus students and partnering organizations profit by shaping innovation impulses and ideas for the implementation of incremental, radical and disruptive solutions. The Master’s programs consist of currently over 300 students, and since 1994 have resulted in more than 6,000 successful graduates and over 350 partner companies; SIBE brings a lot of experience when it comes to management & business leadership, innovation, growth, and globalization.

Steinbeis University, and therefore SIBE's study programs, are state-recognized and accredited by the Foundation for International Business Administration Accreditation (FIBAA). In addition, SIBE's entire quality management system was awarded as system accredited without any conditions.

2.2.3 Steinbeis School of Management and Technology

At the end of the 1990s, the Master of Business and Engineering (MBE) was developed in cooperation with a French university. Its curriculum included the completion of a project. The MBE is now based at the Steinbeis Center of Management and Technology (Blumenthal, 2009)

In 2015, the Steinbeis School of Management and Technology (SMT) was founded as a business school at Steinbeis University. As the operational unit or business school of the department of Technology and Engineering, the SMT administers studies, teaching and research for the Bachelor's and Master's degree programs based there. In addition, the SMT is organizationally responsible for cross-faculty courses in the field of business informatics and industrial engineering. SMT cooperates closely with the Steinbeis Center of Management and Technology (SCMT), the largest project house in the Steinbeis network and its partner companies. SMT is responsible for the study program, while SCMT is responsible for project identification and retention.

The Bachelor's degree courses include Business Informatics and Quality Management. The Master's programs are: Business Engineering with a specialization in Technology Management, Industrial Engineering with a specialization in Mechatronics, IT Systems Engineering, and Business Informatics.

2.2.4 Projekt-Kompetenz-Studium

The German term *Projekt-Kompetenz-Studium* (PKS), literally translated as 'project-competency-studies', was formerly translated into English as Talent Growth Curriculum (TGC). Michael Auer, working for Steinbeis foundation since 1990 and in the meantime its president, coined the term *Projekt-Kompetenz-Studium* at the end of the 90s, which thus found its way into the newly emerging degree courses (Blumenthal, 2009). Due to latest discussions in research on competency-based

learning in higher education, the term was generally rephrased as Experienced-Based Curriculum (EBC) especially at SIBE. However, as Steinbeis University still uses the term *Projekt-Kompetenz-Studium* this thesis makes use of this term.

The *Projekt-Kompetenz-Studium* is a specific expression of so-called Action Learning, which is in turn a special expression of work-integrated learning (Faix & Mergenthaler, 2015). Regarding educational methods, it combines inquiry- and project-based learning. Project-based learning offers immersive first-hand experiences, including opportunities for execution and workplace contact, although often at the expense of reflection (Mintzberg, 2004). Action Learning, however, calls explicit attention to the role of reflection as an agent for learning (Cho & Egan, 2009; Raelin, 1997, 2016).

2.2.4.1 Official regulations and orders

The role of research and thus the connection to inquiry-based learning has been formulated in the basic order of Steinbeis University:

“Preamble: In an effort to secure freedom in research, teaching and studies as an inalienable fundamental right, to enable the solidarity community of all researchers, teachers and students and to involve all members of the university in shaping the common goals and tasks of the university, the members of the Senate of the university have adopted these basic regulations.”

(Steinbeis Hochschule, 2023a, p. 4, own translation)

The project focus in turn is documented in the general study and examination regulations:

“All study programs at Steinbeis University are based on the concept of project competency studies. The aim of this transfer-oriented study program is to efficiently and effectively interlink theory and practice as well as science and business. In order to achieve these goals, the university carries out its tasks in institutions with a science-based or application-oriented focus and maintains cooperation with universities,

research institutions and companies.”

(Steinbeis Hochschule, 2023b, p. 3, own translation)

Furthermore, the study and examination regulations for the M.Sc. in International Management at SIBE state the following with regard to the importance of the project and the competencies developed through the program:

§2 (2): Graduates have familiarized themselves with the current state of science and practice in the fields of (international) management and leadership through their own research and practical work in companies or organizations, both individually and in cooperation with others. By working on real company projects, they have not only acquired additional specialist knowledge, but have also developed their social, personal, activity and action competencies in addition to their specialist and methodological competencies. They have demonstrated their performance by developing solutions in a self-organized manner and under complex, constantly changing conditions in the real world with a creative personality. In doing so, they have further developed their sense of self-efficacy and recognized that the path to a free and self-determined life is the lifelong formation of personality. (SIBE, 2023b, p. 2)

§5 (3): By working on one or more company projects, a further important place of learning is provided in reality. This is mainly characterized by the fact that students act under real conditions in order to turn knowledge acquired in seminars or self-study phases into reality. Lecturers are assigned to each study group at the beginning of the program to assist them with their project work in the project curriculum.

§5 (4) In the scientific work (Project Study Papers, Transfer Papers, Master's Thesis), students are encouraged to reflect on the reasons, goals, plans, results, consequences and limits of their actions in reality. (SIBE, 2023b, p. 6)

The importance of reflection is furthermore stated within the schematic connection between educational aims and pedagogical measures (see Figure 9).

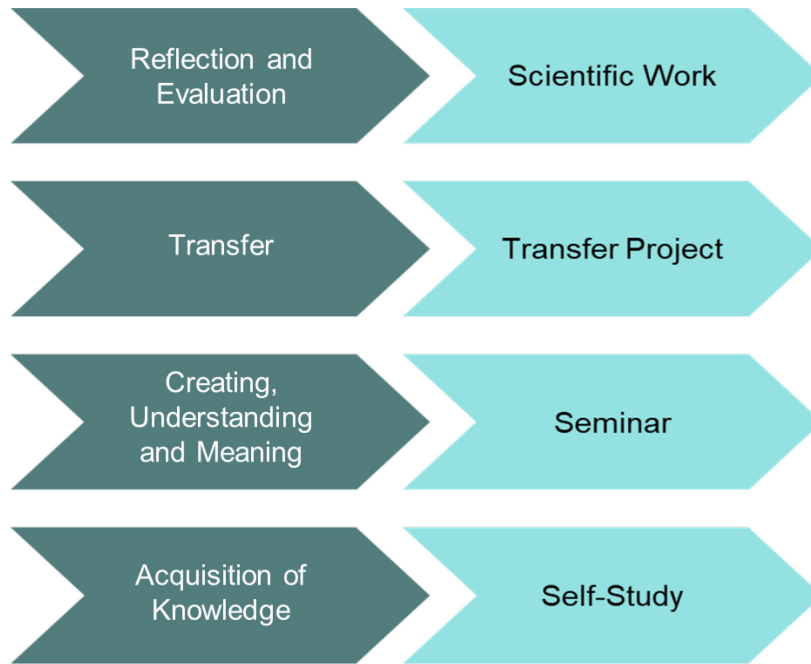


Figure 9 Relation between educational aims and pedagogical measures (SIBE, 2023b, p. 5)

Finally, the study and examination regulations for example for the M.Sc. in International Management offered by SIBE specify several qualification objectives in relation to the project. Thus, upon completion of the respective module, students will be able inter alia to (SIBE, 2022):

- Recognize and understand corporate structures as framework conditions for entrepreneurial action,
- Apply the acquired project management knowledge to the definition, structuring, and planning of (international) projects (including the study project),
- Apply econometric methods to prepare entrepreneurial decisions in complex economic contexts,
- Plan, develop, and implement the study-integrated project with the help of scientific methods and models,
- Reflect and evaluate the already achieved and/or aspired project results with regard to the entrepreneurial benefit,
- Reflect and develop clearly formulated goals for entrepreneurial decisions,
- Evaluate and apply econometric methods and scenario techniques to prepare entrepreneurial decisions,

- Conduct trend analyses and identify significant trends, systematically create future scenarios and present them,
- Develop, realize, and evaluate success potentials and competitive advantages within the framework of a strategy plan,
- Critically reflect and evaluate strategies and their implementation possibilities, and
- Reflect on and evaluate the project results already achieved and/or targeted with regard to the entrepreneurial benefits.

2.2.4.2 Educational philosophy

The *Projekt-Kompetenz-Studium* of Steinbeis University integrates some of the principles and maxims originating from several didactic models such as competency-based learning, Action Learning, inquiry-based learning and project-based learning. Figure 10 shows how the PKS can be categorized into the three didactic models outlined in the chapters 2.1.4 to 2.1.7 regarding the assessment of learning goals, the learning environment and the used educational methods.

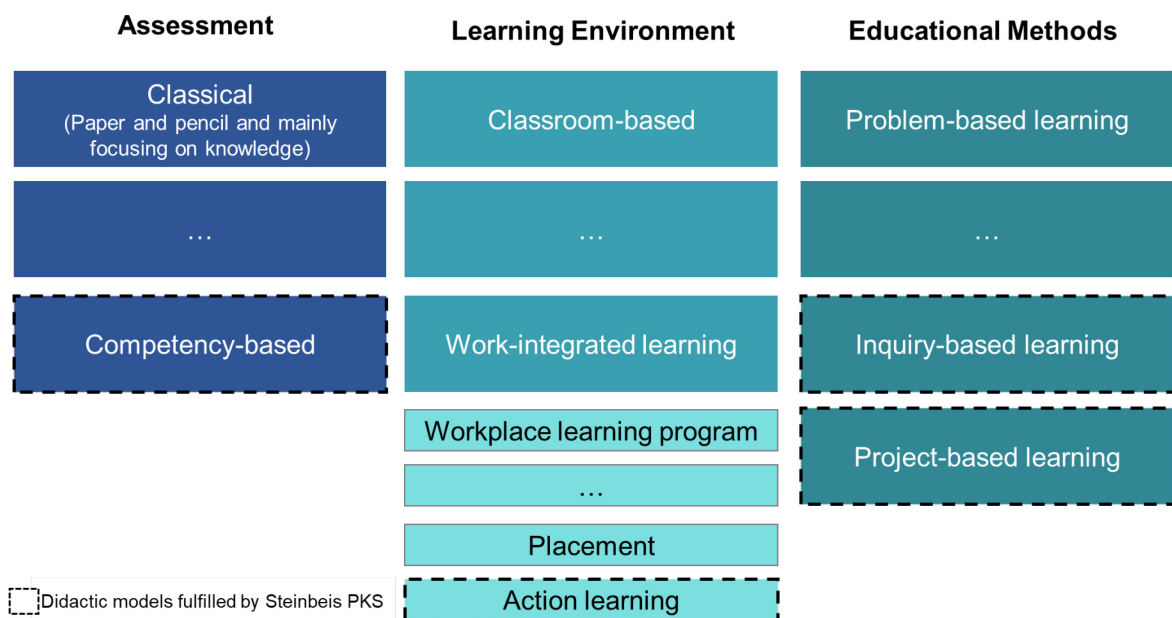


Figure 10 Didactic models fulfilled by Steinbeis University Projekt-Kompetenz-Studium (PKS) (own illustration)

Considering the didactic models, the connection to Wilhelm von Humboldt’s humanistic educational ideal becomes obvious, as the scientific principles suggest an educational setting in which to make one’s own experiences and subsequently

transform them into one's being, for example, one's competencies, one's identity, and one's values. During this process, irritating and disruptive moments do occur, which are the prerequisite for a change of the deepest layers of personality (Erpenbeck, 2010). Personality is a result of action (Rütter, 2008) and competencies in turn are described as dispositions to act (Erpenbeck et al., 2017); therefore, competencies are inherent to personality. Competencies are malleable characteristics of a person and can be developed (Erpenbeck, 2012; Weinert, 2001) by educational measures. Thus, the actions a person takes constitutes being a personality (Rütter, 2008) with the appreciation by others. This is mainly achieved through actions that contribute to the world, for example, by shaping the development of society, sciences and arts, or economy (see Figure 11).

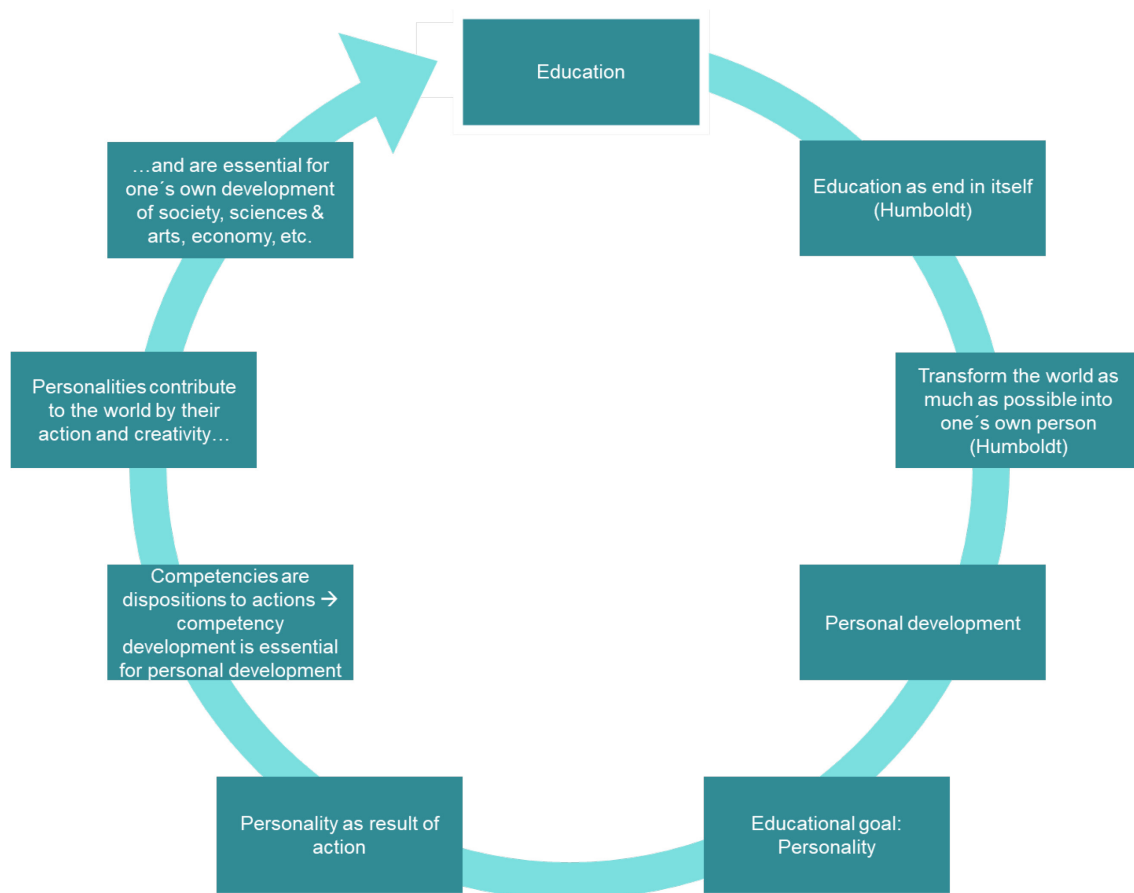


Figure 11 Conceptualizing education: The educational cycle (Kisgen, 2017, p. 65)

2.2.4.3 Educational realization

The educational means to realize the above-mentioned qualification objectives, as well as the overarching pedagogical responsibility of Steinbeis University, are organized within the *Projekt-Kompetenz-Studium*. This is a unique concept that is described in more detail below.

As briefly mentioned, the *Projekt-Kompetenz-Studium* is organized in a theoretical part (50%) and a real-world project (50%) that is implemented in an organization and comprises the work on the project and its documentation. The theoretical part comprises self-studies and seminars inter alia (see Figure 12)

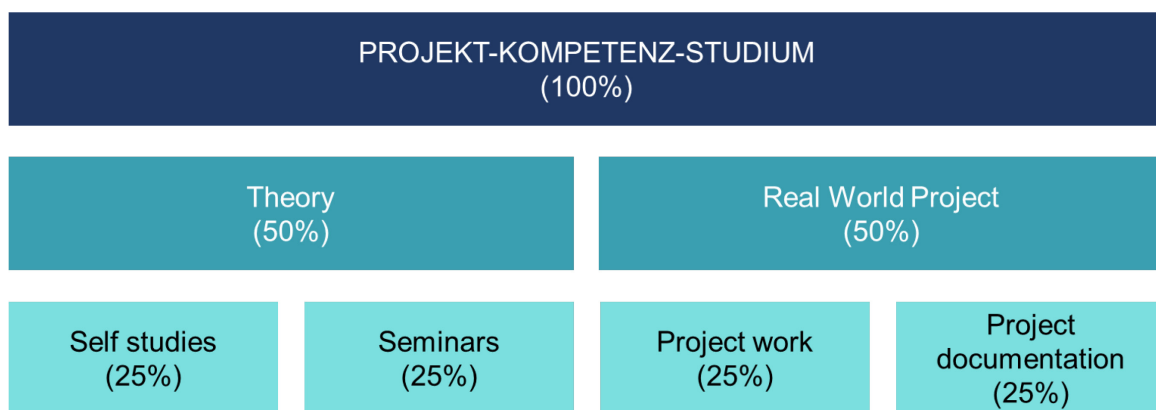


Figure 12 Elements of the Steinbeis University PKS based on Faix and Mergenthaler (2015)

Conceptually, the elements of theory and reality are supplemented by intensive reflection which is essential for learning (Kolb, 1984). Faix (1995) has developed a conceptual framework to connect these three elements to appreciate the importance of reflection. This is on the one hand reached via the project documentation in written papers. Therein, the students must self-evaluate how much they have reached the previously defined goal/s of their project; especially if the goal was not achieved, it is necessary to get to the bottom of the causes. For example, the student may realize that he or she has chosen the wrong methodological approach. On the other hand, the opportunity to reflect on one's project is given within structured discussions in which students present their approaches and receive feedback from peers and lecturers. Furthermore, the element of reflection is connected to theory as it is necessary to assure that the student has considered relevant knowledge and existing theories. Beyond that, the student evaluates if the achieved results fit existing theory or if the result might even have an impact on what is known so far.

The interplay of these three elements and their underlying components are presented in Figure 13.

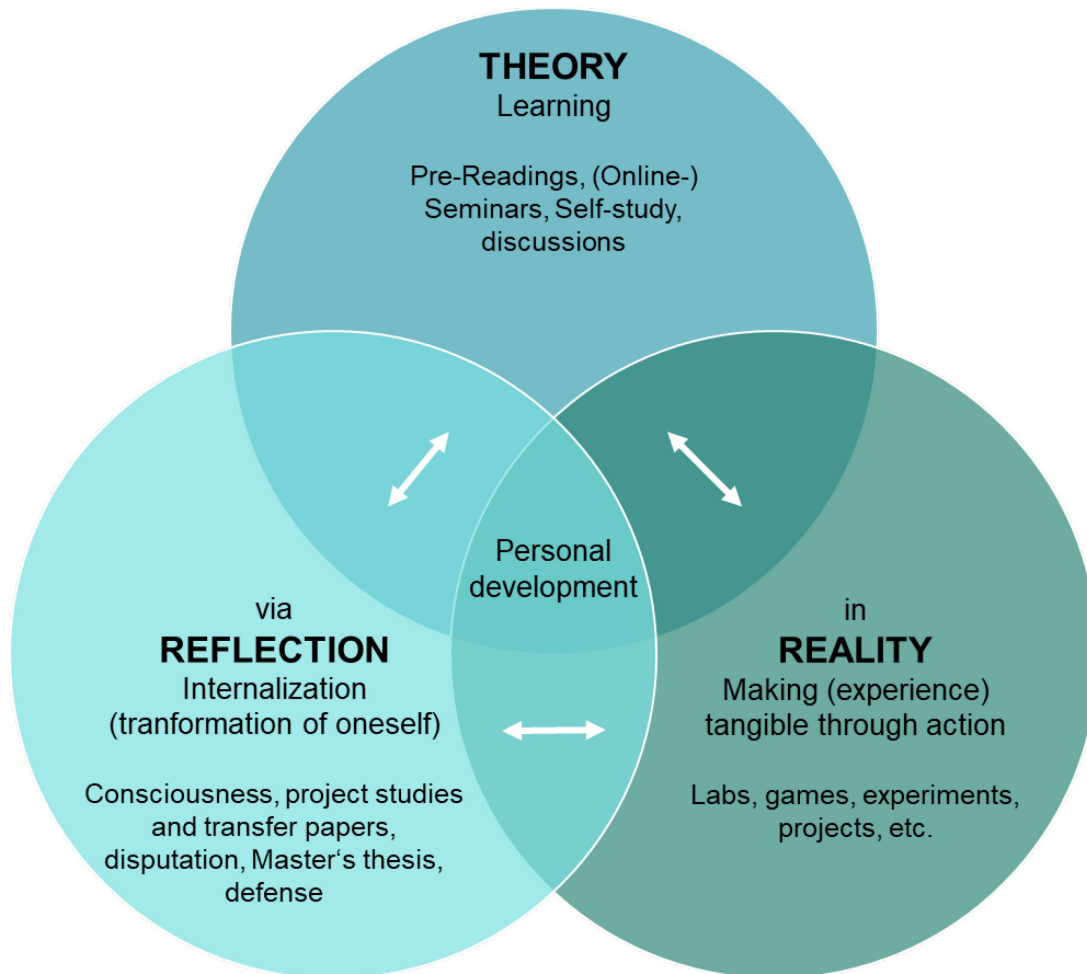


Figure 13 Structure of the Steinbeis University PKS based on Faix (1995)

As already made clear, particular attention is paid to the project as this is the educational element that enables the student to take action. As defined by Faix and Mergenthaler (2015), a project deals with novel, complex problems. The projects the students work on mainly are innovative new business projects that are jointly defined by the student, the providing organization and Steinbeis University. The projects among other things aim for the development and introduction of new products and services, the development of new sales markets, the introduction of new competitive organizational structures, the development and introduction of new competitive processes or production methods through the establishment of new international supplier relationships, or new sources for raw materials or semi-finished products (Faix et al., 2009). Those projects can be defined as innovations

(Schumpeter, 1934/2008) and thus build the basis for individuals to develop into a value-creating creative personality.

For the formation of a creative personality, the simultaneous application of inquiry-based and project-based learning is highly effective. These two methods are best combined with work-integrated (action) learning, thus the two places of learning are systematically connected with each other (Schmidt & Tippelt, 2005; Tippelt & Reich-Claassen, 2010). Within this framework, the students can and must face real challenges and so develop their skills through experiential learning and action. The students have to act in open situations and make independent decisions under uncertain conditions, which in turn requires corresponding competencies (Erpenbeck et al., 2017). This emotional destabilization systematically challenges and promotes skill development (Faix et al., 2009). As a result, the learner's autonomy is promoted when being involved in the selection of problem-solving methods. And autonomy seems to be a property that is closely connected with the term entrepreneur.

The *Projekt-Kompetenz-Studium* promotes to act innovatively. As a result, graduates are well-equipped to continuously perform well in the future under changing work requirements and hence are able to secure the future viability of companies by developing new business opportunities (Faix et al., 2009).

Comparison to other project-based learning programs

Although the *Projekt-Kompetenz-Studium* developed by Steinbeis University represents a unique educational setting, there are comparable approaches taken by other institutions. Blumenthal (2009) gathered the ones described below, although no claim to completeness is given:

- The integrated project study program at Pforzheim University of Applied Sciences was one of the first attempts to integrate personal development and key qualifications into the study program. As part of this program, students were confronted with current entrepreneurial problems, which they solved in teams and under the supervision of professors with practical experience. The students were thus confronted with complex practical problems and were able to develop their key skills by solving complex tasks.

- Witten-Herdecke University established a mentoring program to increase the practical relevance of their degree course. After a longer internship in a company, students maintain contact with the company during the lecture period and participate in working on a company project.
- A dual study program was introduced in Berlin at the end of the 1980s. Study and practical work experience in a company alternate each semester throughout the course, creating a close link between theory and practice.

With regard to the structure of the *Projekt-Kompetenz-Studium*, Djalali (2017) compared the didactic models of highly ranked international business schools. He showed that most of them give students far fewer opportunities for real-world experiences (for example, field trips, company visits, projects) than the *Projekt-Kompetenz-Studium* offered by Steinbeis University, in which 50% of the curriculum consists of practical experience through the implementation of an innovation project.

2.3 Innovation and Entrepreneurship: Educating Value-Creating Personalities

The previous chapter has described that the overarching goal of the *Projekt-Kompetenz-Studium* of Steinbeis University is to educate innovative personalities. Including innovation projects in educational programs works toward the aim to enhance the innovative performance of individuals and organizations (Donovan et al., 2013; Maritz et al., 2014).

Therefore, the next chapter deals with the topic of innovation and related themes to elaborate the relation to educational aspects.

2.3.1 The Importance of Innovation

The importance of innovations is intensively discussed in research among other topics in the field of business and economics as they are seen as a key aspect to generate long-term growth for organizations (Tucker, 2008), regions, and entire countries (Tidd & Bessant, 2021). Innovations can lead to competitive advantages for the organization introducing the innovation and thus result in superior

performance. Corporate prosperity has a positive impact on the regional economy, visible in the gross domestic product (GDP), the most used measure of economic activity.

For organizations, the motivation to innovate often stems from complex problems that need to be solved (Jonassen et al., 2006; Kurtzberg, 2005; Van der Vegt, 2003) as accelerated change and increased competitiveness forces organizations to adapt (Damanpour, 1988; Porter & Stern, 2001) by implementing the latest innovations and in particular by creating innovations on their own (Gassmann et al., 2010).

With regard to the socio-economic growth of a country, innovations create a platform on which to foster technical and technological modernization as well as improve the socio-ecologic-economic security of the society (Klimuk et al., 2020). Furthermore, modern society crucially depends on the development of new products and services, which reduce, for example, labor and so reduce costs (Mansour & Kanso, 2018).

“Innovation is studied in many disciplines and has been defined from different perspectives” (Damanpour & Schneider, 2006, p. 216), resulting in widespread use of the term without acceptance of a single definition (Adams et al., 2006). Baregheh et al. (2009) conducted a content analysis and found around 60 definitions for the term innovation. Summarizing their findings, they conclude that innovation is a “multi-stage process whereby organizations transform ideas into new / improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace” (Baregheh et al., 2009, p. 1334).

Most definitions have in common that innovation should deliver additional value (Baregheh et al., 2009; Peschl et al., 2014; Sawyer, 2006; Wölfle et al., 2014). As such, an innovation is more than an invention as the commercialization of ideas and their implementation is included (Bird & Bird, 1989).

King and Anderson (2002) define innovation as anything that is newly introduced as a result of an intentional idea with the purpose to provide benefits affecting the public. The Organization for Economic Cooperation and Development (2005) states that innovation can take forms such as new services, products, processes, marketing methods, and organizational solutions that are at least new to the firm.

“1. Innovations are responses to new situations or ones that do not exist in a certain way. So, innovations are necessary adaptations to

changes of previously existing situations.

2. Innovations always have the character of being different in some manner, either in terms of being radically different or of having been improved from the ground up. So, innovations serve to change things that have been previously known. It is no longer enough to have knowledge in one's head or to regurgitate it on a test; the point now is to transfer knowledge – to create something new and real with this knowledge. Innovation is more a matter of developing new knowledge or combining existing knowledge in new ways to solve new or not yet identified problems.”

(Faix & Mergenthaler, 2015, p. 158)

Innovations can be distinguished into three types based on the extent of influence the innovation has. The apparently lowest level are incremental innovations, which can also be categorized as smaller renovations or improvements. Here, the origin is existing knowledge based on an established product portfolio. The next level includes radical innovations, which aim for solutions to already existing problems. Finally, the third and highest level represent disruptive innovations. These innovations deliver totally new approaches and solutions for problems that have not been known so far (Zillner & Krusche, 2012).

These levels implicitly refer to the development of new products. But innovation “[...] is no longer restricted to R&D laboratories [...]. Innovation could be and is more general and horizontal in nature, including social, business model, and technical innovation” (S. Dutta et al., 2019, p. 205). Thus, Carbon et al. (2021) add this horizontal aspect to the definition of innovation and additionally class different types of innovations into clusters. The first cluster comprises products, services, and methods. The second cluster contains market dimensions such as gaining access to new international markets. Finally, the third cluster is built of business model innovations (see Figure 14).

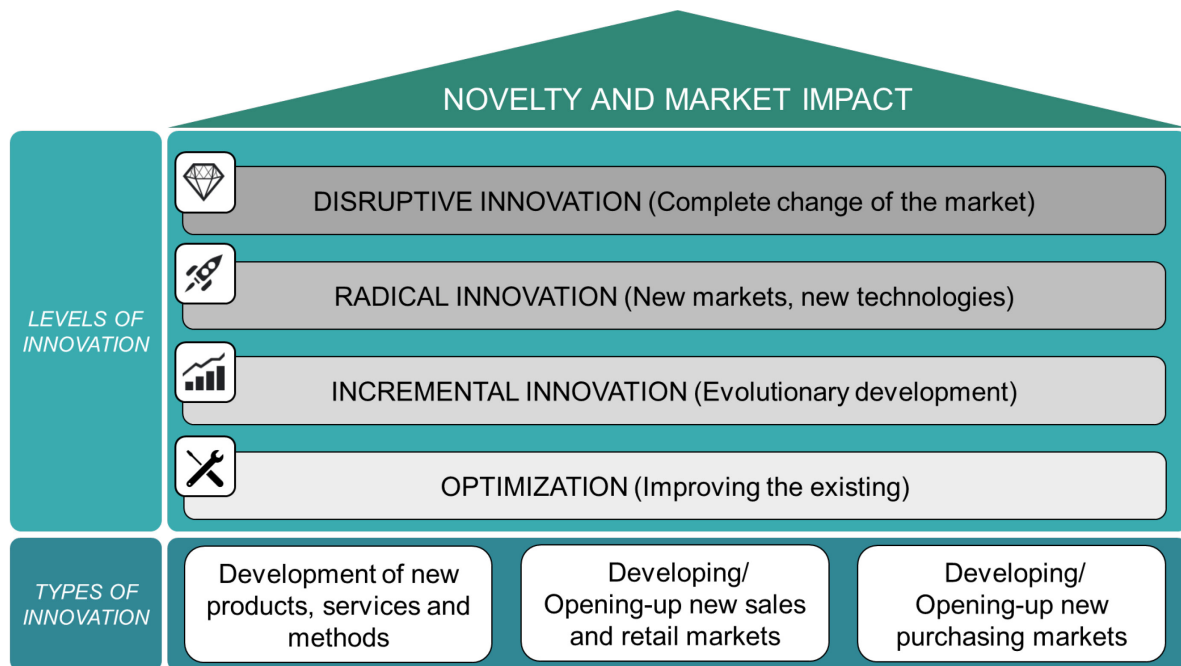


Figure 14 Levels and types of innovation (own illustration based on Carbon et al. (2021))

Regarding the process of innovation, Eveleens (2010) found the following phases: idea generation, selection, developing, and prototyping, implementing/ launch, post-launch, and learning/evaluation. Faix and Mergenthaler (2015) condense these phases into 1) generation of ideas, 2) conversion, and 3) diffusion. Additionally, they emphasize the importance of feedback from the recipient, for example, a client. The recipient of an object decides whether something is new (and valuable): “An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 2003, p. 12). This relation, called the innovation value chain (Faix & Mergenthaler, 2015), is shown in Figure 15.

As already discussed, there is a conceptual difference between the term invention and innovation. This is clearly presented in a quote by the Austrian economist Joseph A. Schumpeter (1883 – 1950):

“[...] The inventor produces ideas, the entrepreneur ‘gets things done’.” (Schumpeter, 1947, p. 149)⁹

⁹ Huynh (2007) conclude that Schumpeter’s definition of an entrepreneur was equivalent to that of a leader, while Czarniawska-Joerges and Wolff (1991, p. 533) state that “entrepreneurship is leadership in exceptional situations.”

Schumpeter is seen as the “forefather of entrepreneurship” (Karmarkar et al., 2014, p. 160) and “prophet of innovation” (McCraw, 2009). These two ‘nicknames’ help demonstrate the relationship between the terms innovation and entrepreneurship. Schumpeter emphasizes that the primary task of an entrepreneur is to carry out innovations. Some researchers see innovation as the foundation of entrepreneurship (Drucker, 1985), while others express the opinion that entrepreneurship and innovation can be viewed as different sides of the same coin (Soriano & Huarng, 2013).

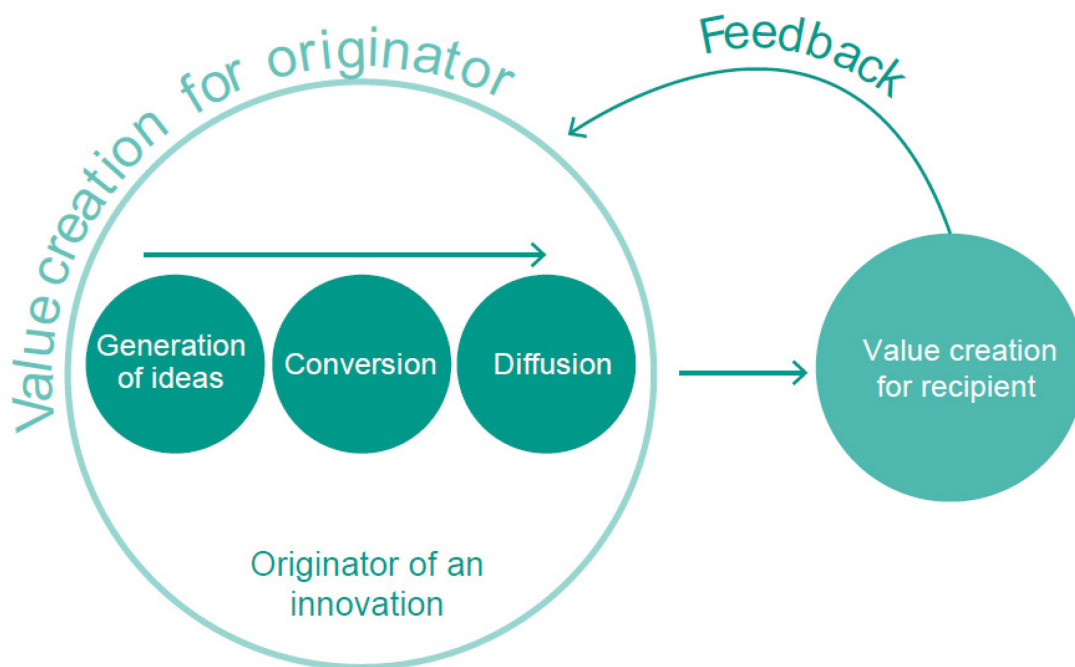


Figure 15 The complete innovation value chain (Faix et al., 2015, p. 97)

2.3.2 Entrepreneurship and Intrapreneurship

Due to the interconnectedness of innovation and entrepreneurship their relevance for economies worldwide is immense (Gieure et al., 2020). Entrepreneurship opens various opportunities and may contribute to general wealth, reducing unemployment and enhancing social development (Acs & Audretsch, 2003; Coulibaly et al., 2018). Governments around the world have taken this up vigorously and want to support the young generation, in particular, to be entrepreneurs (Fayolle & Gailly, 2009; Hytti & O’Gorman, 2004). Also, European countries promote entrepreneurship to foster economic growth and job creation (Audretsch et al., 2007; Lackéus, 2015; Urbano

et al., 2019). The economic situation in a country thereby determines the nature of entrepreneurship (Chukwu et al., 2019; Morris et al., 2013).

In recent years, several organizations and institutions have developed activities in order to support entrepreneurial development. For example, the European Union (EU) as well as the Organization for Economic Cooperation and Development (OECD) encourage governments globally to facilitate entrepreneurship, especially in novel and innovative economy sections (Sitaridis & Kitsios, 2017).

Entrepreneurship definitions vary between rather narrow and broader approaches. The latter, for example, is represented by Shane and Venkataraman (2000), who see entrepreneurship as the realization of value and profit for organizations by identifying business opportunities and exploiting them. Onto this, Eckhardt and Shane (2003, p. 336) add the element of “future goods and services” which build the opportunities “previously undetected or unutilized by market participants.”

With a narrower perspective, entrepreneurship has been defined solely as the creation of new ventures, but these days, the prevailing opinion is that entrepreneurship also comprises venture growth (Neneh & Vanzyl, 2014) and therefore mainly constitutes a way of thinking and behaving (Kirby & Ibrahim, 2011) in order to achieve something new. Thus, for some researchers founding a small private enterprise which lacks novelty would not count as entrepreneurial activity (Eckhardt & Shane, 2003, p. 336).

Schumpeter (1934/2008) specifies several cases that strictly put the importance of the new at the forefront:

“This concept covers the following five cases: (1) The introduction of a new good—that is one with which consumers are not yet familiar—or a new quality of a good. (2) The introduction of a new method of production, that is one not yet tested by experience in the branch of manufacture concerned, which need by no means be founded upon a discovery scientifically new, and can also exist in a new way of handling a commodity commercially. (3) The opening of a new market, that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before. (4) The conquest of a new source of supply

or raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created.

(5) The carrying out of the new organization of any industry, like the creation of a monopoly position (for example through trustification) or the breaking up of a monopoly position.”

(Schumpeter, 1934/2008, p. 66)

Bacigalupo et al. (2016) stress the point of value creation by pointing out that it is of course the financial value which is of great interest for organizations, but a cultural or social value may also be realized.

This is also emphasized by the European Commission (EC), as forms of social entrepreneurship and even daily life situations can be considered as entrepreneurial behavior (European Commission [EC] & Directorate-General for Enterprise and Industry, 2004). Acting entrepreneurially within an existing business corporation is specifically called intrapreneurship (Pinchot, 1985). Intrapreneurial behaviors (and this is analogously the case for entrepreneurial behavior) is characterized as a combination of proactive, innovative, and risk-taking behaviors (De Jong et al., 2015) with the aim to increase value (Stevenson & Jarillo, 2007). However, besides the personal engagement for intrapreneurship, those activities usually require management support (Elenkov & Manev, 2005; Hohensee et al., 2014).

In the rest of this thesis, the term entrepreneurship is mainly used in the context of venture creation and self-employment. Otherwise, the term intrapreneurship will be used.

2.3.3 The Entrepreneur

In view of what has been shown so far, mainly entrepreneurial action and behavior constitute being an ‘entrepreneur’, making it an individual thing that can be tricky to fully explain. Not surprisingly, research has more to say on the question, “what makes an entrepreneur?”

Fleischmann (2014) approached this topic from the perspective of entrepreneurial thinking. His ten characteristics comprise that entrepreneurial thinking is:

1. Hopeful thinking
2. Melioristic thinking (wanting to make something better)
3. Holistic thinking, in the sense of connective thinking
4. Action-oriented and team-oriented with a multiplier effect
5. Enabling leadership by embracing possibilities
6. Emancipatory thinking
7. Social and ethical thinking
8. Heuristic and dialectical thinking, as it rejects the hubris of certainties
9. Utopian thinking
10. Thinking about connective problem-solving

Others have wondered what an entrepreneur needs to know to recognize the opportunities to create value. This comprises: 1) special interest knowledge and general industry knowledge, 2) knowledge of markets, 3) knowledge of customer problems, and 4) knowledge of ways to serve markets (Ardichvili et al., 2003).

Personality traits and competencies of entrepreneurs

To analyze entrepreneurial behavior, research has either focused on personality traits or on the competencies an entrepreneur exhibits (Boyatzis, 2011). Several competencies have been found to be relevant for entrepreneurs, such as taking initiative, having strong communication skills, and having the ability to exploit opportunities (D. K. Dutta et al., 2011; Lans et al., 2008) as well as general leadership and management competencies (O'Brien & Hamburg, 2019). Being entrepreneurially competent is appreciated in paid employment and self-employment equally (Liñán, 2008).

Some studies suggest that personality traits have the biggest explanatory potential to describe entrepreneurial behavior (Eastman et al., 2001). Marcati et al. (2008), specifically, found that the personality is a key factor when it comes to adoption of innovations in small- and medium-sized enterprises. However, the exact entrepreneurial activity engaged in influences which personality traits are typically shown by entrepreneurs (Kerr et al., 2018).

When it comes to personality traits, the Big-5 model is best known; this model was described by several researchers. John et al. (2008, p. 138) describe the five macro personality traits as follows:

1. Openness to experience: describes the breadth, depth, originality, and complexity of an individual's mental and experimental life.
2. Conscientiousness: describes socially prescribed impulse control that facilitates task- and goal-orientated behavior.
3. Extraversion: describes an energetic approach toward the social and material world and includes traits such as sociability, activity, assertiveness, and positive emotionality.
4. Agreeableness: contrasts a prosocial and communal orientation toward others with antagonism, and includes traits such as altruism, tender-mindedness, trust, and modesty.
5. Neuroticism: contrasts emotional stability and even-temperedness with negative emotionality, such as feeling anxious, nervous, sad, and tense.

A recent literature review conducted by Kerr et al. (2018) dealt with the personality traits shown by entrepreneurs. They used the renowned dimensions of the Big-5 model and added elements that have been found relevant such as self-efficacy, innovativeness, locus of control, need for achievement, and risk attitudes, as well as the goals of entrepreneurs and their aspirations. The results of this literature review will be presented below.

Several studies have wanted to compare managers and entrepreneurs. Despite conceptual problems, especially regarding the definition of managers¹⁰, H. Zhao and Seibert (2006) demonstrated that entrepreneurs rank higher on openness to experience, conscientiousness and extraversion compared to managers, while

¹⁰ As outlined, entrepreneurship can also occur within companies. H. Zhao and Seibert (2006) in their meta-analysis compare entrepreneurs, specified as founders, with managers. When defining managers, they follow a broad approach, thus including a diverse population with people coming from different levels and functions. It seems obvious that such an unspecific selection may also include intrapreneurs that consequently distort the results.

exposing lower agreeableness and neuroticism. On the contrary, Envick and Langford (2000) found entrepreneurs to be significantly less conscientious and agreeable than managers, and also less extraverted.

Other personality traits have been found to be relevant to entrepreneurs in addition to the Big-5 dimensions. Self-efficacy, for example, describes the belief of a person that they can perform tasks and fulfill roles which are connected to expectations, goals, and motives (Cassar & Friedman, 2009). Entrepreneurs tend to be overconfident in their performance estimates (Shane, 2009)¹¹. Additionally, the concept of innovativeness, defined as individual responses to new things (Goldsmith & Foxall, 2003), has been intensively researched. However, there is a lack of consistency regarding the measurement of innovativeness leading to contradictory results (Kerr et al., 2018).

The next concept that has garnered great research interest when it comes to entrepreneurial personality traits is locus of control. "A person with an internal locus of control conceptualizes that their own decisions control their lives, while those with an external [locus of control] believe the true controlling factors are chance, fate, or environmental features that they cannot influence" (Kerr et al., 2018, p. 15). While locus of control is influenced by cultural aspects¹² it may furthermore be different between men and women. Hansemark (2003) demonstrates that locus of control predicts entrepreneurial activities only for men.

Another trait that has been researched regarding personality and entrepreneurship is the need for achievement, an individual's desire for significant accomplishment, mastering of skills, and attaining challenging goals (McClelland, 1985). A meta-

¹¹ Researchers hypothesize that entrepreneurs probably are more confident than others and thus score themselves higher in the subjective surveys typically used to collect data (Kerr et al., 2017).

¹² Countries with more individualistic cultures show greater internal locus of control as demonstrated by Mueller and Thomas (2001). Personality differences can thus be caused by cultural characteristics such as individualism, uncertainty avoidance, and risk propensity as introduced by Hofstede (1980). In terms of the individualization dimension, Germany ranks in the middle.

analysis of 18 studies and 3,272 subjects shows that entrepreneurs exhibit a higher achievement motivation than managers (Stewart & Roth, 2007).

Finally, the literature review made by Kerr et al. (2018) focused on the trait of risk taking, which has been researched in connection to entrepreneurship as early as in the 1920s. Knight (1921/2002) suggested that entrepreneurs are mainly characterized through taking actions regarding opportunities despite uncertainty and risk. "The individual's preferences over risk can play a critical role in determining the entry decision" (Åstebro et al., 2014, p. 55).

Besides these personality traits, research has emphasized that entrepreneurs may follow different goals. While some may especially aim for venture growth, others just want to secure their family income. This may cause huge differences regarding entrepreneurial characteristics (Miner & Raju, 2004; Stewart & Roth, 2001). Additionally, Block et al. (2015) found that entrepreneurs following a good opportunity are more willing to take risks than by-necessity entrepreneurs. "Research on these topics is, however, surprisingly slim compared to other aspects that we have reviewed" (Kerr et al., 2018, p. 32).

In line with the shortcomings that have been described briefly, there has been rich criticism regarding the personality trait approach when wanting to explain entrepreneurship. Instead, behavioral approaches have been suggested (Gartner, 1988; Rauch, 2014), focusing also on the antecedents of behavior, as venture creation is seen as planned and hence intentional. Intentions can be used as a better predictor of behavior than attitudes, beliefs or other psychological or sociological variables (N. F. Krueger & Carsrud, 1993). More precisely, Ajzen and Fishbein (1980/2002) claim that attitudes and beliefs predict intentions, which in turn predict behavior.

2.3.4 Approaches for Entrepreneurship Education

Strategic papers by the German Council set the focus of higher education on the aim to educate professionals who are able to find solutions for challenges associated with technical, economic or societal change (Wissenschaftsrat, 2015). Therefore, educational institutions are encouraged to expand multidisciplinary knowledge sharing by implementing programs based on real-world problems to

develop the innovation competence of future professionals (European Commission [EC], 2012, 2017), while the EU identifies entrepreneurship as a competence for everyone. Under the policies of the EC, member states should foster entrepreneurial skills from primary school onwards alongside a focus from secondary to higher education on the opportunity of business creation as a career destination (Hoppe, 2016). The EU agenda for the modernization of higher education focuses on the 'knowledge triangle' and the role of entrepreneurship in linking education, research, and innovation (Maassen & Stensaker, 2011)

Entrepreneurship education (EE) should enable citizens to embrace and adapt to the constant disequilibrium in which we find ourselves today, whilst remaining cognizant of the social implications of their actions (Ciobotaru, 2013).

2.3.4.1 Types and content of Entrepreneurship Education

One very broad definition of entrepreneurship education has been made by McIntyre and Roche (1999) as cited in Paray and Kumar (2020): The process of enhancing skills and concepts to recognize opportunities which others overlooked and to have the confidence and conviction to act where others hesitated. This was added by the element of personal surroundings and markets (Iwu et al., 2021) and the specification for "commercial opportunities and the insight, self-esteem, knowledge and skills to act on them" (Iacobucci & Micozzi, 2012, p. 678). Finally, Westhead and Solesvik (2016) pointed out the fact that opportunities can also be actively created.

40 years ago, Jamieson (1984) distinguished between education about entrepreneurship and education for entrepreneurship. Education about entrepreneurship focuses on raising awareness about entrepreneurship by teaching students about the various aspects of starting and running a business. Courses in this tradition often focus on acquiring knowledge relevant to entrepreneurship (Graevenitz et al., 2010; Oosterbeek et al., 2010). Education for entrepreneurship, in contrast, prepares students to set up a business and usually emphasizes a practice- and action-oriented learning philosophy. This distinction between education about and education for entrepreneurship is simplified and has thus been criticized (Gibb, 2002). However, it is important with regard to the evaluation of education outcomes.

To a certain extent, a similar distinction has been made by Hynes (1996). In her opinion, entrepreneurship aims to develop knowledge or skills enabling an individual to achieve an effective performance. Entrepreneurship education aims to enable an individual to assimilate and develop knowledge, skills and values that allows a broader range of problems to be addressed.

Liñán (2004) identifies four types of entrepreneurship education: entrepreneurial awareness education, education for start-up, education for entrepreneurial dynamism and continuing education for entrepreneurs.

There are several other definitions that could be used to classify and categorize educational activities to foster entrepreneurship. An important point is that there are many approaches that explicitly describe that educational goals also comprise intrapreneurial development.

The ultimate objective of EE is to ensure a change of students' mindset when it comes to innovation and risk taking in business ventures (Jones et al., 2014). Thus, EE not only follows the creation of new business ventures (Bjornali & Anne Støren, 2012; Fayolle et al., 2006; Gibb, 2002; Lackéus, 2015). Instead, EE should focus on the development of an entrepreneurial mindset (or entrepreneurial thinking) that enables entrepreneurs to turn ideas into action (European Commission [EC], 2013).

Such an approach is also in line with the fact that only a minority of graduates start ambitious enterprises; but young people who have attended entrepreneurship education programs can use the acquired knowledge and skills in many professions and thus raise the level of innovation in different types of organizations (Draksler & Sirec, 2021). Furthermore, some organizations complain that the interpersonal skills needed for success in today's marketplace are missing in young employees, indicating that education in this area is crucial (Bedwell et al., 2014)¹³. The general perception among major education stakeholders is that entrepreneurial

¹³ As more and more people are involved in tertiary education, while the labor market and the education system are not coordinated, in several countries more and more young graduates do not obtain employment (in the short term). Therefore, Schøtt et al. (2015) emphasize that graduates should be helped to enter the labor market by guiding and improving their competencies.

competences are more greatly appreciated by companies. So, they are not only a key for self-employment (Iglesias-Sanchez et al., 2019).

“In the end, education is the general and comprehensive answer to how people can become innovators.”

(Faix & Mergenthaler, 2015, p. 101)

2.3.4.2 Pedagogical Measures

Based on a subjectivist educational understanding¹⁴, Bijedic (2013) conceptualized that EE should emphasize the entrepreneurial personality. Furthermore, the education of a creative personality must focus on the acquisition of a deep understanding of entrepreneurship and management aspects on the one hand and the development of the student's subjective strength on the other hand (Faix & Mergenthaler, 2015). The subjectivist educational paradigm is oriented to fostering creative individuals who think and act entrepreneurially, that is, who translate their ideas into action—be it in their own companies or as employees (Walterscheid, 1998). As a consequence, EE must go beyond knowing and understanding in order to bring theoretical concepts to the real world (Neck & Greene, 2011).

To achieve this goal, certain teaching methods seem to be more successful than others to prepare students for an entrepreneurial career (Dilts & Fowler, 1999). Real-life experiences in an educational setting on how to develop innovations offers

¹⁴ Walterscheid (1998) typify the objectivist educational paradigm as an “old school” (p. 8) approach and the subjectivist educational paradigm as a “modern school” (p. 10) approach. The objectivist educational paradigm 1) is embedded in a material conception of education, 2) is based on the storage of objective knowledge to be transmitted in educational processes, 3) regards the learner as a “medium of predetermined knowledge” (p. 7), while the teacher is considered a “representative of knowledge” (p. 7), who has to select and structure the knowledge in a way that the learner can easily consume it, and 4) states that the educational setting has to be separated from the real living environment. The subjectivist educational paradigm 1) conceives education as facilitator for a subject's individual potentials, 2) promotes educational contents (which represent complex, realistic, and holistic comprised issues) that foster subjects experiences and growth, 3) argues that education has to facilitate the gathering of experiences, and 4) shapes educational settings which are quite realistic and close to professional life.

challenging, open task approaches with opportunities to promote active agency. However, learning outcomes must be defined in curricula as statements of what the individual knows, understands, and is able to do (European Union, 2015). Such a precise definition of outcomes is rarely possible when innovation projects are central to educational programs: The results of such projects are open-ended, not predefined, and therefore cannot be in line with any conceivable and precisely formulated learning outcome.

When designing entrepreneurship education programs, research has identified four main characteristics that should be included: 1) an active learning approach, for example, through project- or problem-based learning; 2) focus on and opportunity for reflection; 3) a competency-based assessment procedure; and 4) interdisciplinary content and thinking. The researchers promoting the different approaches respectively are presented in Table 4.

Table 4 Elements of entrepreneurship education (EE) programs that should be fostered

Characteristic	Sources
Active learning (project-/problem-based)	Baaken et al. (2015)
Classroom settings are far from ideal when it comes to entrepreneurship. Teaching should actively involve students with emphasis on action, experimentation, and practice. Projects provide additional educational value for EE when providing students with problems to be solved in a real-life business environment. The learner's autonomy must be promoted. Thus, the feeling or development of self-employment is enhanced by learning methods that enable independent discovery and problem solving, which also improves perceived self-efficacy through experiential and social interactive learning. Furthermore, active learning implies both self-development and organization development.	Harkema and Schout (2008) Hoidn and Kärkkäinen (2014) Kuratko (2005) Maritz et al. (2015) Morris et al. (2013) Ndofirepi and Rambe (2018) Neck et al. (2014) Niehm et al. (2015) Pedler (1997) Rideout and Gray (2013) Vincett and Farlow (2008)

Focus on reflection

Reflection in the context of experience creates a link with the actions that have taken place and their consequences. When this link is missing, actions become haphazard and unplanned. Learning from experiences leads to new and improved subsequent actions through the thoughtful linking of actions and their consequences. The literature on entrepreneurial learning has emphasized that owners/managers learn from their experiences and that the nature and extent of this learning depends critically on the essential role of reflection.

Cope (2003)
Gordon and Jack (2010)
Kempster and Cope (2010)

Competency-based learning

This approach seems to be promising when focusing on innovativeness as typical training styles are probably not sufficient.

Arranz et al. (2017)
Morris et al. (2013)
Seufert (2016)

Interdisciplinarity

A multi- or even interdisciplinary approach is needed for contemporary innovation management, as 21st-century problems cannot be solved by single disciplines. Interdisciplinary engagement, in which students can integrate knowledge and skills drawn from diverse disciplines, can help them to address ill-structured, “wicked” problems and develop creativity, critical thinking, and problem-solving skills.

Bridle et al. (2013)
Cowden and Santiago (2016)
Exter et al. (2019)
Haynes (2017)
Holley (2017)
Mobley et al. (2014)
Palmer (2001)
Rosenberg (2009)

This thesis specifically focusses on the *Projekt-Kompetenz-Studium* established by Steinbeis University. As described in chapter 2.2, the unique project-focus within the pedagogical approach fulfills these requirements and is therefore deemed to have a positive influence on the development of entrepreneurship intention.

2.3.4.3 Effect of entrepreneurship education

Currently, there are several scholarly discussions regarding the effectiveness of EE. One stream deals with the ongoing debate on whether entrepreneurship implies individuals with a definite personality or with developable skills (Bechard & Toulouse, 1998). Another stream, as a high amount of resources is devoted to entrepreneurship education hoping this will lead to a new generation of entrepreneurs (Rauch & Hulsink, 2015), of articles, reviews, and meta-analyses have tried to confirm program effectiveness (Bae et al., 2014; Martin et al., 2013; Nabi et al., 2017). However, research so far has applied diverse intention models and 'ad hoc research instruments' to assess the effectiveness of entrepreneurship education leading to inconsistent study results (Chandler & Lyon, 2001).

The focus of most existing evaluations lies either on outcomes like the increase in business creation rates (OECD, 2009) or on course-induced shifts in entrepreneurial intentions (Graevenitz et al., 2010). Some authors have concluded that there is little evidence regarding effectiveness (Fiet, 2000; Weaver et al., 2006).

One reason for the problematic evaluation is that a very low proportion of graduates start a business immediately after graduation (Luthje & Franke, 2003). In fact, findings from career transition research indicate that academic entrepreneurs realize their business ideas after approximately five years from graduation (Golla et al., 2006). This substantial time lag between treatment and criterion poses a threat to internal validity and complicates longitudinal studies (Fretschner & Weber, 2013). In addition to the direct effects of EE programs through new start-ups, the participants may repeat the entrepreneurial process many times during their entire working career by starting new companies or new business areas in existing companies, by running their businesses more competently, or by assisting other entrepreneurs (Rasmussen & Sørheim, 2006). This outcome of EE can hardly ever be assessed.

However, it seems like limited attention has been paid to the importance of specific educational variables, such as program design and pedagogical approach (Fayolle et al., 2006). Several scholars emphasize that future research should focus on assessing "whether different teaching methods and learning environments [...] have different effects on the outcomes [of EE]" (Barba-Sánchez & Atienza-Sahuquillo,

2018, p. 58). So far, only a few studies combine EE and action research in higher education (Taylor & Pettit, 2007). For example, Ho et al. (2014) showed that experiential learning has higher impact on EI than classroom-based learning.

In summary, this field of education is still in its infancy and there seems to be no common framework or agreed best practice on how to educate entrepreneurs (Brockhaus et al., 2003; Fiet, 2001; Maritz & Brown, 2013).

2.4 Theory of Planned Behavior (TPB)

2.4.1 History and Development

There are many predictors of behavior, and they vary depending on the type of behavior. However, Ajzen and Fishbein (1977) theorize that most effective predictor is the intention to perform a behavior; and, thus these two researchers developed their theory of reasoned action (TRA) (Ajzen & Fishbein, 1980/2002). Later, Ajzen (1988) more precisely pointed out that intention describes the purpose to try to perform a specific behavior (Ajzen, 1988).

The theory of reasoned action was extended in the following years and formed the theory of planned behavior (TPB) presented by Ajzen (1991). The theory assumes that social behavior performed by humans is reasoned, controlled, or planned, as the consequences of the considered behavior are taken into account (Ajzen & Fishbein, 2000).

The theory of planned behavior has been applied to the prediction of many types of human behaviors, for example, considering electoral choices or intentions to stop smoking.

2.4.2 Antecedents of Intention

Ajzen and Fishbein (1980/2002) found that intentions depend on specific attitudes and beliefs. Thus, there are several elements that can be regarded as antecedents of the respective intention.

2.4.2.1 Attitude Toward the Behavior (ATB)

The first antecedent of intention describes what general attitude prevails regarding the behavior under consideration. This attitude toward the behavior (ATB) represents the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question (Ajzen, 1991). Such attitudes are subject to change based on experiences. New insights restart the evaluation process while considering former knowledge and beliefs. Attitude is defined as the tendency to respond or react positively or negatively to an object, people, institution, or moment. Attitudes are moderately less stable than personality traits and can be changed over time or influenced by the interaction of individuals with the environment (Izquierdo & Buelens, 2011).

Here is an example to describe this concept. When deciding whether to take part in a computer course, the question arises as to what advantages it brings. If you come to the conclusion that you will be able to do your work faster afterwards, you will have a positive attitude. However, if you fear that you will then be given even more work by your boss, this could lead to a negative attitude.

2.4.2.2 Subjective Norms (SN)

Besides their own attitudes, people also consider the perceptions of others, which results in a perceived social pressure to perform the behavior or not (Ajzen, 1991). These subjective norms (SN) are influenced by normative beliefs and are of less relevance for individuals with a strong internal locus of control than for those with a strong action orientation. SN are determined by beliefs of important others (for example, friends, family) about a certain behavior and the degree to which someone tends to comply with these beliefs. The term 'role model', referring to a person or group of reference or of high appreciation, is relevant in this context, especially for younger people.

Regarding the computer course example given above, it might have a positive influence if people at your workplace had already taken the course and found it beneficial. Then you could be more likely to want to take the course as well.

2.4.2.3 Perceived Behavioral Control (PBC)

The third antecedent is perceived behavioral control (PBC). This concept comprises the perceived ease or difficulty to perform a behavior (Ajzen, 1991) and thus covers non-volitional elements (Ajzen, 2002). This factor relates to perceptions of the behavior's feasibility which are an essential predictor of the behavior. Individuals usually decide to demonstrate behaviors they think they will be able to control and master¹⁵. PBC reflects past experiences as well as the presence or absence of resources and opportunities.

Again, using the example of the computer course: if you think that you are not clever enough to take the course, then you are less likely to take it. Similarly, if you believe that you cannot afford the course, then you will be less likely to sign up for it.

2.4.3 Intention and Behavior

The three mentioned antecedents predict intentions; furthermore, PBC is directly connected to the considered behavior (Ajzen, 1991). The understanding of behavior is a core concern of psychology (American Psychological Association, 2015) and, accordingly, the discipline has developed models of how to predict behavior. The theory of planned behavior, comprising attitude toward the behavior, subjective norms, perceived behavioral control, intention and behavior as well as their relations, is presented in Figure 16 below.

Although intentions are considered to be a reliable predictor of behavior, Reynolds (1994) note that there are often significant time lags from intention to action, and in addition the development of the intention may evolve over time (Kolvereid & Moen, 1997)¹⁶.

¹⁵ The concept of PBC appears quite similar to the notion of perceived self-efficacy described by Bandura (1977, 1982). Perceived self-efficacy refers to people's beliefs about their capabilities to exercise control over their own activities and over events that affect their lives (Bandura, 1988). PBC is more focused on the ability to perform a particular behavior. Accordingly, Ajzen (2002) re-specified the concept of PBC towards "perceived control over performance of a behavior."

¹⁶ From educational perspective, the terms competencies and performance fit this relation between intention and behavior. As mentioned earlier, competencies describe the disposition to act (Erpenbeck et al., 2017), especially in new and non-routine situations, which is the case for

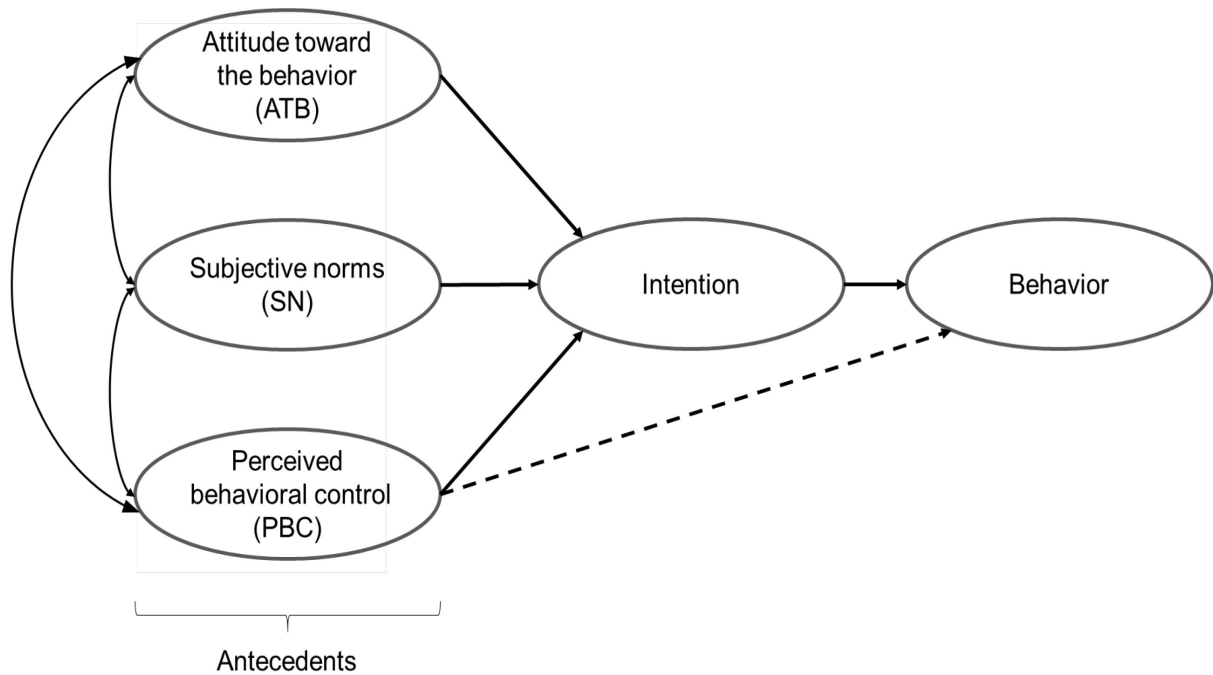


Figure 16 Original model of the theory of planned behavior based on Ajzen (1991)

2.4.4 Validation of the Theory of Planned Behavior

Based on its three-decade history, the theory of planned behavior is well-validated. The theory ensures that the mechanisms, centrality of intervention techniques, generalizability, and limitations involved can be more easily delineated (Glaub et al., 2014). A meta-analysis indicated that the theory of planned behavior accounted for 27% and 39% of the variance in behavior and intentions, respectively (Armitage & Conner, 2001).

Its validity has also been proven in meta-analyses on organizational behavior (Sheppard et al., 1988), as well as in the domain of individual entrepreneurship activity as a planned behavior (N. F. Krueger, 2009; N. F. Krueger et al., 2000; L. Lee et al., 2011; Schlaegel & Koenig, 2014). This concept will be elaborated upon in more detail in the following section.

entrepreneurial activities. White (1959), Weinert (2001) and Voorhees (2001) argued that performance—in this case, the entrepreneurial behavior—is a motivational aspect thus, the mentioned time lag can be explained based on this relation.

2.5 Entrepreneurship Intention (EI), Entrepreneurship Education (EE) and the Theory of Planned Behavior

As described in chapter 2.3.3, the characteristics of entrepreneurs are of great research interest. This comprises personality traits as well as concepts that try to predict if someone will act entrepreneurially. The theory of planned behavior can be applied in this context.

With regard to entrepreneurship, the general concept has been validated by N. F. Krueger et al. (2000) and N. F. Krueger (2009), while there are several additions that have been made by scholars over the years. With regard to ATB and SN, E. Autio and Wennberg (2010) found that the influence of social peer groups is extraordinary large and impacts the decision to become an entrepreneur or not three times as much as the person's individual attitude. However, the opinion of close family members might be misleading as there is a risk of blind encouragement to potential entrepreneurs (Arregle et al., 2015) which may cause an overconfidence regarding their own capabilities (Entrialgo & Iglesias, 2016).

N. F. Krueger and Carsrud (1993) were the first to apply the theory of planned behavior to the field of entrepreneurship. "Researchers might use this model [theory of planned behavior] to analyze how the process of doing a business plan or entrepreneurial education affects intentions" (N. F. Krueger & Carsrud, 1993, p. 327). In this sense, EE can be seen as an external influence that shapes individual entrepreneurial activity by influencing ATB, SN, and PBC. Other external aspects may furthermore influence whether intention indeed leads to entrepreneurial behavior. This second possibility for external distortion may be the reason why Katz (1990) pointed out that there is only a weak relation between intention and behavior in the area of entrepreneurship. Regarding these additional influences, one has also to keep in mind that the concept of intention is widespread. Sitaridis and Kitsios (2017) emphasized that in the case of Greece self-employment mainly emerges out of necessity and not out of opportunity recognition¹⁷; thus the

¹⁷ The role of opportunities has been included in entrepreneurship research (Gartner et al. (2003); Shane (2007); Shane and Venkataraman (2000) as a cognitive act (Gaglio & Katz, 2001; S. Shane, 2000). Thus, the individual is still considered to be the core element for this task, no matter whether

elements ATB, SN, and PBC may comprise totally different opinions and framework conditions. Furthermore, many factors outside the individual have been recognized as important for entrepreneurship, for instance, the role of culture (Mueller & Thomas, 2001), networks (Burt, 2000; Grandi & Grimaldi, 2003), resources (Lichtenstein & Brush, 2001), and environment conditions (Malecki, 1993). Finally, it is important to mention that some persons may not be willing to become entrepreneurs alone but would collectively (Etzkowitz, 2003). The vast influence of external conditions is also shown by Luthje and Franke (2003), who found that orientations and behaviors of students and young graduates are influenced by a number of personal and environmental factors. The conceptual supplement is shown in Figure 17.

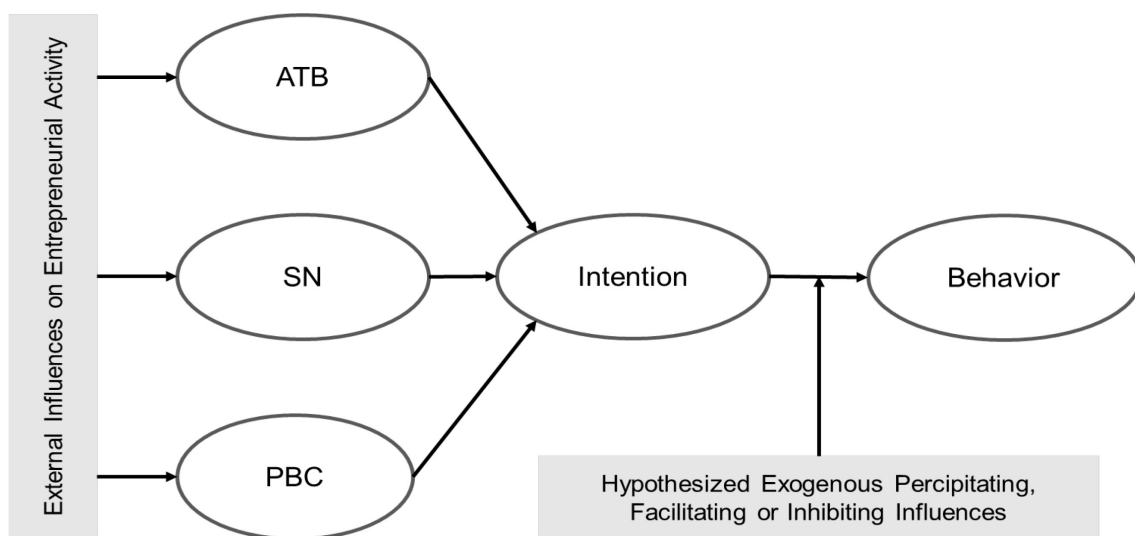


Figure 17 Adapted model of the theory of planned behavior for entrepreneurial behavior based on N. F. Krueger & Carsrud (1993)

As mentioned, educational programs can have an impact on the antecedents of intention identified by the theory of planned behavior. On the one hand, conveying content about entrepreneurship and what it means may positively influence the development of attitude; on the other hand, emphasizing which competencies are needed by an entrepreneur may show that becoming an entrepreneur is a realistic possibility; and this influence on PBC, as a key predictor of people's intentions, is also meaningful (Rauch & Hulsink, 2015).

it is as a sole entrepreneur or as part of a team. N. Krueger and Dickson (1994) found that an increase of perceived behavioral control increases the perception of opportunity.

“Teaching people about the realities of entrepreneurship may increase their entrepreneurial self-efficacy, but simultaneously decrease the perceived desirability of starting a business”

(N. F. Krueger & Carsrud, 1993, p. 327)

There is a debate in EE literature about whether behavior that should result in the start-up of an enterprise is an appropriate outcome of an EE program (Fayolle et al., 2006)¹⁸. Although EE has been found to influence both the current behavior and future intentions of students (Kolvereid & Moen, 1997), changes in EI rates are more often used to measure the outcomes of EE (Graevenitz et al., 2010). However, “the entrepreneurial intent literature has not resulted in cumulative knowledge because the various perspectives have been pursued in isolation from other perspectives [...]. Future work on entrepreneurial intentions should attempt to integrate and reduce the number of alternative intention models” (Shook et al., 2003, p. 386).

To overcome this incommensurability and to provide a standard instrument for measuring EI, Liñán and Chen (2009) developed the entrepreneurial intention questionnaire (EIQ)¹⁹, which has been validated on student samples from Spain and Taiwan. However, the establishment of this questionnaire is still in process. Furthermore, different curricular and instructional designs of entrepreneurship courses reduce the comparability between studies (Fretschner & Weber, 2013). Thus, it is not surprising that several studies have not found a positive influence of EE on the development of EI (Graevenitz et al., 2010; Oosterbeek et al., 2010). To conclude, the influence of EE on EI and behavior is still under researched (Bird et al., 2012; Pittaway & Cope, 2007), especially regarding questions about how programs should be designed to maximize their effectiveness (Heuer & Kolvereid, 2014), as for now, there are no conclusive findings regarding the link between EE and EI (Aparicio et al., 2019).

¹⁸ As described, entrepreneurial education does not solely aim for the creation of new business ventures. However, research applying the theory of planned behavior so far mainly focuses on this form of entrepreneurship without mentioning the opportunity for intrapreneurial behavior.

¹⁹ The questionnaire provided by Liñán and Chen (2009) also focuses on entrepreneurship in a narrow sense asking mainly for self-employment intentions.

Excursus: Shapero's Entrepreneurial Event Theory

Besides the theory of planned behavior by Ajzen (1991) specified in the context of entrepreneurial intention by N. F. Krueger and Carsrud (1993), there are other similar models that aim to predict entrepreneurial behavior.

One quite famous model is the entrepreneurial event theory proposed by Shapero and Sokol (1982). The authors themselves talk about "a possible frame of reference—a paradigm of entrepreneurial event formation" (Shapero & Sokol, 1982, p. 76). The model highlights the key notion of displacement because it is at the beginning of the entrepreneurial process.

The model states that entrepreneurial intention is formed by perceived desirability, propensity to act, and perceived feasibility, as shown in Figure 18. N. F. Krueger and Carsrud (1993) stated that there are some conceptual overlaps between the theory of planned behavior and the entrepreneurial event theory. From their point of view, ATB encompasses the notion of perceived desirability (or lack thereof) in Shapero and Sokol's (1982) model.

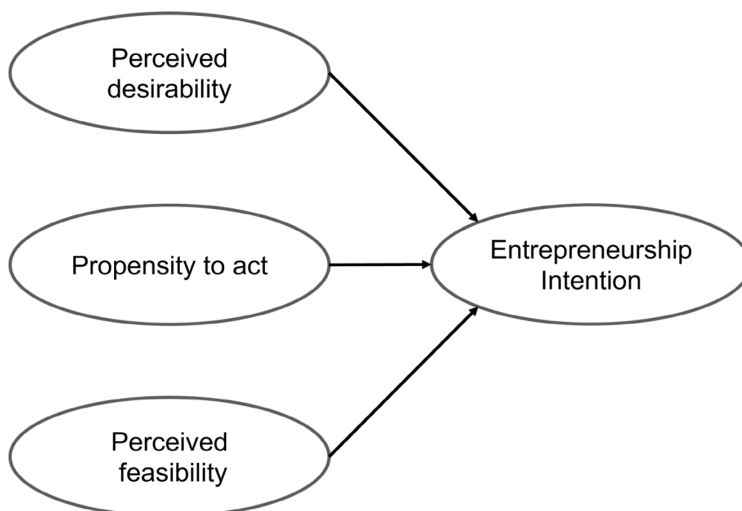


Figure 18 Entrepreneurial event theory based on Shapero & Sokol (1982)

One disadvantage of this model is that it focuses exclusively on the issue of new business creation. The evolution towards the adoption of an entrepreneurial behavior in general is not conceptually included.

3 Derivation of the Research Questions

As explained in the previous chapter dealing with the theoretical background, there is no model which is yet totally elaborated and used as single best solution in order to analyze the effect of entrepreneurship education (EE) on the development of entrepreneurship intention (EI) and subsequently behavior. As the theory of planned behavior seems to be well suitable for the research on entrepreneurship, this thesis will follow the call made by Shook et al. (2003) to reduce the amount of variety regarding intention models that are scholarly used and will use the theory of planned behavior to add further scientific insights regarding the appropriateness and validity of this model.

Large questions remain so far unanswered. The context of higher education especially has not received remarkable research interest in terms of EE programs and their effectiveness in increasing EI. Thus, the first two research questions aim to define a status quo in order to understand to what extent current literature has utilized the theory of planned behavior to evaluate program effectiveness within tertiary education. A particular focus is placed on the program design and the participants of EE programs as well as on resulting behavior.

Research Question 1:

To what extent do studies analyze the influence of EE on EI and theory of planned behavior's antecedents, ATB, SN, and PBC, in terms of

- a) program design,**
- b) duration,**
- c) participant selection,**
- d) field of study,**
- e) educational level, and**
- f) influencing factors?**

Research Question 2:

In how far is entrepreneurial behavior included as a result of the EE program in these studies?

As Heuer and Kolvereid (2014) have pointed out, empirical data is scarce when it comes to the evaluation of different program designs. Although there have been some studies dealing with the effect of experiential learning on the development of EI, to the best of the author's knowledge there is no study evaluating the effect of a project-based and work-integrated program focusing on the development of entrepreneurial personalities. Therefore, the effectiveness of such a program is largely unexplored and could thus provide insights especially in comparison to traditional pedagogical approaches.

Research Question 3:

Which effect does a project-based, work-integrated EE program have on the development of EI and its antecedents, namely ATB, SN, and PBC, as well as on the entrepreneurial activities of EE participants?

As the concept of entrepreneurship (also including intrapreneurship) is very diverse and entrepreneurs may follow totally different goals ranging from venture growth securing family income (Miner & Raju, 2004), it is necessary to understand the deeper beliefs when evaluating the success of EE programs as well as when designing appropriate pedagogical approaches.

Research Question 4:

Which different interpretations regarding entrepreneurship exist and how does this influence the effectiveness of EE programs?

Research Question 5:

Which contextual factors have an influence on the effectiveness of EE programs and how do these explain the retrieved quantitative data?

Depending on these beliefs, EE programs can focus on competencies and personality traits that should be developed through the program. As existing literature has mainly tried to compare entrepreneurs with nonspecifically defined 'managers' (Envick & Langford, 2000; H. Zhao & Seibert, 2006), the question remains what participants themselves see as valuable traits that constitute an entrepreneur.

Research Question 6:

Which personality traits and competencies can be decisive for an entrepreneur and how does this relate to intrapreneurial behavior?

Until now, literature has either focused on the quantitative assessment of changes in EI (Graevenitz et al., 2010) or on increase in business creation rates (OECD, 2009). Very little attention has been paid to qualitative feedback by participants, which might be exceptional valuable for program development and improvement.

Research Question 7:

Which recommendations arise for a project-based and work-integrated program focusing on the development of entrepreneurial personalities?

Research questions 1 and 2 will be answered by means of a systematic review of the existing literature and thus influence the subsequent empirical analyses used to answer the research questions that follow.

Research question 3 builds on the literature review by formulating hypotheses that postulate the effect of a specific EE program on the development of EI. This research question will be answered using a quantitative approach to assess changes in the variables proposed in the theory of planned behavior.

Finally, research questions 4 to 7 aim to find explanations regarding the results achieved so far and, furthermore, shall shed light on currently hidden beliefs held by the participants of EE programs. Thus, these questions will be answered following a qualitative approach to gain deep insights of underlying subjective theories.

SYSTEMATIC LITERATURE REVIEW

4 Objectives to Analyze current Literature

Taken into consideration the wide diversity of entrepreneurship education (EE) programs and their inconsistent effects, the following research questions have been raised:

- *To what extent do studies analyze the influence of EE on entrepreneurship intention (EI) and theory of planned behavior's antecedents, ATB, SN, and PBC, in terms of a) program design, b) duration, c) participant selection, d) field of study, e) educational level, and f) influencing factors?*
- *In how far is entrepreneurial behavior included as a result of the EE program in these studies?*

To answer this question, it was chosen to conduct a systematic literature review (SLR). As Rousseau et al. (2008, p. 479) state: "Systematic means comprehensive accumulation, transparent analysis, and reflective interpretation of all empirical studies pertinent to a specific question. Reliance upon any sampling or subset of the literature risks misrepresenting its diversity in findings, outcomes methods, and frames of reference."

The purpose of a literature review is "to locate the research project, to form its context or background, and to provide insights into previous work" (Blaxter et al., 2010, p. 124), while the researcher "extracts and synthesizes the main points, issues, findings and research methods which emerge from a critical review of the readings" (Nunan, 1992, p. 217).

Different kinds of studies can be incorporated into a SLR, while it is a matter of course to include the intellectual quality of the original studies as well as their context (Caracelli & Cooksy, 2013). Fink (2005) pointed out that a literature review is a systematic, explicit, and reproducible method with the goal to identify, evaluate, and synthesize the existing work produced by researchers, scholars, and practitioners.

The objective of the SLR is to obtain an overview of the already published literature in the field of theory of planned behavior in connection with entrepreneurship intentions (EI) in a standardized way. This includes looking at what this literature looks like in order to identify research gaps. In the sense of mapping, the SLR shows how the literature is structured, what it contains and what connections exist. This is

followed by scoping in order to define which future research interests can be pursued on the basis of existing literature. In addition to this descriptive part, the further purpose of an SLR is to carry out an analytical assessment of the literature, to deeply analyze the presented results. Combining those two aspects, it is possible to obtain rather quantitative as well as qualitative insights to develop a deeper understanding.

Based on the SLR and the resulting condensed overview of existing literature, it is possible to derive hypotheses about the presumed relations and conditions to understand if and how a special form of EE, more precisely the *Projekt-Kompetenz-Studium* offered by Steinbeis University, may influence the development of EI among its participants. In this context, entrepreneurship is defined in the wide sense including different entrepreneurial activities not limited to venture creation or self-employment.

5 Search Strategy to Identify relevant Literature

5.1 First Step: Defining Search Terms

As shown in chapter 2.3, entrepreneurship can be defined in several senses—more widely or in a narrower way focusing on self-employment or venture creation. For the present research, the wider approach was chosen. Therefore, the search term *entrepreneur** was set. The star (*) indicates that letters following after this position can vary. This means, the term *entrepreneurship* would be found but also the term *entrepreneurial*.

For literature dealing with the theory of planned behavior, the search term *theory of planned behav** was defined. The star in this case allows to find the British as well as the American spelling (behaviour vs. behavior).

Finally, the term *education* has been used to include articles related to educational offers mainly by institutions from the educational sector and not from private entities. Here words like ‘training’ seem to be more common.

The search combined the terms using the Boolean operator *AND* to find articles including all search terms. So, the final keywords were: “entrepreneur*” AND “theory of planned behav*” AND “education”.

5.2 Second Step: Establishing Exclusion Criteria

The first search in the database Web of Science revealed a large number of hits. A first analysis showed that many articles were not relevant to the topic of interest. Therefore, explicit exclusion criteria were set to choose those articles that would be truly informative to the SLR. The term ‘education’ especially revealed results that were not suitable, for example studies were included that did not analyze students from higher education institutions but participants from other training formats or high schools. Conceptionally, the focus was set on empirical analyses, therefore theoretical articles were excluded. Besides this, content related exclusion criteria and further limitations such as language reduced the number of analyzed articles (see Table 5).

The content related exclusion criteria were used to evaluate either the title of the study, its abstract or the whole paper. This process is schematically described in Figure 19.

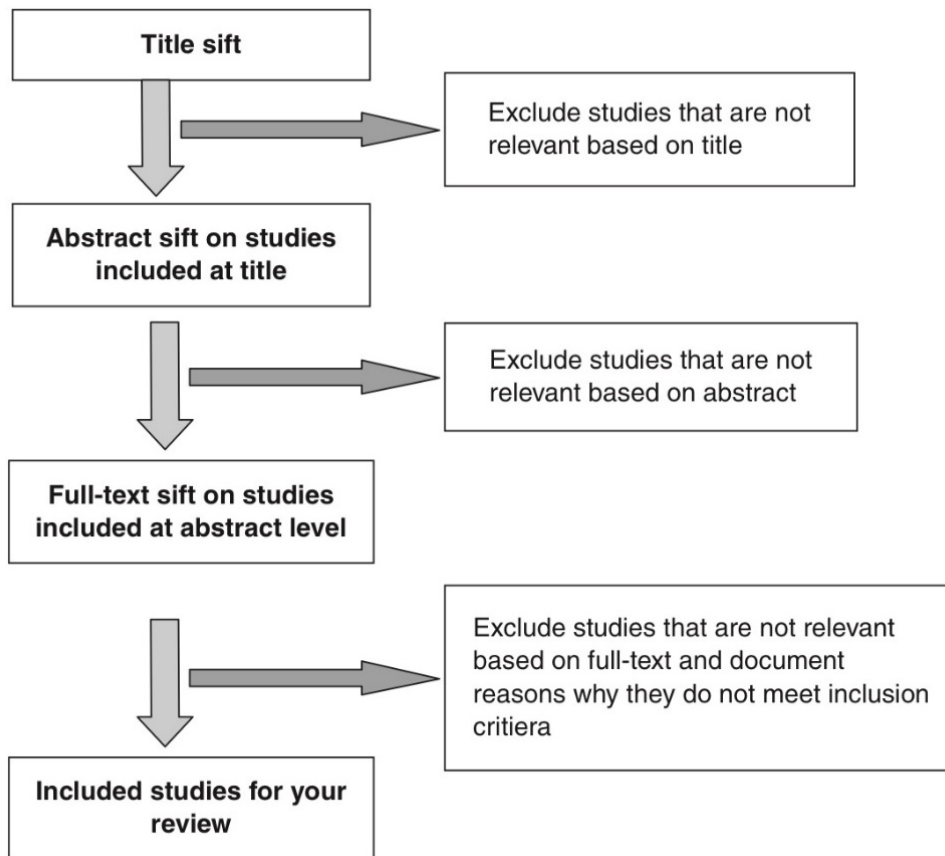


Figure 19 Process of selecting relevant literature based on Booth et al. (2012, p. 99)

5.3 Third Step: Choosing the database

Two databases were chosen for the SLR. Both, Web of Science and ProQuest merge their interdisciplinary searches from several databases and therefore cover a wide range. Web of Science generates journal impact factors (JCR–Journal Citation Reports), whose great dissemination nowadays makes this database one of the most important ones.

Table 5 Articles retrieved from Web of Science and ProQuest

Web of Science	ProQuest
442 initial results	
- 75 conference proceedings	
- 15 not available	
- 13 language not English (or German)	
- 254 abstract analysis	
- 34 paper analysis	
51 articles	13 additional articles
64 articles in total	

The initial results that were found were analysed regarding exclusion criteria and other limitations such as availability of the full text or language. In total, 64 articles have been analyzed. Although the obtained article list may not be exhaustive, the author is confident that the list is at least representative for the work published within the EE domain.

6 Findings: Focal points and Short-comings in Literature

6.1 Overview of Analyzed Studies

First of all, it was analyzed whether a given study included in the SLR was quantitative or qualitative in nature. Then, the different possibilities regarding subjects were integrated. Some studies dealt with either Bachelor's or Master's students. Other studies combined Bachelor's, Master's and PhD students while others did not even mention the academic level of the subjects. Additionally, the SLR analyzed whether the field of study or the major taken was considered. Regarding educational aspects, different pedagogical approaches and the program duration was taken into account as well as whether participation in an entrepreneurship program was electively chosen by the participant or compulsory as part of the curriculum. Within the theory of planned behavior concept, it was furthermore analysed how far the studies integrated in the SLR dealt with entrepreneurial actions that have been taken by the participants. Finally, the countries in which the study was conducted were considered.

Table 6 shows the list of studies that have been integrated in the SLR. The overview in Figure 20 indicates the different aspects that have been analyzed.

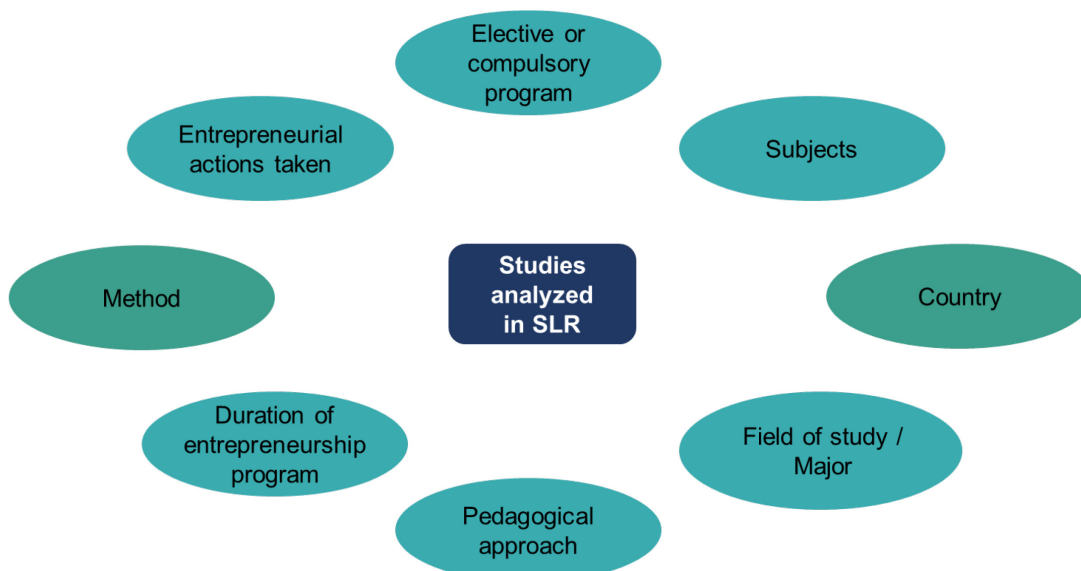


Figure 20 Content elements that have been analyzed in the SLR (own illustration)

Table 6 List of studies analyzed in the SLR and overview of results

Author and Year	Title	Method	Subjects	Field of study	Pedagogical approaches & duration	EE choice	EE Action analyzed	Country	Results
Agu, A. G. (2021)	A survey of business and science students' intentions to engage in sustainable entrepreneurship	Quantitative	Bachelor	several but not analysed	2 semesters	compulsory	no	Nigeria	>ATB has positive influence on EI >SN has positive influence on EI >PBC has no positive influence on EI >EE has positive influence on EI
Agu, A. G., Kalu, O. O., Esi-Ubani, C. O., & Agu, P. C. (2021)	Drivers of sustainable entrepreneurial intentions among university students: an integrated model from a developing world context	Quantitative	Bachelor	several but not analysed	2 semesters	compulsory	no	Nigeria	>ATB has positive influence on socialEI >SN has no positive influence on socialEI >EE has positive influence on ATB and SN but not on general EI
Zdolsek Draksler, T., & Sirec, K. (2021)	The Study of Entrepreneurial Intentions and Competencies of Business vs. Non-Business Students	Quantitative	unknown	several but not analysed	unknown	unknown	no	Slovenia	>ATB is positively related to EI >SN is not positively related to EI >PBC has a positive influence on EI >SN influences ATB >SN influences PBC
Mensah, I. K., Zeng, G., Luo, C., Xiao, Z., & Lu, M. (2021)	Exploring the Predictors of Chinese College Students' Entrepreneurial Intention	Quantitative	B+M+PhD	several but not analysed	unknown	unknown	no	China	>ATB has a positive influence on EI >SN has a positive influence on EI >PBC has a positive influence on EI >EE has a positive influence on EI
Ndovela, M., & Chinyamurindi, W. T. (2021)	Entrepreneurial careers: Factors influencing entrepreneurial intentions using a sample of undergraduate exit students	Quantitative	Bachelor	Commerce	unknown	unknown	no	South Africa	>ATB is positively related to EI >SN is positively related to EI >PBC is positively related to EI >EE has a positive influence on EI >Proactivity is positively related to ATB >High risk taking is not positively related to ATB >proactivity & high risk taking enhance EE participation
Otache, I., Umar, K., Audu, Y., & Onalo, U. (2021)	The effects of entrepreneurship education on students' entrepreneurial intentions A longitudinal approach	Quantitative	Bachelor	Polytechnics	2 semesters	unknown	no	Nigeria	>EE has a positive influence on EI >ATB has a positive influence on EI >SN has a positive influence on EI >PBC has no positive influence on EI >ATB mediates between EE and EI >SN does not mediate between EE and EI >PBC does not mediate between EE and EI
Otache, I., Oluwade, D. O., & Idoko, E.-O. J. (2020)	Entrepreneurship education and undergraduate students' self-employment intentions: do paid employment intentions matter?	Quantitative	Bachelor	Accounting	unknown	compulsory	no	Nigeria	>EE has a positive influence on EI >Inverse relationship between paid employment intention and EI
Paray, Z. A., & Kumar, S. (2020)	Does entrepreneurship education influence entrepreneurial intention among students in HEIs? The role of age, gender and degree background	Quantitative	B+M+PhD	Management vs. Science technology	unknown	unknown	no	India	>EE has a positive influence on EI, ATB, SN, PBC >ATB, SN, PBC have a positive influence on EI and mediate between EE and EI >significant differences between male and female >Postgraduates students have higher levels of EI and TPB dimensions than undergraduates >management students have higher EI

Table 6 List of studies analyzed in the SLR and overview of results (continued)

Author and Year	Title	Method	Subjects	Field of study	Pedagogical approaches & duration	EE choice	EE Action analyzed	Country	Results
Nguyen, P. M., van Dinh, T., Luu, T.M.N., & Choo, Y. (2020)	Sociological and theory of planned behaviour approach to understanding entrepreneurship: Comparison of Vietnam and South Korea	Quantitative	Bachelor	unknown	unknown	unknown	no	Vietnam + South Korea	>EE has a positive impact on ATB -> V; yes SK: yes >EE has a positive impact on PBC -> V: no SK: yes >ATB has a positive impact on EI -> V: no SK: yes >PBC has a positive impact on EI -> V: yes SK: yes >SN has a positive impact on EI -> V: no SK: yes
Zovko, L., Bilić, I., & Dulčić, Ž. (2020)	Determinants of students' entrepreneurial intention: an empirical research	Quantitative	B+M+PhD	unknown	unknown	unknown	no	Croatia	>ATB has a positive influence on EI >SN has not a positive influence on EI >Role models does not have a positive influence on EI >EE has not a positive influence on EI >need for achievement is not positively related to EI >Propensity toward risk is positively related to EI
Asghar, M. Z., Gul, F., Seitamaa Hakkarainen, P., & Taşdemir, M. Z. (2019)	Validating Entrepreneurial Intentions Questionnaire to Assess the Impact of Entrepreneurship Education	Quantitative	unknown	Technology	unknown	unknown	no	Finnland	>EE enhances EI >EE participants have higher ATB, SN, and PBC
Fernández-Pérez, V., Montes-Merino, A., Rodríguez-Ariza, L., & Galicia, P. E. A. (2019)	Emotional competencies and cognitive antecedents in shaping student's entrepreneurial intention: the moderating role of entrepreneurship education	Quantitative	unknown	Social and legal science	unknown	compulsory	no	Spain	>SN influences PBC and ATB positively and directly but not EI >ATB and PBC influence EI directly and positively >EE paired with positive SN enhances ATB
Hou, F., Su, Y., Lu, M., & Qi, M. (2019)	Model of the Entrepreneurial Intention of University Students in the Pearl River Delta of China	Quantitative	Bachelor	several but not analysed	unknown	unknown	no	China	>Role models are positively linked to EI >EE positively influences EI and PBC >no positive relation between role models and PBC >PBC positively affects EI >PBC mediates between EE and EI but not between role models and EI
Zhang, F., Wei, L., Sun, H., & Lo Tung, C. (2019)	How entrepreneurial learning impacts one's intention towards entrepreneurship A planned behavior approach	Quantitative	Bachelor	Engineering	1 semester	both but not analysed	no	Hong Kong	>EE has a positive relationship with EI >ATB, SN and PBC mediate between EE and EI >Prior exposure to entrepreneurship moderates indirectly the effect of EE on EI via ATB and PBC but not SN
Baghen, A. (2018)	University Students' Entrepreneurial Intentions: Does Education Make a Difference?	Quantitative	Master	several but not analysed	unknown	unknown	no	Iran	>EE has a significant positive impact on EI through PBC and ATB
Chukwuma-Nwuba, E. O. (2018)	The influence of culture on entrepreneurial intentions: a Nigerian university graduates' perspective	Quantitative	Bachelor	unknown	1 semester	compulsory	no	Nigeria	>The effect of culture on EI is mediated by ATB and SN >Culture has a direct positive effect on EI >ATB has significant positive relationship with EI >The effect of SN on EI is mediated by ATB >SN has direct positive relationship with EI

Table 6 List of studies analyzed in the SLR and overview of results (continued)

Author and Year	Titel	Method	Subjects	Field of study	Pedagogical approaches & duration	EE choice	EE Action analyzed	Country	Results
Enrtaigo, M., & Iglesias, V. (2017)	Are the Intentions to Entrepreneurship of Men and Women Shaped Differently? The Impact of Entrepreneurial Role-Model Exposure and Entrepreneurship Education	Quantitative	Bachelor	several but not analysed	1 semester action oriented	elective	no	Spain	>SN are positively related to EI, this relationship is mediated by ATB and PBC >Parental role models are positively related to EI, this relationship is mediated by ATB and PBC >EE positively influences ATB but not PBC >EE does not directly influence EI
Passaro, R., Quinto, I., & Thomas, A. (2018)	The impact of higher education on entrepreneurial intention and human capital	Quantitative	B+M	not analysed	theory based for B with unknown duration; business plan competition for M for 6 months	both but not analysed	no	Italian	>EE positively indirectly affects EI through TPB >More active learning has positive effects >EE positively directly affects EI
Ahmed, T., Chandran, V., & Klobas, J. (2017)	Specialized entrepreneurship education: does it really matter? Fresh evidence from Pakistan	Quantitative	B+M+PhD	MBA with entrep. Course (compulsory) Bachelor with Entrepreneurship as Major	unknown 4 years	both analysed	no	Pakistan	>MBA students EI is more influenced by SN >EI of EE students is driven by PBC >EE students ATB, SN and PBC is not higher >EI is higher for MBA students than EE students >Qualitative approaches are needed
Pedirni, M., Langella, V., & Molteni, M. (2017)	Do entrepreneurial education programs impact the antecedents of entrepreneurial intention? An analysis of an entrepreneurship MBA in Ghana	Mixed Method	Master	Entrepreneurship	1 year action oriented	whole program	no	Ghana	>locus of control, self-efficacy, need for achievement and risk propensity are positively influenced by the MBA program >These findings are also confirmed via the focus group interviews
Shah, I. A., Amjed, S., & Jaboo, S. (2020)	Investigating entrepreneurial intention among public sector university students of Pakistan	Quantitative	B+M+PhD	Entrepreneurship	unknown	whole program	no	Pakistan	>ATB and SN influence EI directly and significantly >PBC does not influence EI
Sitaridis, I., & Kitsios, F. (2017)	Entrepreneurial intentions of information technology students: the theory of planned behaviour, the role of gender and education	Quantitative	B+M+PhD	IT	unknown	unknown	no	Macedonia	>ATB, SN and PBC can significantly predict EI >Females EI is lower than males EI >EE does not positively influence EI
Sun, H., Lo, C. T., Liang, B., & Wong, Y. L. B. (2017)	The impact of entrepreneurial education on entrepreneurial intention of engineering students in Hong Kong	Quantitative	Bachelor	Engineering	unknown	unknown	no	China	>Experimental learning is suggested for EE as know-how enhances PBC >ATB, SN and PBC have a positive impact on EI >SN positively affect ATB and PBC >PBC influences ATB

Table 6 List of studies analyzed in the SLR and overview of results (continued)

Author and Year	Titel	Method	Subjects	Field of study	Pedagogical approaches & duration	EE choice	EE Action analyzed	Country	Results
Entrialgo, M., & Iglesias, V. (2016)	The moderating role of entrepreneurship education on the antecedents of entrepreneurial intention	Quantitative	Bachelor	several but not analysed	1 semester action based	elective	no	Spain	>SN positively affect ATB and PBC >SN are more important for women >SN is more important for students without EE to generate PBC
Iglesias-Sánchez, P., Jambriño-Maldonado, C., Velasco, A. P., & Kokash, H. (2016)	Impact of entrepreneurship programmes on university students	Quantitative	B+M+PhD	several but not analysed	duration unknown highly practical	compulsory	no	Spain	>EE has positive influence on EI >EI especially depends on PBC and ATB
Karimi, S., Biemans, H. J. A., Lans, T., Chizari, M., & Mulder, M. (2016)	The Impact of Entrepreneurship Education: A Study of Iranian Students' Entrepreneurial Intentions and Opportunity Identification	Quantitative	Bachelor	several but not analysed	2 years	both analysed	no	Iran	>Elective EE has significantly increased EI while compulsory EE did not have a significant effect on EI >But both types do not develop ATB >Both types significantly increased SN and PBC
Khalifa, A. H., & Dhiab, M. M. (2016)	The impact of entrepreneurship education on entrepreneurial intention: The UAE context	Quantitative	unknown	Management	unknown	unknown	no	UAE	>EE does not positively impact EI >EI of UAE students is very low >comfortable economic situation and social level may reduce EI
Malebana, M. J. (2019)	Does entrepreneurship education matter for the enhancement of entrepreneurial intention?	Quantitative	unknown	Management	3 levels (no/1 semester/ 3 years)	unknown	no	South Africa	>The greater the EE exposure the greater is EI >The greater the EE exposure the greater are ATB, SN and PBC
Maresch, D., Harms, R., Kailer, N., & Wimmer-Wurm, B. (2016)	The impact of entrepreneurship education on the entrepreneurial intention of students in science and engineering versus business studies university programs	Quantitative	B+M+PhD	Engineering vs. Business	unknown	unknown	no	Austria	>SN, ATB and PBC are positively connected to EI, this relationship depends on type of study >SN has a negative influence on Science students EI >A higher extent of EE does not cause higher ATB >The greater the extent to EE, the weaker the positive impact of SN on EI
Díaz-García, C., Sáez-Martínez, F., & Jiménez-Moreno, J. (2015)	Assessing the impact of the "Entrepreneurs" education programme on participants' entrepreneurial intentions	Quantitative	unknown	several but not analysed	1 semester	elective	no	Spain	>EE does not enhance ATB >EE increases perceived difficulties >EE increases EI
Pouratashi, M. (2015)	Entrepreneurial Intentions of Agricultural Students: Levels and Determinants	Quantitative	unknown	Agriculture	unknown	unknown	no	Iran	>EE increases EI >students with self-employed parents had significantly higher EI
Rauch, A., & Hulsink, W. (2015)	Putting Entrepreneurship Education Where the Intention to Act Lies	Quantitative	Master	Entrepreneurship	1 year action oriented	whole program	yes	Netherlands	>EE enhances PBC, ATB and EI >EE has positive impact on behaviour

Table 6 List of studies analyzed in the SLR and overview of results (continued)

Author and Year	Title	Method	Subjects	Field of study	Pedagogical approaches & duration	EE choice	EE Action analyzed	Country	Results
Varamäki, E., Joensuu, S., Tomikoski, E., & Viljamaa, A. (2015)	The development of entrepreneurial potential among higher education students	Quantitative	Bachelor	several but not analysed	unknown duration action based vs. lecture based	unknown	no	Finland	>ATB and PBC has positive impact on EI but SN does not >action based EE influences ATB but not PBC
Vuković, K., Kedemec, I., & Korent, D. (2016).	The Impact of Exposure to Entrepreneurship Education on Student Entrepreneurial Intentions	Quantitative	B+M+PhD	Economics	unknown	whole program	no	Croatia	>No difference in EI in different years of study >Difference in ATB in different years of study >No difference in PBC in different years of study >Difference in familiarity with entrepreneurship infrastructure in different years of study
Heuer, A., & Kolvereid, L. (2014)	Education in entrepreneurship and the Theory of Planned Behaviour	Quantitative	unknown	Entrepreneurship	duration unknown several courses and methods	whole program	no	Belgium / Norway	>EE enhances EI directly without enhancing antecedents (ATB, PBC, SN) >TPB model is at least not complete
Roxas, B. (2014)	Effects of entrepreneurial knowledge on entrepreneurial intentions: a longitudinal study of selected South-east Asian business students	Quantitative	Bachelor	Business	10 months theory and action	unknown	no	Philippines	>PBC is positively related to EI >ATB is positively related to EI
Zhang, Y., Duysters, G., & Cloodt, M. (2014)	The role of entrepreneurship education as a predictor of university students' entrepreneurial intention	Quantitative	B+M+PhD	Technological vs. Non-technological	unknown	elective	no	China	>ATB is positively related to EI >PBC is not positively related to EI >Prior entrepreneurship exposure is negatively related to EI >EE is positively related to EI >Technology students have higher EI
Fritschner, Michael; Weber, Susanne (2013)	Measuring and Understanding the Effects of Entrepreneurial Awareness Education	Mixed Method	unknown	Business	1 semester	elective	no	Germany	>EE enhances PBC (not SN and ATB) >EI depends heavily on ATB after EE (PBC and SN does not anymore play a role in predicting EI as before EE) >students with self-employed parents have high EI >Independence and Financial Success are the most important positive aspects after EE >Risk and Workload are the most important negative aspects after EE
Solesvik, Marina Z. (2013)	Entrepreneurial motivations and intentions: investigating the role of education major	Quantitative	Bachelor	several but not analysed	several courses on marketing and finance	unknown	no	Ukraine	>EE participants have higher EI which promotes ATB and PBC but not SN >EI is positively and significantly associated with ATB, SN, PBC
Lourenço, Fernando; Javawarna, Dilani (2011)	Enterprise education: the effect of creativity on training outcomes	Quantitative	unknown	several but not analysed	8 hours	elective	no	England	>results largely agree with the TPB as applied to entrepreneurship and suggest trainees' perception of creativity as a driver for enhancing learning habits among nascent entrepreneurs

Table 6 List of studies analyzed in the SLR and overview of results (continued)

Author and Year	Titel	Method	Subjects	Field of study	Pedagogical approaches & duration	EE choice	EE Action analyzed	Country	Results
Romero, Isidoro; Petrescu, Raluca Mariana; Balalia, Alina Elena (2011)	Universities as Suppliers of Entrepreneurship Education Services	Quantitative	unknown	several but not analysed	unknown	compulsory	no	Romania / Spain	>EI is higher for Romanian students due to higher ATB >no significant differences in PBC
Sánchez, José C. (2011)	University training for entrepreneurial competencies: Its impact on intention of venture creation	Quantitative	unknown	several but not analysed	8 months practise oriented	elective	no	Spain	>The higher proactivity and risk taking (and PBC) the higher EI >EE enhances proactivity, risk taking, PBC and EI
Souliaris, Vangelis; Zerinati, Stefania; Al-Laham, Andreas (2007)	Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students?	Quantitative	Bachelor	Science and engineering	5 months	both but not analysed	yes	England / France	>EI is high when SN, PBC, and ATB are high >SN and EI is higher after EE (PBC and ATB is not) >EE has not raised entrepreneurial actions >study peers must be part of SN
Ho, Yuen-Ping; Low, Pei-Chin; Wong, Poh-Kam (2014)	Do University Entrepreneurship Programs Influence Students' Entrepreneurial Behavior? An Empirical Analysis of University Students in Singapore	Quantitative	unknown	several but not analysed	Experimental learning for one year vs. classroom learning with unknown duration	unknown	yes	Singapore	>EE participation enhances entrepreneurial engagement >Experimental learning has higher impact on entrepreneurial engagement than classroom based learning >Business degree students are more likely to be entrepreneurial
Iglesias-Sánchez, P., Jambriño-Maldonado, C., & las Heras-Pedrosa, C. de (2019)	Training Entrepreneurial Competences with Open Innovation Paradigm in Higher Education	Mixed Method	unknown	several but not analysed	Hackathon, role play, team building max. 1 day	unknown	no	Spain	>Positive correlation between employability and EI >EE has a positive impact on EI and employability
Ismail, A. B., Sawang, S., & Zolin, R. (2018)	Entrepreneurship education pedagogy: teacher-student centred paradox	Quantitative	Bachelor	Business	1 semester	unknown	no	Malaysia	>Teacher- and student-centred approaches positively affect subjective and objective learning outcomes >Subjective learning outcomes but not objective learning outcomes are good predictors of EI
González-López, M. J., Pérez-López, M. C., & Rodríguez-Ariza, L. (2019)	Clearing the Hurdles in the Entrepreneurial Race: The Role of Resilience in Entrepreneurship Education	Quantitative	unknown	Business	2 semesters	compulsory	no	Spain	>EE is positively related to EI, PBC, SN, and ATB >PBC, SN, and ATB are positively associated with resilience
Otache, I. (2019)	Enhancing the effectiveness of entrepreneurship education: the role of entrepreneurial lecturers	Quantitative	unknown	Business	1 semester	unknown	no	Nigeria	>EE has a positive influence on EI >EI gets stronger when lecturers are entrepreneurially inclined

Table 6 List of studies analyzed in the SLR and overview of results (continued)

Author and Year	Titel	Method	Subjects	Field of study	Pedagogical approaches & duration	EE choice	EE Action analyzed	Country	Results
Díaz-Casero, J. C., Fernández-Portillo, A., Sánchez-Escobedo, M. C., & Hernández-Mogollón, R. (2017)	The Influence of University Context on Entrepreneurial Intentions	Quantitative	unknown	unknown	unknown	unknown	no	Spain	>EE positively affects EI >university context positively affects EI >university context positively affects EE
González-Serrano, M. H., Calabuig Moreno, F., & Crespo Hervás, J. (2021).	Sport management education through an entrepreneurial perspective: Analysing its impact on Spanish sports science students	Quantitative	unknown	Sports	unknown	elective	no	Spain	>EE enhances PBC
Padilla-Angulo, L., Díaz-Pichardo, R., & Leal-Rodríguez, A. L. (2021)	Are different entrepreneurship-promotion activities equally effective? an analysis by academic year and gender	Quantitative	B+M+PhD	several but not analysed	unknown	compulsory	no	France	>ATB and PBC have a positive and significant impact on EI >SN has a positive and significant impact on ATB and PBC but not on EI >1st and 3rd year EE activities are good for EI
Dodescu, A. O., Botezat, E. A., Conștiangoiară, A., & Pop-Cohuț, I. C. (2021)	A Partial Least-Square Mediation Analysis of the Contribution of Cross-Campus Entrepreneurship Education to Students' Entrepreneurial Intentions	Quantitative	Bachelor	several but not analysed	2 years	unknown	no	Romania	>SN does not influence EI directly but via PBC & ATB >working experience does not influence EI via PBC >entrepreneurship experience does influence EI via PBC
Kusumojanto, D. D., Narmaditya, B. S., & Wibowo, A. (2020)	Does entrepreneurial education drive students' being entrepreneurs? Evidence from Indonesia	Quantitative	unknown	unknown	unknown	unknown	no	Indonesia	>EE influences PBC and ATB >EE does not directly influence EI
Tessema Gerba, D. (2012)	Impact of entrepreneurship education on entrepreneurial intentions of business and engineering students in Ethiopia	Quantitative	Bachelor	several but not analysed	unknown	compulsory	no	Ethiopia	>EE influences PBC and SN >management students have higher EI than engineering students (not significant)
Fayolle, Alain; Gailly, Benoit; Lassas-Clerc, Narjisse (2006)	Assessing the Impact of Entrepreneurship Education Programmes: A New Methodology	Quantitative	unknown	Engineering	1 day	elective	no	France	>validation of a new method to assess EE effect >EE strongly influences EI, but not highly significant PBC
Ndofirepi, T. M., & Rambe, P. (2018)	A qualitative approach to the entrepreneurial education and intentions nexus: A case of Zimbabwean polytechnic students	Qualitative	unknown	Commerce vs. Applied science vs. Engineering	1 year	compulsory	no	Zimbabwe	>Environment plays a big role when it comes to EI, e.g. economic situation in the country >Business students prefer permanent employment >Participants want not only theory but also practice and authenticity in relation to EE

Table 6 List of studies analyzed in the SLR and overview of results (continued)

Author and Year	Titel	Method	Subjects	Field of study	Pedagogical approaches & duration	EE choice	EE Action analyzed	Country	Results
Ramos, D., Madeira, M. J., & Duarte, F. A. P. (2020)	Entrepreneurship Education and Entrepreneurial Intention: the Case of Portugal	Quantitative	B+M+PhD	unknown	unknown	unknown	no	Portugal	>EE positively influences EI >propensity to take risks positively influences EI
Adelekan, S. A., Williamson, M., & Atiku, S. O. (2018)	Influence of social pedagogical initiatives on students' attitudes and behaviours	Quantitative	Bachelor	Management	unknown	unknown	no	Nigeria	> There is significant positive relationship between EE and students' behavioral outcomes >ATB mediate the relationship between EE behavioral outcomes > There is a significant positive relationship between EE and EE positively influences EI
Sang, D., & Lin, J. (2019)	How does Entrepreneurial Education Influence the Entrepreneurial Intention of College Students: The Moderating and Mediating Effects of Entrepreneurial Alertness	Quantitative	unknown	unknown	unknown	unknown	no	China	
Shah, I. A., Amjed, S., & Jaboo, S. (2020)	The moderating role of entrepreneurship education in shaping entrepreneurial intentions	Quantitative	Bachelor	several but not analysed	unknown	compulsory	no	Oman	>ATB, SN and PBC are significant predictors of EI >EE is a moderator between ATB, SN and PBC towards EI
Soria-Barreto, K., Honores-Marin, G., Gutiérrez-Zepeda, P., & Gutiérrez-Rodríguez, J. (2017)	Prior Exposure and Educational Environment towards Entrepreneurial Intention	Quantitative	unknown	Business	unknown	unknown	no	Chile / Colombia	>ATB, SN and PBC are significant predictors of EI >Working experience reduces EI
Štrirečki, K., & Faturokhman, A. (2021)	An Experimental Study on the Effectiveness of	Quantitative	unknown	several but not analysed	7 weeks	compulsory	no	Indonesia	>EE increases ATB, SN, PBC, and EI
Nenzhelele, T. E., Moraka, N. V., & More, K. K. (2016)	The impact of practical entrepreneurship project on future entrepreneurial intentions	Quantitative	unknown	unknown	5 weeks practically oriented project	elective	no	South Africa	>EE increases PBC >EE increases EI
Vodă, A., & Florea, N. (2019)	Impact of Personality Traits and Entrepreneurship Education on Entrepreneurial Intentions of Business and Engineering Students	Quantitative	B+M+PhD	unknown	unknown	compulsory	no	Romania	>EE has negative influence on EI

6.2 Quantitative Comparisons and Content Analyses

6.2.1 Analyses of the Theory of Planned Behavior Components²⁰

All studies integrated into the SLR make use of the theory of planned behavior and its variables. This builds the conceptual framework. The most common relation of the variables is presented in Figure 21. Accordingly, entrepreneurship education (EE) has a direct influence on entrepreneurship intention (EI), while also influencing the antecedents ATB, SN, and PBC. However, there are also studies that see EE as moderating variable between the antecedents and EI (Fernández-Pérez et al., 2019; Y. Zhang et al., 2014).

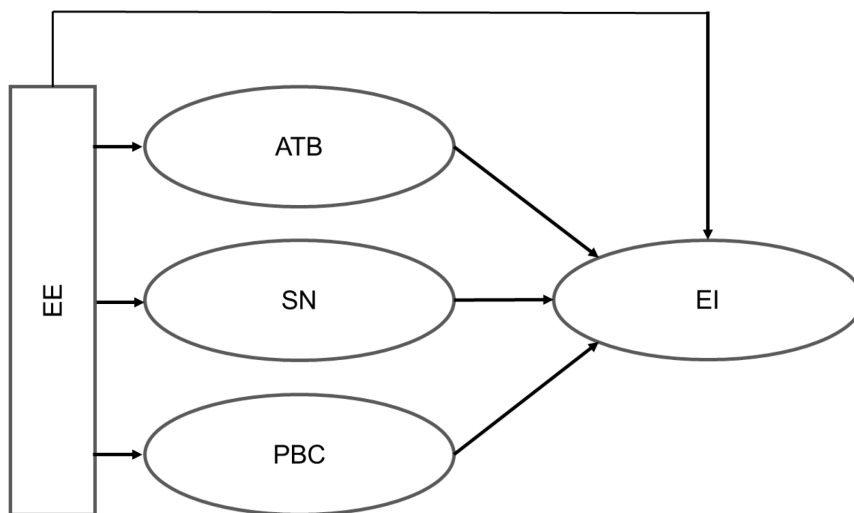


Figure 21 Adapted theory of planned behavior model to explain the effect of entrepreneurship education (own illustration)

As can be seen from the most relevant results summarized for each study in the SLR and presented in Table 6, there is neither consensus regarding the effectiveness of EE to develop EI, nor regarding the role of the antecedents as part of the theory of planned behavior. Most studies analyzed in the SLR, mainly support the theoretical concept, in particular regarding the influence of EE on the development of EI. For example, Mensah et al. (2021) show that ATB, SN, PBC as

²⁰ It must be mentioned that not all studies included all elements mentioned in the theory of planned behavior. For example, Rauch and Hulsink (2015) argue that SN as beliefs of friends and family cannot be influenced directly by EE. Thus, they did not analyze whether there are any effects.

well as EE has a positive influence on EI, while others look on the positive effect of EE on ATB, SN, and PBC (Asghar et al., 2019). Furthermore, some researchers found a full mediating effect of ATB, SN, and PBC (Paray & Kumar, 2020; F. Zhang et al., 2019) or at least found some variables to be mediators (Otache et al., 2021). However, a great number of studies included in the SLR show contradictory results. Kusumojanto et al. (2020) found an effect of EE on PBC and ATB but could not demonstrate a direct influence on EI. Others reported the opposite: EE strongly influences EI but not highly significant PBC (Fayolle et al., 2006). Padilla-Angulo et al. state that ATB and PBC have a positive and significant impact on EI while SN does not—instead SN has a positive and significant impact on ATB and PBC.

Several studies fail to demonstrate the direct and significantly influence of EE on EI (Entrialgo & Iglesias, 2018; Khalifa & Dhiaf, 2016; Sitaridis & Kitsios, 2017). Vuković et al. (2016) analyzed whether there are differences in EI and PBC among students in different years of study without finding a significant increase. Indeed, some studies even report a negative influence of EE on EI (Vodá & Florea, 2019).

Within the theory of planned behavior concept, the element SN generates the most diverse results. As mentioned, several studies do prove the influence of SN on EI (Mensah et al., 2021) while others cannot find an effect (Draksler & Sirec, 2021; Zovko et al., 2020). Dodescu et al. (2021) showed that SN does not influence EI directly but does via PBC and ATB. Besides these results, there are researchers who conceptionally added the role of study peers when it comes to SN (Souitaris et al., 2007). Rauch and Hulsink (2015) did not analyze SN as part of the model, as based on their argument this antecedent of EI cannot be influenced by EE.

Also, for PBC, the results are very diverse. Several studies could not find an influence of EE on the development of PBC (Ahmed et al., 2017; Romero et al., 2011; Souitaris et al., 2007) while some of them have even applied an action-oriented approach (Entrialgo & Iglesias, 2018; Varamäki et al., 2015). Other studies failed to demonstrate that PBC is a predictor of EI (Otache et al., 2021; Shah et al., 2020; Y. Zhang et al., 2014).

To conclude, some studies discuss the possibility that the theoretical concept of the theory of planned behavior is at least not sufficient (Heuer & Kolvereid, 2014).

6.2.2 Analyses of the Educational Parameters

6.2.2.1 Educational level of the participants

More than 39% of the authors did not precisely describe the educational level of their study participants. Of those that did, the SLR revealed that research has mainly focused on EE programs offered at the undergraduate level. Thus, existing research barely addresses those programs aimed at graduate students, such as MBAs (Rodrigues et al., 2010; Souitaris et al., 2007). About 34% had Bachelor's students as subjects and 5% analyzed solely Master's students. 22% of the studies included Bachelor's, Master's and sometimes PhD students, but mainly without comparing if there are differences between the groups. Paray and Kumar (2020) showed that postgraduates students have higher levels of EI and theory of planned behavior dimensions than undergraduates.

This fact is in conflict with the increasing number of EE programs aiming for the second educational level. Based on the numbers derived, the effectiveness of these programs has been largely unexplored (Wright et al., 2009).

6.2.2.2 Field of study

Several researchers analyzed whether a student's EI depends on the field of study they have chosen. By and large, differences are mainly expected when comparing participants from the field of engineering with those from the economic sector. Other study subjects do not reach noteworthy research interest.

Even though literature regularly discusses possible differences, for the SLR the largest part of studies (41%) mentioned that participants came from different fields of study, but did not analyze any differences. Only about 11% of the studies aimed to compare the EI of engineering and economic students, without reaching consensus which group is superior. For example, Ho et al. (2014), Ismail et al. (2018), and Paray and Kumar (2020) conclude that business degree students are more likely to be entrepreneurial, while Y. Zhang et al. (2014) found that engineering students have higher EI.

Given these contradictory results it is not surprising that approximately 36% of the analyzed studies focused solely on participants from one field of study and about 12% of studies did not mention the field of study of their participants at all.

6.2.2.3 Participant selection

Oosterbeek et al. (2010) emphasized the need to test different program variants when it comes to the selection process as studies often do not consider whether someone participates in an EE program as elective course or is forced to do so as a compulsory part of the curriculum.

Nevertheless, almost half of the studies in the SLR (47%) do not even mention if the program is compulsory or elective. The other studies focus on either compulsory (22%) or elective (16%) programs. While the study performed by Vodă and Florea (2019) analyzed a compulsory program and showed a negative effect of EE on EI, other studies analyzing an elective program also failed to confirm a direct positive effect (Entrialgo & Iglesias, 2018; Xu et al., 2016).

Just above 3% analyzed the difference between the two types of courses. Karimi et al. (2016) showed that an elective course has a greater effect on EI, SN, and PBC than a compulsory course. Ahmed et al. (2017) compared students that have decided to join a Bachelor program entirely focusing on entrepreneurship with students from a MBA program containing a compulsory EE course. Besides the methodological difficulty when comparing Bachelor with Master degree students, he found that EI is higher for the MBA students. About 8% of the studies analyzed programs which are completely dedicated to entrepreneurial content; thus, participants have somewhat electively chosen this program. Just under 5% of the studies mention having participants from elective and compulsory programs but without analyzing differences.

6.2.2.4 Program design

One element of the raised research questions focuses on the pedagogical approaches. Regarding the wide variety in didactics, methods, and foci (see chapter 2.1.3 to 2.1.7), it is astonishing that roughly 87 % of the SLR studies do not mention any pedagogical framework. Those who do mainly describe a student-centered,

action-oriented approach as key element of their EE. Nevertheless, the level of details provided in the respective studies ranges from a few sentences (for example, as described in Nenzhelele et al. (2016)) to detailed explanations. Rauch and Hulsink (2015) precisely present how the EE program in their study has been designed.

Three studies aimed for a comparison between experiential learning and classroom based learning demonstrating the latter to have less positive effects on the formation of EI (Ho et al., 2014; Passaro et al., 2018; Varamäki et al., 2015).

6.2.2.5 Duration of EE

When wanting to assess the effect of an educational intervention, it seems relevant to know how long this intervention took place and how intense it was. This is especially true when the outcome is an action that usually lags a time difference, as it is the case for EE (Souitaris et al., 2007).

For the studies analyzed in the SLR, half of the authors reported the duration of the EE program. Some programs only lasted for one day (Fayolle et al., 2006; Iglesias-Sanchez et al., 2019; Iglesias-Sanchez et al., 2016; Lourenço & Jayawarna, 2011) or a few weeks (Nenzhelele et al., 2016; Srirejeki & Faturokhman, 2021), while others lasted for one (Chukwuma-Nwuba, 2018; F. Zhang et al., 2019) or two (Agu, 2021; Otache et al., 2021) semesters. Entire study programs focusing on the development of EI may also last for two (Karimi et al., 2016) or even four (Ahmed et al., 2017) years. The half-year-long module is one of the most popular forms of academic EE (M. T. Schaper & Casimir, 2007)

Very few studies analyzed the development of EI over the course of the EE program. Malebana (2019) found that the greater the EE exposure, the greater is the participants' EI.

6.2.3 Resulting Behavior

Fayolle et al. (2006) argue that behavior is hard to measure. For example, real venture creation cannot be measured during or immediately after an EE program, since the venture creation process takes time. Thus, it is not surprising that about

95% of studies analyzed in the SLR do not consider whether intention results in behavior.

Rauch and Hulsink (2015) developed a questionnaire focusing on entrepreneurial behavior without solely counting final venture creation as such a behavior. When it comes to actions like 'spending a lot of time thinking about starting a business' or 'preparing a business plan' they showed that EE has positive impact on behavior.

On the other hand, other studies also asked their participants for several actions that could be taken as nascent entrepreneur²¹ without being able to show that EE has raised those entrepreneurial actions (Ho et al., 2014; Souitaris et al., 2007).l

6.2.4 Further Results and Influencing Factors

Besides the criteria focusing on the design and the participants of an EE program, the SLR also revealed variables that have an influence on the development of EI and its antecedents and therefore should be considered. For example, it was shown, that working experience reduces EI (Soria-Barreto et al., 2017) and, quite similarly, prior entrepreneurship exposure is also negatively related to EI (Y. Zhang et al., 2014).

²¹ Nascent entrepreneurs are defined as "individuals who were identified as making steps to found a new business but who had not yet succeeded in making the transition to new business ownership" (Carter et al. (1996, p. 151).

Excursus: How does EE effectiveness vary between countries?

The studies analyzed in the SLR have been performed in different countries. While 13 studies were conducted in African countries, 8 studies analyzed China including Hong Kong, 15 were from other Asian countries, and 1 from South America, the regional focus is on Europe with 31 studies.

Nguyen et al. (2020) conducted a research to compare Vietnam and South Korea. This study demonstrates that using the same methodological approach may lead to contradictory results seemingly caused by cultural effects. While ATB and SN positively influence EI for the South Korean participants, this is not the case for the Vietnam group. In contrast, PBC has a positive influence on EI in Vietnam but not in South Korea.

For the United Arab Emirates (UAE), Khalifa and Dhiab (2016) argue that the low EI of students can be caused by the very comfortable economic situation and the high standard of living. This means that some countries and societies seem to be more conducive to engage in entrepreneurial activities than others (Baughn et al., 2006).

Evaluation of European studies

The economic situation in Europe is very diverse. Therefore, it is necessary to have a deeper look on the results retrieved from the SLR. One important criterion to assess the economic power of a country is the youth unemployment rate. A high rate can cause a higher interest in self-employment. Only six studies out of 31 were performed in countries with a youth unemployment rate below average (Austria, Belgium, Germany, Netherlands, Norway, and Slovenia). 22 studies were conducted in countries with youth unemployment rates higher than average (Croatia, Finland, France, Italy, Portugal, Romania, Spain). 10 out of these 22 studies analyzed Spain, which has by far the highest youth unemployment rate namely 27.8%. In comparison, Germany's rate is 5.8% (Statista, 2023).

This also reflects the self-employment rate in the respective countries (see Figure 22). While Germany has a decreasing share of self-employed people, which is well under the European average, this share is increasing in France. Spain shows some slight irregularities, but always remains at a rather constant level, which is above average.

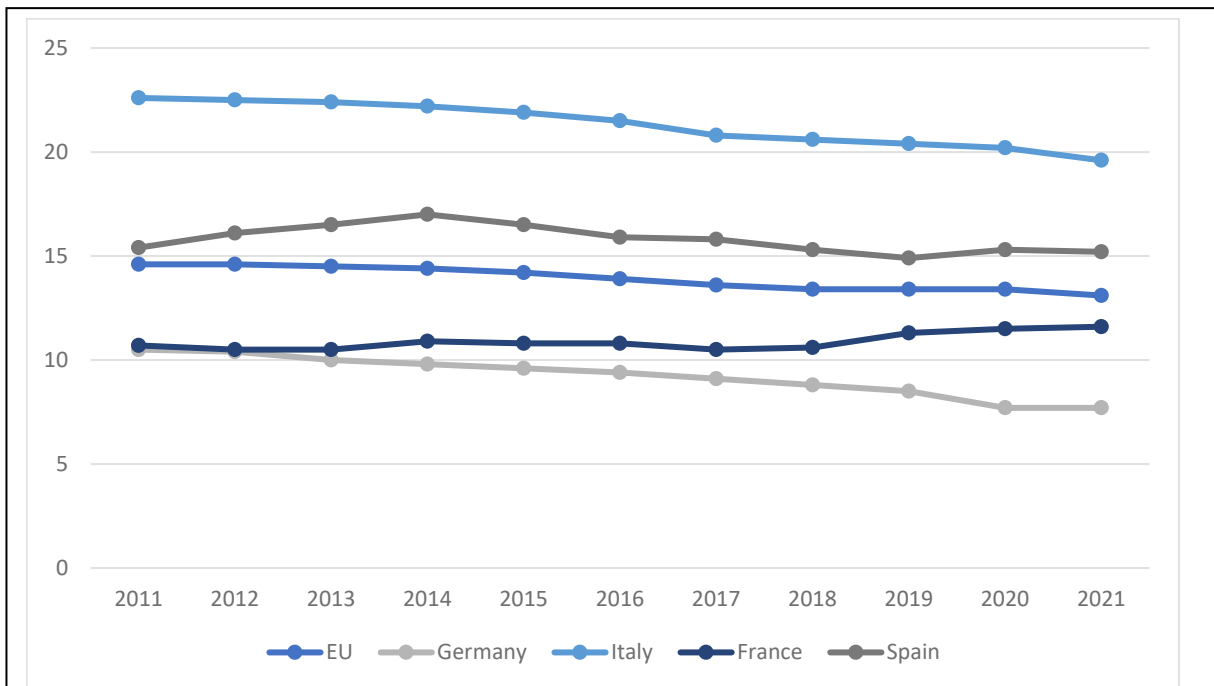


Figure 22 Share of self-employed people in different countries (data retrieved from CEDEFOP (2020))

Besides the economic situation in a country, its culture is also important in determining the attitudes of people towards entrepreneurship (Vernon-Wortzel & Wortzel, 1997). Favorable conditions can lead to higher EIs in the population, which leads to further venture creation, thus raising acceptability and legitimacy of entrepreneurship even more (Liñán & Chen, 2009). Consequently, Hayton et al. (2002) suggest that investigating the relation between culture and the level of entrepreneurial activity is both of practical and theoretical importance. Although not for Europe, Chukwuma-Nwuba (2018b) showed the positive influence of culture on EI. Thus, differences between countries regarding entrepreneurial activity may be due to cultural and/or economic factors (Shinnar et al., 2012).

However, the case of Spain demonstrates how complex the evaluation of EE programs is. J. C. Sánchez (2011) showed a positive effect for the elective, eight month EE program that was practically oriented. However, another study analyzing a similar program (elective, 1 semester, action-oriented) could not show a positive effect of EE on PBC and EI (Entrialgo & Iglesias, 2017). This shows that two studies conducted in the same country, thus providing the same cultural context and a comparable economic situation (considering the time difference of 6 years), can result in contradictory findings.

7 Discussion and Implications for the Empirical Part

This SLR analyzed and compared different studies that all deal with the development of entrepreneurship intention (EI) as a desired result of entrepreneurship education (EE). As Fretschner and Weber (2013, p. 411) pointed out: “Different curricular and instructional designs of the ‘treatment’ entrepreneurship course [...] reduce the comparability between the studies.” However, several elements have been identified that provide explanations on whether a program is effective or not. These elements comprise program design and duration, participant selection, field of study and the educational level. Special interest has been laid on whether the studies also include behavior as an outcome of an EE program.

First of all, it must be mentioned that there was no single study that included information on all the mentioned elements (see Table 6). Fields filled with the term ‘unknown’ or ‘not analyzed’ are predominate in this table. With regard to the research question 1—*To what extent do studies analyze the influence of EE on EI and theory of planned behavior’s antecedents, ATB, SN, and PBC, in terms of a) program design, b) duration, c) participant selection, d) field of study, e) educational level, and f) influencing factors*—in summary, these elements have not played an important role in the literature so far. This will be discussed in detail subsequently.

As shown, about 87% of the studies did not mention their program design and about 50% did not even mention how long the EE program lasted. This means that there is no opportunity to find commonalities, differences, and patterns.

Regarding field of study, several studies in the past have suggested that there might be differences, especially when comparing students from the business or economic fields with students from the engineering or technology field. Kolvereid and Moen (1997) pointed out that students in an entrepreneurship major have a higher EI than those from non-entrepreneurship majors, and these students are likely to create new businesses after graduation. However, comparing the results of the studies included in this SLR, this cannot be confirmed.

When it comes to the selection of participants for an EE program, the results are also contradicting. Some meta-analyses have presented a negative correlation between EE and EI for compulsory programs (Graevenitz et al., 2010; Oosterbeek et al., 2010; Singh & Verma, 2010). The results of this SLR demonstrate that several

elective programs also fail to demonstrate a positive effect of EE on EI. Moreover, several studies evaluate the effect of a program that is labeled as 'whole program'. This means that the whole degree program focuses on entrepreneurship. Thus, participants have electively chosen to participate in this degree program. "As a consequence, there might be a self-selection bias related to elective-based EE programs" (Entrialgo & Iglesias, 2018, p. 11).

No concluding discussion is possible for the program design and duration as well as for the educational level of the participants. Given the fact that only about 4% of the studies integrated into the SLR analyzed only Master's students, a comparison with programs for Bachelor's students is not possible. Furthermore, only 13% of studies mentioned a pedagogical approach, which is usually student-centered and action-oriented. In turn, it can be assumed that the rest of the studies followed more traditional approaches. This seems trustworthy as the studies mainly had Bachelor's students as participants, thus offering limited opportunities for experiential learning. Regarding the program duration it is again not really possible to find concluding elements. Studies with a rather short duration of the entrepreneurship education program (one day to a few weeks) mainly come to very positive results, confirming the effectiveness of the program. However, when analyzing studies with longer program duration (at least one semester), the results become inconsistent.

Besides these content-related analyses, there is another interesting point when it comes to the methodological rigidity. Educational evaluation studies regularly set back methodological rigor, especially when it comes to control groups. For example, Passaro et al. (2018) compared Bachelor's students, who have passed a theory-based EE program, with Master's students who have passed an action-based EE program. The results of this study attribute greater effectiveness for the action-based program. However, the validity of this result is questionable. Similarly, Draksler and Sirec (2021) analyzed business degree students who have participated in an EE program of unknown duration. As a quasi-control group, they used non-business degree students who have not participated in an EE program. Thus, the question remains if the achieved results are caused by the educational measure or if differences are caused by the field of study. In this context, Martin et al. (2013) showed that they could not include a large number of studies into their

meta-analysis due to methodological issues and that studies with poorer quality standards may overestimate the effects of EE.

Additionally, the time of measurement might cause problems. For example, Souitaris et al. (2007) could not find a significant relationship between education and behavior when they measured right after the end of the program, while Kolvereid and Moen (1997) measured a long-term effect of EE; they showed that resulting behavior may take place eight years later. On the one hand, measurements right after the intervention are suitable as the immediate effect is covered. But—as shown for leadership development programs—there is a bounce seen in people returning from the programs which has been called the “honeymoon effect” (McClelland, 1985). Therefore, it would be necessary to analyze the long-term effect of such programs, for example by measuring the remaining effect several months after the program has finished. Souitaris et al. (2007) argue that a declared nascency can actually be enthusiasm generated by finishing the program, which would dissipate soon after. Since a very low proportion of graduates start a business immediately after graduation (Luthje & Franke, 2003), longitudinal studies are necessary to explain the intention–behavior link (Kolvereid, 1996). Therefore, on the other hand, the internal validity is under threat if the measurement takes places delayed (Fretschner & Weber, 2013), as it becomes harder to isolate the role played by the EE and its impact on a specific outcome such as venture creation (Hyttä et al., 2004).

This leads to the last point that should be discussed with regard to the research question 2—*In how far is entrepreneurial behavior included as a result of the EE program in these studies?* The focus of most existing evaluations lies either on purely ‘hard’ outcomes like an increase in business creation rates (OECD, 2009) or on course-induced shifts in EI (Graevenitz et al., 2010). Souitaris et al. (2007) in this context add the opportunity to evaluate the change of inspiration (which is a construct with an emotional element) with EE programs as they found that participants EI was not related to nascency.

The overall purpose of this SLR was to increase the understanding about the effectiveness of EE in general and to analyze, if the current literature on higher education students has considered different kinds of pedagogical approaches to explain the development of EI. The SLR showed that information on program

design, duration and on participants is very scarce. Thus, it was not possible to find explanations for the contradictory results regarding the effect of EE programs on EI or on the antecedents ATB, SN, and PBC.

Based on the findings revealed by the SLR, it is evident that future research is needed. Such research should especially take care about providing relevant information regarding design and duration of the EE program. Increasing the number of studies would help to find patterns and explanations for the results retrieved so far. Once a deeper understanding of the relationship between EE and EI, as well as the developmental process to build EI, is understood, it might be possible to draw conclusions in terms of best practice pedagogical approaches in the future. Therefore, it is also necessary to agree on a single theoretical approach and to set up a consistent terminology ensuring that future studies can easily be compared regarding their results.

A first step in this direction will be made in the further course of this thesis. A quantitative analysis will be conducted on the results of the Steinbeis University EE program, filling the gap in terms of EE programs applying an action-oriented approach, as the pedagogical framework offered by Steinbeis University fulfills this requirement. Additionally, the structure of Steinbeis University allows comparison between students from the economic field with students from the engineering field while having the same program design. Finally, it is beneficial to focus on post-graduate students, as literature so far has mainly analysed undergraduate participants of EE programs. Furthermore, the SLR revealed that almost all studies (about 94%) have solely conducted a quantitative methodology. However, those statistical analyses do not provide an opportunity to understand underlying subjective beliefs.

Thus, the quantitative analysis of Steinbeis University students will be followed by a qualitative approach. This follows the call made by Ahmed et al. (2017) for qualitative approaches. Such an empirically mixed-method approach (L. Cohen et al., 2017) provides a “concurrent embedded strategy” according to Creswell (2009).

EMPIRICAL PART: MIXED-METHOD-APPROACH

8 Quantitative Analyses

8.1 Objectives and Theoretical Development of Hypotheses

Strategic papers by the German Council have placed the focus of higher education on the goal to educate people to become professionals who are able to find solutions for the challenges associated with technical, economic, or societal change (Wissenschaftsrat, 2015). Thus, a large amount of resources is devoted to entrepreneurship education (EE), hoping this will lead to a new generation of entrepreneurs (Rauch & Hulsink, 2015). As a consequence, several articles, reviews, and meta-analyses have tried to confirm the effectiveness of EE programs (Bae et al., 2014; Martin et al., 2013; Nabi et al., 2017). However, it appears that few attention has been paid to the importance of specific educational variables, such as program design and pedagogical approach (Fayolle et al., 2006). Therefore, several scholars emphasize that future research should be focused on assessing “whether different teaching methods and learning environment [...] have different effects on the outcomes [of EE]” (Barba-Sánchez & Atienza-Sahuquillo, 2018, p. 58).

Up to now, only a few studies combine EE and action research in higher education (Taylor & Pettit, 2007). For example, Ho et al. (2014) showed that experiential learning has higher impact on entrepreneurship intention (EI) than classroom based learning. This field of education is still in its infancy and there seems to be no common framework or agreed best practice on how to educate entrepreneurs (Brockhaus et al., 2003; Fiet, 2001; Maritz & Brown, 2013). These findings are underlined by the results of the systematic literature review, as it was not possible to find patterns and similarities between studies dealing with EE programs. Literature reveals that, so far, little attention has been paid to action-oriented EE programs. Therefore, this research wants to fill this gap.

The *Projekt-Kompetenz-Studium* (PKS) offered at Steinbeis University is a unique project-based and work-integrated program that aims to educate creative personalities with competencies to solve contemporary economic and technological challenges (see chapter 2.2.4). This pedagogical approach is a special form of an EE program as the declared focus is set beyond the creation of new business

ventures. However, given researchers call for an agreement on one theoretical basis when it comes to EE, the quantitative part of this thesis will focus on the evaluation of the effect on EI in a narrower sense, thus comprising solely new business creation. Research question 3 is therefore focused on: *Which effect does a project-based, work-integrated EE program have on the development of EI and its antecedents, namely ATB, SN, and PBC, as well as on the entrepreneurial activities of EE participants?*

Thus, the theoretical basis is the theory of planned behavior introduced by Ajzen (1991). The theory of planned behavior and its validity has been proven in the domain of individual entrepreneurship activity (N. F. Krueger, 2009; N. F. Krueger et al., 2000; L. Lee et al., 2011; Schlaegel & Koenig, 2014) although Katz (1990) emphasizes that the link between intention and actual behavior is quite low in the field of entrepreneurship. However, Shook et al. (2003) state that “future work on entrepreneurial intentions should attempt to integrate and reduce the number of alternative intention models” (Shook et al., 2003, p. 386). Therefore, the theory of planned behavior was seen as the best theoretical foundation for this research and has been applied accordingly.

The main assumption of the theory of planned behavior is that EE positively influences the development of EI (Kolvereid & Moen, 1997). Besides the direct influence of EE on EI, the antecedents of EI namely attitude toward the behavior (ATB), subjective norms (SN), and perceived behavioral control (PBC) act as mediators. Thus, the first hypothesis is as follows:

H1 EI is positively influenced by entrepreneurship education:

- 1.1 Entrepreneurship education directly and significantly increases EI.
- 1.2 Entrepreneurship education directly and significantly increases ATB.
- 1.3 Entrepreneurship education directly and significantly increases SN.
- 1.4 Entrepreneurship education directly and significantly increases PBC.
- 1.5 ATB, SN, and PBC mediate the effect of entrepreneurship education on EI.

Besides the direct influence of EE on the development of EI and the antecedents from the theory of planned behavior, several studies have found further influencing

variables. One of these variables is working experience gathered by EE program participant (A. C. Cooper, 1993). Soria-Barreto et al. (2017) found a negative relation between working experience and EI while Fatoki (2014) showed that students with previous working experience have a higher level of EI compared to those without. Dodescu et al. (2021) postulated that the effect of PBC on EI is mediated by working experience. Hypothesis 2 summarizes this conceptual framework in a rather positive sense:

H2 Working experience influences EI and PBC:

2.1 Working experience increases EI.

2.2 Working experience increases PBC.

Some studies suggest that science and engineering students are more likely to report an intention to become self-employed than business students (Kuckertz & Wagner, 2010). Others studies suggest higher levels of EI for business students in comparison to engineering students (Ertuna & Gurel, 2011; Karhunen & Ledyeva, 2010). For this research, the assumption is that economic students already have a deeper business and management knowledge which consequently leads to a higher EI compared with engineering students. This leads to hypothesis 3:

H3 Economic students have higher levels of EI than engineering students.

Although SN are explicitly part of the theory of planned behavior and can be measured, there are related constructs that may have an influence on the development of EI. For example, past exposure to entrepreneurial activity (N. F. Krueger & Carsrud, 1993; Matthews & Moser, 1996) may influence SN. Furthermore, self-employed parents influence the entrepreneurial interest and career choices of their children (Crant, 1996; De Wit & Van Winden, 1989). Such role models not only influence on SN and EI directly, but also may change how ATB and PBC are related to EI (Athayde, 2009; Boyd & Vozikis, 1994; Dohse & Walter, 2012). Thus, hypothesis 4 is as follows:

H4 EI and its antecedents depend on the family exposure to entrepreneurship:

- 4.1 Self-employed parents positively influence EI.
- 4.2. Self-employed parents positively influence SN.
- 4.3. Self-employed parents positively influence PBC.

Finally, several studies acknowledge the direct influence of gender on the development of EI (Marlow & McAdam, 2012), but no literature is available that emphasizes a relation between gender and the intentional antecedents ATB, SN, and PBC. As women generally have a less positive attitude to risk (Dawson & Henley, 2015), a crucial element within entrepreneurial activities, the EI of women should be lower than EI of men. Hypothesis 5 therefore is the following:

H5 EI is higher for men.

Although intention is considered to be a reliable predictor of behavior, Reynolds (1994) notes that there are often significant time lags from intention to action, and that the development of intention may evolve over time (Kolvereid & Moen, 1997). Thus, EI is commonly used as outcome variable (see also the results of the SLR in chapter 6.2) although behavior is the true dependent variable in the theory of planned behavior conceptualization emphasized by Ajzen (1991) and presented in Figure 16. Based on Gartner and Carter (2003), entrepreneurial behavior comprises several activities taken by individuals that finally lead to new business creation. Rauch and Hulsink (2015) have developed a questionnaire that makes it possible to measure how many activities have been taken by an individual and thus provide an opportunity to measure the effectiveness of EE on a behavioral level. Based on this, it is hypothesized that higher levels of EI as well as higher levels of PBC (based on the conceptual direct influence on behavior suggested by Ajzen (1991)) entail more entrepreneurial activities. Furthermore, it is assumed that EE directly leads to the realization of higher amounts of activities related to venture creation. Hypothesis 6 summarizes these ideas.

H6 Activities toward venture creation depend on EI, antecedents, and EE:

- 6.1 EI positively influences Activities.
- 6.2 PBC positively influences Activities.
- 6.3 EE positively influences Activities.

8.2 Methodical Approach

8.2.1 Research Design

A cross-sectional survey was conducted among applicants, students and graduates from Steinbeis University, a private university in Germany with two faculties. One faculty focuses on economic programs while the other focuses on engineering programs. As outlined in chapter 2.2.4, the university's special didactical approach is having an overall focus on the development of entrepreneurial competencies in a wide sense without strictly aiming for business creation. Furthermore, the curriculum includes elements like marketing and finance, which can be seen as entrepreneurial courses (Solesvik, 2013). Such a cross-sectional design is generally deemed as appropriate to analyze EI (E. Autio et al., 2001; Luthje & Franke, 2003). There was no opportunity to identify a reliable control group: As 50% of the curriculum is realized in a project-based and work-integrated format and therefore dedicated toward entrepreneurship, it was not possible to follow different methodologies or to randomize participation.

8.2.2 Definition of the Sample

The participants for this survey were randomly selected as the structured questionnaire was designed on an online survey platform and the distribution took place on social media platforms to reach a larger group of participants. Due to this, it was not possible to track how many potential participants were reached to answer the questionnaire. Therefore, no response rate can be given. The sampling method provided equal chance for all consenting participants and the possibility of generalizing findings to the student population.

Participants were not forced to complete the structured questionnaire. It was clearly explained that the results were for research purposes only, participation was voluntary, and that declared views would not affect grades of participating students. To increase the response rate, participants were not asked to provide their names in the questionnaire. All participants had the chance to take part in a sweepstake by submitting their personal data by e-mail after finishing the questionnaire. It was

therefore not possible to match the e-mail to the respective questionnaire. The field work took place from December 2022 to January 2023.

8.2.3 The Instruments of Measurement

The design of the questionnaire mainly based on the previously described theory of planned behavior (Ajzen, 1991) due to its strength as a framework in the development of intentions as well as its explanatory capacity according to the studies analyzed in the SLR. The majority of the constructs considered in the study were measured using Likert scales. However, other constructs had to be measured by nominal scales due to their qualitative nature. The whole questionnaire is shown in Table 7.

At the beginning of the questionnaire, some variables were used for control purposes and to assess the demographic information of the participants. Variables considered relevant for the development of EI are gender, field of study (major), working experience and whether their parents were self-employed. The intensity of EE the participants have completed, was assessed by the variable “Level of Master studies”, which asked whether the participant is currently an applicant, student or alumni.

The second part of the questionnaire was designed on the basis of the established and validated questionnaire designed by Liñán and Chen (2009). This questionnaire was developed solely to measure EI and its key antecedents in the theory of planned behavior applied to entrepreneurship. The questionnaire contained five items asking for ATB. For SN one item was added, as Souitaris et al. (2007) pointed out that in the context of students it seems appropriate to additionally ask for the role of peers. Therefore, SN contains four instead of the three items in the original questionnaire. PBC was assessed with six items, and finally EI was also measured by means of six items. The questionnaire uses a seven-point Likert scale with 1 as lowest value and 7 as highest value regarding agreement. Seven-point Likert scales are the most frequently used version of rating scales (D. R. Cooper & Schindler, 2014). This part of the questionnaire was only available to those participants who had not already found their own business (assessed with a selecting question to be answered with yes or no at the beginning of the second part of the questionnaire).

The third part of the questionnaire aimed to assess any entrepreneurial activities already taken by the participants to analyze whether EI does result in entrepreneurial behavior, as proposed in the theory of planned behavior. The list developed by Rauch and Hulsink (2015) containing 18 activities associated with new business creation was used.

If necessary, the original questions included into the questionnaire were translated to German and for accuracy reasons a reverse translation was conducted by a professional English tutor (Harkness & Schoua-Glusberg, 1998). No data was missing from the responses collected.

Table 7 Questionnaire for this research, containing three parts

		Value
1. Demographics & Control variables	Age	Free field
	Gender	Male
		Female
		Not specified
	First university degree	Bachelor
		Magister/Diploma
		Other
		Free field
	Graduation year of first degree	Free field
	Major first degree	Human medicine/Health Science
		Engineering science
		Mathematics/Natural Sciences
		Media/Communication Science
Psychology		
Law		
Social Science		
Industrial Engineering		
Economics		
Other: Free field		
(Planned) Master degree	MBA	
	M.A.	
	M.Sc.	
	M.A. / MBA	
	MBE	
Level Master studies	Applicant	
	1 st /2 nd semester	
	3 rd /4 th semester	
	From 5 th semester	
	Alumni	
	Year of graduation: Free field	
Major Master	Free field	
Working experience	< 1 year	
	1 to less than 2 years	
	2 to less than 5 years	
	5 to less than 10 years	
	> 10 years	
Self-employed parents	No	
	Yes, one	
	Yes, both	

2.1	Founding	Have you founded a company?	Yes	No	
2.2	Entrepreneurial Intention Questionnaire by Liñán and Chen (2009)	ATB	Being an entrepreneur implies more advantages than disadvantages to me	1 total disagreement	7 total agreement
			A career as entrepreneur is attractive for me	1 total disagreement	7 total agreement
			If I had the opportunity and resources, I would like to start a firm	1 total disagreement	7 total agreement
			Being an entrepreneur would entail great satisfaction for me	1 total disagreement	7 total agreement
			Among various options, I would rather be an entrepreneur	1 total disagreement	7 total agreement
		SN	My close family would approve my decision to be an entrepreneur	1 total disagreement	7 total agreement
			My friends would approve my decision to be an entrepreneur	1 total disagreement	7 total agreement
			My colleagues would approve my decision to be an entrepreneur	1 total disagreement	7 total agreement
			My study mates would approve my decision to be an entrepreneur	1 total disagreement	7 total agreement
		PBC	To start a firm and keep it running would be easy for me	1 total disagreement	7 total agreement
			I am prepared to start a viable firm	1 total disagreement	7 total agreement
			I can control the creation process of a new firm	1 total disagreement	7 total agreement
			I know the necessary practical details to start a firm	1 total disagreement	7 total agreement
			I know how to develop an entrepreneurial project	1 total disagreement	7 total agreement
			If I tried to start a firm, I would have a high probability of succeeding	1 total disagreement	7 total agreement
		EI	I am ready to do anything to be an entrepreneur	1 total disagreement	7 total agreement
			My professional goal is to become an entrepreneur	1 total disagreement	7 total agreement
			I will make every effort to start and run my own firm	1 total disagreement	7 total agreement
			I am determined to create a firm in the future	1 total disagreement	7 total agreement
			I have very seriously thought of starting a firm	1 total disagreement	7 total agreement
	I have the firm intention to start a firm some day	1 total disagreement	7 total agreement		
3.	List of entrepreneurial activities by Rauch and Hulsink (2015)	Spent a lot of time thinking about starting a business?	Yes	No	
		Organized a start-up team?	Yes	No	
		Defined market opportunities?	Yes	No	
		Prepared a business plan?	Yes	No	
		Selected a business name?	Yes	No	
		Created a legal entity?	Yes	No	

Registered with the tax authorities?	Yes	No
Saved money to invest in a business?	Yes	No
Invested your own money in a business?	Yes	No
Required and received financial support?	Yes	No
Searched for facilities and equipment?	Yes	No
Purchased or leased major items, like equipment, facilities, or property"	Yes	No
Purchased raw materials, inventory, or supply?	Yes	No
Developed models or procedures for a product/service?	Yes	No
Started marketing or promotional activities?	Yes	No
Devoted full-time to the business?	Yes	No
Applied for licenses or patents?	Yes	No
Hired employees?	Yes	No

8.2.4 SPSS for Statistical Analyses

The Statistical Product and Service Solutions (SPSS) version 29 was used to analyze the data. Because the data did not have a normal distribution, non-parametric statistics were applied (Saunders et al., 2009). These statistical techniques include the Kruskal-Wallis test and the Mann-Whitney U test, which were used to test the differences in entrepreneurship intention and its antecedents as the theory of planned behavior between the groups (applicants, students, and alumni) based on their different levels of exposure to EE.

8.3 Results

8.3.1 Descriptive Statistics

8.3.1.1 Composition of the Sample

This study involved a total of 124 respondents. At the start of the second part of the questionnaire, a selecting question asked whether the respondent has already founded a company. Those who answered “yes”, did not answer the part assessing entrepreneurship intention and its antecedents because most questions ask for future plans and actions, which logically have already been taken by a founder. Out of 124 participants, 21 were identified as founders. Therefore, the second part of the questionnaire contains a sample size of 103. The main objective of this research was to assess the EI and its antecedents and the effect of EE. Thus, the focus lies on this second part of the questionnaire and the smaller sample constitutes the basis for most analyses.

The sample consists of 58% women and 42% men. 35% of the respondents were 20 to 24 years old, 49% were 25 to 29 years old, 12% were 30 to 34 years old, and 4% were 35 or older. The variable for level of Master studies consists of five categories: 12% were applicants²² for a program at Steinbeis University (thus without EE in their Master), 36% were in the 1st or 2nd semester (low level of EE), 20% were in the 3rd or 4th semester (intermediate level), 6% were in the 5th semester, and 26% were alumni (the last two categories represent the highest level of EE). To assess the exposure to entrepreneurship, the respondents were asked for their parents' profession. 77% do not have self-employed parents, 17% have one self-employed parent, and 6% have two self-employed parents. The major subject was assessed for Bachelor and Master degrees. During their Bachelor, 41% had an engineering focus while 59% focused on economics. During their Master, 24% had an engineering major and 74% an economic major. 3% had less than 1 year of working experience, 19% had 1 to less than 2 years,

²² Applicants in this context means that these people have applied for a program at Steinbeis University and have already passed the assessment center with positive feedback.

44% had worked for 2 to less than 5 years, 28% had 5 to 10 years and 6% had more than 10 years of working experience.

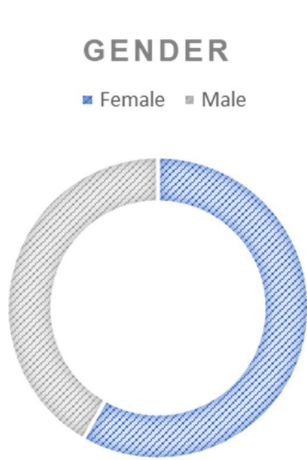


Figure 23 Distribution of Gender

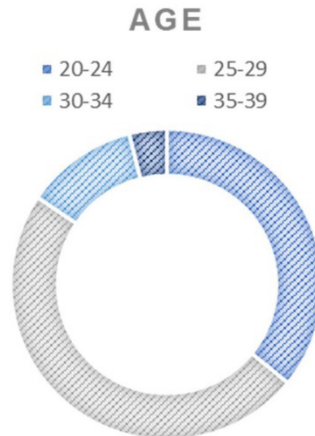


Figure 24 Distribution of Age

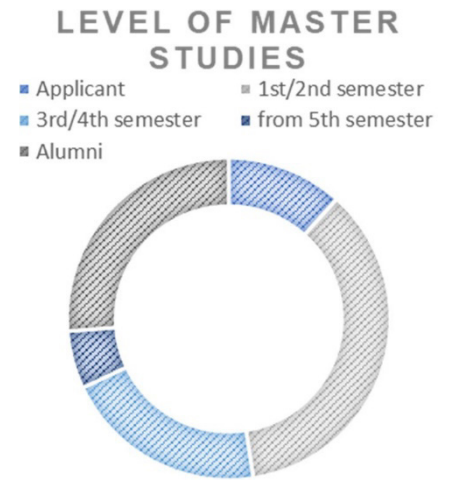


Figure 25 Distribution of Level Master studies

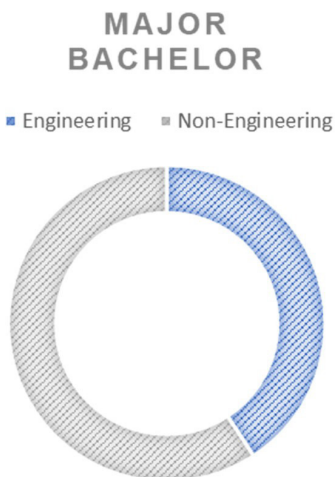


Figure 26 Distribution of Major Bachelor

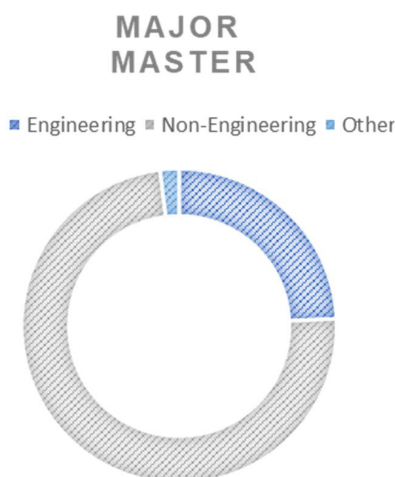


Figure 27 Distribution of Major Master

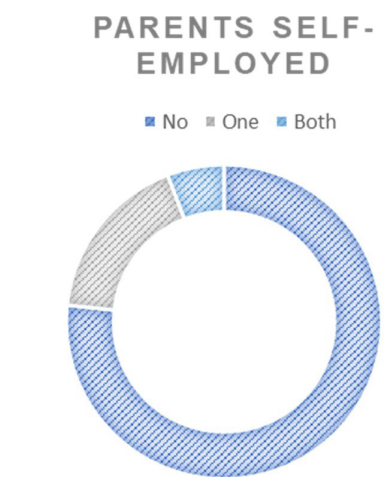


Figure 28 Distribution of Parents self-employed



Figure 29 Distribution of Working experience

8.3.1.2 Correlations

Normally distribution was not met, as assessed by the Shapiro-Wilk-Test, $p < .05$ (see Appendix 1). Due to this non-parametric data, the Spearman's rank correlation coefficients were calculated (McCrum-Gardner, 2008).

The correlation matrix offers a better observation of the dependencies between the four variables, namely attitude toward the behavior (ATB), subjective norms (SN), perceived behavioral control (PBC), and entrepreneurship intention (EI) within the theory of planned behavior (TPB). The results are presented in Table 8 below.

Table 8 Correlations of all TPB variables

			ATB	SN	PBC	EI
Spearman's rho	ATB	Correlation Coefficient	1.000	.304**	.460**	.856**
		Sig. (2-tailed)	.	.002	<.001	<.001
	SN	Correlation Coefficient	.304**	1.000	.421**	.286**
		Sig. (2-tailed)	.002	.	<.001	.003
PBC	Correlation Coefficient	.460**	.421**	1.000	.459**	
	Sig. (2-tailed)	<.001	<.001	.	<.001	
EI	Correlation Coefficient	.856**	.286**	.459**	1.000	
	Sig. (2-tailed)	<.001	.003	<.001	.	
N			103	103	103	103

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

EI and the three variables of the theory of planned behavior are statistically significantly correlated in the expected direction. According to J. Cohen (1992), a Spearman's rho value of .1 is ranked as low, .3 as intermediate and .5 as high. The correlation of EI and ATB is the highest with a correlation coefficient of .856. Second is the correlation of EI to PBC, with a .459 coefficient. With a correlation coefficient of .286, EI and SN have a weaker association, although nevertheless in the expected direction. These results are consistent with previous research of Liñán and Chen (2009) and Kolvereid and Isaksen (2006), who also found ATB and SN to be significantly correlated with EI, and previous research of van Gelderen et al. (2008) on the relation of EI with PBC and SN.

8.3.1.3 Means

As we can see from the data in Table 9, the total average mean for ATB is 4.542. One item with a higher-than-average mean is “If I had the opportunity and resources, I would like to start a firm” (5.019). The value of 4 reflects moderate agreement, while higher values can be seen as high agreement (on a scale ranging from 1 to 7). Only one item does not reach 4: this item aims to assess different career options: “Among various options, I would rather be an entrepreneur” is the lowest ranked item (3.874). This indicates that there are other promising career opportunities, although being an entrepreneur seems to be quite attractive and satisfying (see the means for ATB items 2 and 4).

The SN means reach the highest total average mean with 5.235. The item “My study mates would approve my decision to be an entrepreneur”, which was added to the questionnaire based on the work-integrated format of Steinbeis University’s programs, is ranked as the SN item 2 focusing on friends. The lowest agreement was found for item 3 asking about approval by colleagues.

The total average mean for the PBC items was 3.926, representing a rather sparse agreement based on the seven-point Likert scale. However, one item is ranked remarkably higher. With a mean of 4.806, the item “I know how to develop an entrepreneurial project” has a strong conceptual connection to the project-based pedagogical approach of Steinbeis University. Due to the wide definitional framework of entrepreneurship, this can also be linked to the concept of innovation or intrapreneurship in existing companies. Considering the pedagogical approach of Steinbeis University, which is to enable real-world experience and not solely to support venture creation, it is not surprising that the item “I know the necessary practical details to start a firm” has the lowest mean (3.437).

Finally, the EI items have the lowest total average mean (3.450). Even if the highest ranked item, “I have very seriously thought of starting a firm” (3.971), is associated with entrepreneurial behavior, it only achieves a very moderate agreement. The item “I will make every effort to start and run my own firm” achieves the lowest value (3.087), indicating that the willingness to perform exceptional endeavors is not very present.

Table 9 Descriptive statistics for items

		Mean	SD	Variance
ATB	1 Being an entrepreneur implies more advantages than disadvantages to me	4.340	1.511	2.283
	2 A career as entrepreneur is attractive for me	4.680	1.753	3.072
	3 If I had the opportunity and resources, I would like to start a firm	5.019	1.885	3.553
	4 Being an entrepreneur would entail great satisfaction for me	4.796	1.697	2.881
	5 Among various options, I would rather be an entrepreneur	3.874	1.755	3.081
	Total average means	4.542	1.543	2.380
SN	1 My close family would approve my decision to be an entrepreneur	5.068	1.470	2.160
	2 My friends would approve my decision to be an entrepreneur	5.621	1.053	1.109
	3 My colleagues would approve my decision to be an entrepreneur	4.689	1.270	1.612
	4 My study mates would approve my decision to be an entrepreneur	5.563	1.040	1.081
	Total average means	5.235	.895	.801
PBC	1 To start a firm and keep it running would be easy for me	3.738	1.372	1.883
	2 I am prepared to start a viable firm	3.883	1.541	2.375
	3 I can control the creation process of a new firm	3.913	1.533	2.352
	4 I know the necessary practical details to start a firm	3.437	1.635	2.673
	5 I know how to develop an entrepreneurial project	4.806	1.408	1.982
	6 If I tried to start a firm, I would have a high probability of succeeding	3.777	1.182	1.397
	Total average means	3.926	1.038	1.078
EI	1 I am ready to do anything to be an entrepreneur	3.272	1.521	2.314
	2 My professional goal is to become an entrepreneur	3.359	1.789	3.201
	3 I will make every effort to start and run my own firm	3.087	1.707	2.915
	4 I am determined to create a firm in the future	3.456	1.810	3.277
	5 I have very seriously thought of starting a firm	3.971	2.031	4.125
	6 I have the firm intention to start a firm some day	3.553	1.964	3.859
	Total average means	3.450	1.630	2.656
N				103

8.3.2 Theory of Planned Behavior Testing

The Kruskal-Wallis test is the non-parametric equivalent of the single-factor analysis of variance and is used when the requirements for a parametric method are not met. An analysis of variance is used to test whether independent samples originate from a common population with regard to an ordinal-scaled variable.

The Mann-Whitney U test for independent samples tests whether the central tendencies of two independent samples are different and is used if the requirements for a t-test for independent samples are not met.

The null hypothesis for both tests is that there is no difference between the groups or rather variable categories.

8.3.2.1 Cronbach's Alpha

The literature reviewed already supported the validity of the questionnaire, but in addition the internal consistency of the questionnaire as an instrument of investigation was validated by applying Cronbach's Alpha to all items that formed the four variables (ATB, SN, PBC, and EI; see Table 10).

Table 10 Cronbach's Alpha

Reliability Statistics

	Cronbach's Alpha	N of Items
ATB	.938	5
SN	.713	4
PBC	.808	6
EI	.953	6

Values between .7 and .8 are considered good and values between .6 and .7 are just acceptable (Streiner, 2003). Values between .8 and .9 are very good. A very high Cronbach's alpha—which is the case for ATB and EI—can indicate redundant items within the scale. It is therefore advisable to critically scrutinize values above .9.

8.3.2.2 Factor Analysis

Due to the high correlation of EI and ATB (see Table 8) and the high Cronbach's Alpha results for these variables (see Table 10), a factor analysis was performed to check the latent structure behind all variables. The Kaiser-Meyer-Olkin measure of sampling adequacy was .880, which was well above the acceptable limit of .5 (Field, 2020). Bartlett's test of sphericity was highly significant ($p < .001$). Overall, the results suggest that factor analysis was appropriate for the data.

Table 11 Prerequisites for factor analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.880
Bartlett's Test of Sphericity	Approx. Chi-Square	1815.782
	df	210
	Sig.	<.001

Additionally, the null hypothesis that the observed intercorrelation matrix comes from a population in which the variables are non-collinear was rejected according to the Bartlett's Test of Sphericity ($df = 210$, $p < .001$).

The scree plot shown in Figure 30 would suggest a reasonable decision for three factors.

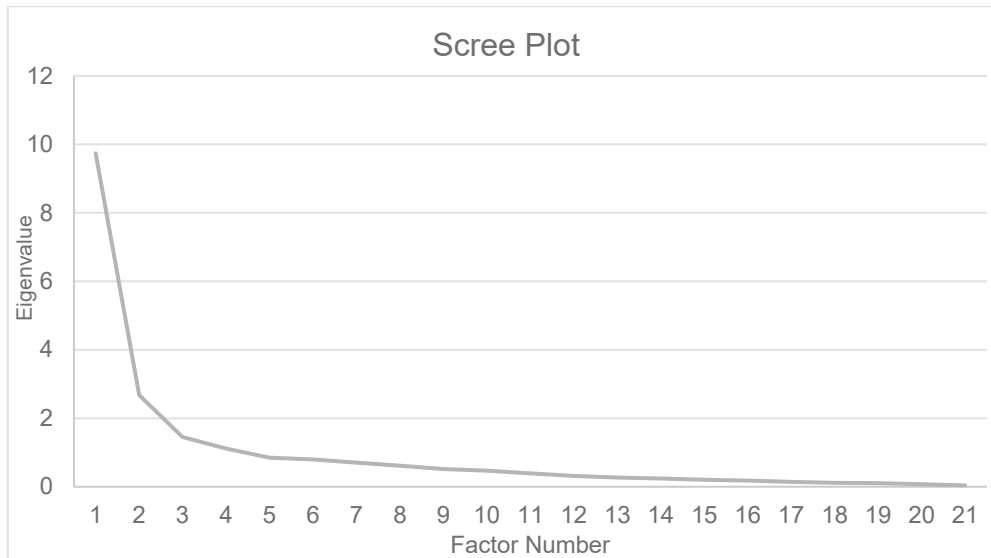


Figure 30 Scree plot for factor analysis

The Principal Axis Factoring method was selected for factor extraction, as it is superior compared to Maximum Likelihood for small samples and data showing non-normality, as in this case (Winter & Dodou, 2012). Additionally, an oblique rotation method (Promax, $Kappa=4$) was used to improve the factor pattern matrix, as proposed for small samples with non-normality (Costello & Osborne, 1994). After rotation, the first component accounted for 46.4% of the variance, the second component accounted for 12.7% of the variance, and the third component accounted for 6.9% of the variance. The total cumulative variance explained by the three factors sums up to a 66.0% of variance, which is normal for social sciences research (Sparkman et al., 1979). The communalities of almost all items are satisfactory ($>.3$) meaning that all items explain an adequate amount of variance through the common factors (Costello & Osborne, 2005).

Table 12 Factor structure

		Pattern Matrix ^a		
		1	2	3
ATB	Being an entrepreneur implies more advantages than disadvantages to me	.726		
	A career as entrepreneur is attractive for me	.923		
	If I had the opportunity and resources, I would like to start a firm	.887		
	Being an entrepreneur would entail great satisfaction for me	.796		
	Among various options, I would rather be an entrepreneur	.803		
SN	My close family would approve my decision to be an entrepreneur			.544
	My friends would approve my decision to be an entrepreneur			.482
	My colleagues would approve my decision to be an entrepreneur			.641
	My study mates would approve my decision to be an entrepreneur			.484
PBC	To start a firm and keep it running would be easy for me		.499	
	I am prepared to start a viable firm		.300	
	I can control the creation process of a new firm		.761	
	I know the necessary practical details to start a firm		.916	
	I know how to develop an entrepreneurial project		.484	
	If I tried to start a firm, I would have a high probability of succeeding		.436	
EI	I am ready to do anything to be an entrepreneur	.766		
	My professional goal is to become an entrepreneur	.886		
	I will make every effort to start and run my own firm	.910		
	I am determined to create a firm in the future	.944		
	I have very seriously thought of starting a firm	.782		
	I have the firm intention to start a firm some day	.913		

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

The final factor structure, as exhibited in Table 12 above, demonstrates that the second factor has loadings on items referring to PBC and the third factor has loadings on items referring to towards SN. However, the first factor contains loadings from items referring to towards SN. However, the first factor contains loadings from items referring to ATB as well as items referring to EI. Additionally, all factors are considered 'strong' as the average of the loadings of each factor is greater than .7, showing adequate convergent validity, and high discriminate validity.

The factor analysis shows that the items measuring PBC and SN can be clearly distinguished. But ATB and EI items load on the same factor. Therefore, it is not

possible to build distinct factors. Based on this analysis, ATB was excluded from the following measures, which is also in line with the high correlation between ATB and EI (see Table 8 above).

8.3.2.3 Entrepreneurship Education, Theory of Planned Behavior components and Mediation

8.3.2.3.1 Educational influence on EI and its antecedents

The first analysis considers the distribution of EI across the categories of Level Master studies. Looking at the Kruskal-Wallis Test in Table 13, there is a significant difference with $p=.029$.

Table 13 *Kruskal-Wallis Test for EI in different categories of level Master studies*

Test Statistics	
Kruskal-Wallis H	10.807
df	4
Asymp. Sig.	.029

Based on this statistically significant result, it was analysed which categories differ from each other regarding EI. As seen in Figure 31, there is a steep decrease in EI when looking at the categories of applicants, 1st/2nd semester students, and alumni. This decrease is significant for both pairwise comparisons (see Table 14).

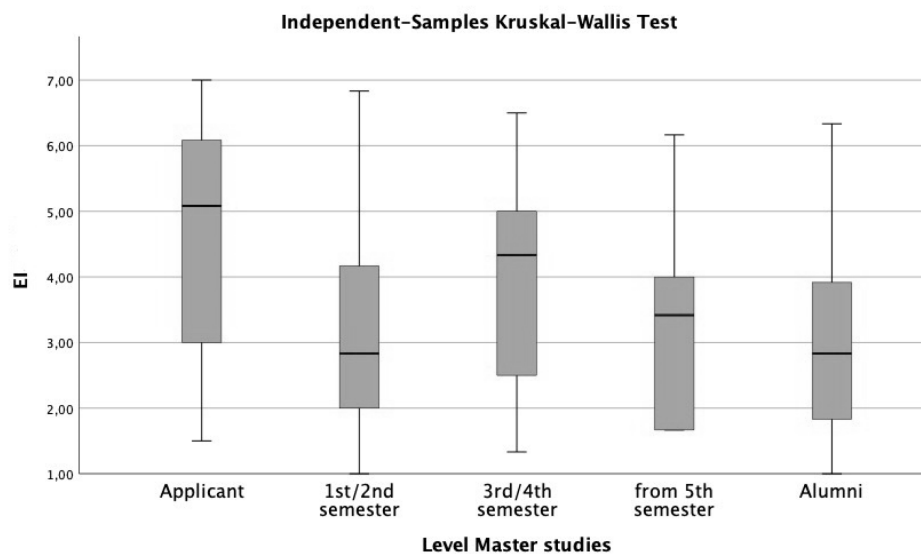


Figure 31 *EI of different categories of level Master studies*

Table 14 Differences between categories of level Master studies regarding their EI

Sample 1-Sample 2	Test	Std.	Std. Test	Sig.
	Statistic	Error	Statistic	
Alumni-1st/2nd semester	1.203	7.557	.159	.874
Alumni-from 5th semester	6.583	13.475	.489	.625
Alumni-3rd/4th semester	17.262	8.687	1.987	.047
Alumni-Applicant	27.167	10.359	2.623	.009
1st/2nd semester-from 5th semester	-5.381	13.140	-.409	.682
1st/2nd semester-3rd/4th semester	-16.059	8.157	-1.969	.049
1st/2nd semester-Applicant	25.964	9.919	2.618	.009
from 5th semester-3rd/4th semester	10.679	13.821	.773	.440
from 5th semester-Applicant	20.583	14.928	1.379	.168
3rd/4th semester-Applicant	9.905	10.804	.917	.359

Therefore, H1.1 must be rejected, as the relationship between EI and the level Master studies is not in the hypothesized positive direction. Rather, there is negative and statistically significant relation for some categories.

The distribution of SN is the same across categories of level Master studies as can be seen in Table 15 based on Kruskal-Wallis Test. As there is not significant difference between the categories, H1.3 must be rejected, which predicted that SN would rise with progressing entrepreneurship education.

Table 15 Kruskal-Wallis Test for SN in different categories of level Master studies

Test Statistics	
Kruskal-Wallis H	7.352
df	4
Asymp. Sig.	.118

As can be seen in Figure 32, there is slight increase of PBC across the categories of level Master studies. But, based on the Kruskal-Wallis Test (see Table 16), this increase is not statistically significant. Therefore, H1.4 postulating a positive and significant relation must be rejected.

Table 16 Kruskal-Wallis Test for PBC in different categories of level Master studies

Test Statistics	
Kruskal-Wallis H	7.831
df	4
Asymp. Sig.	.098

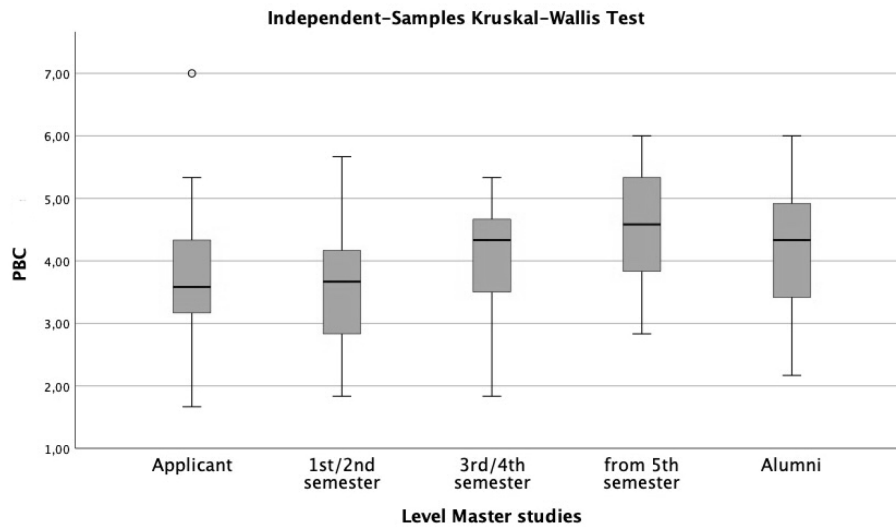


Figure 32 PBC of different categories of level Master studies

8.3.2.3.2 Mediation Model

The indirect effects of SN and PBC on the relationship between EE and students' EIs were tested. A mediating effect exists when a third variable interferes between the independent variable and the dependent variable. The approach specified by Baron and Kenny (1986) was applied to test this relation. According to them, a mediating effect is present if the following four conditions are met:

- A statistically significant relationship between the independent variable and the dependent variable in the absence of the mediator variable;
- A statistically significant relationship between the independent variable and the mediator variable;
- A statistically significant relationship between the mediator variable and the dependent variable;
- A previously statistically significant relationship between the independent variable and the dependent variable becomes statistically nonsignificant or reduces significantly.

Alternatively, it has been argued that a mediating effect can also exist when the path between the independent variable and the mediator variable, and the path between the mediator variable and the dependent variable are statistically significant (Rucker et al., 2011; X. Zhao et al., 2010).

As linearity of variables was not given (see Appendix 2) for the relation between EI and Level Master studies (Applicant to Alumni), a recoding was necessary for the variable representing the level of EE. Therefore, data was recoded into a dichotomous variable as follows fitting to the fact that research mostly measures EE with a dummy variable (Basu & Virick, 2008; Wu & Wu, 2008). Based on the results of Keim (2018), students tend to underestimate their knowledge and competencies immediately after the start of the program. This unawareness and feeling of overwhelm may also be an explanation for reduced EI, as the students lack the confidence that they could be an entrepreneur. Thus, data sets from students in their 1st/2nd semester were excluded from the analyses. Additionally, those data sets from students in their 3rd/4th semester, from 5th semester and from alumni were summarized into one value. Hence, the possibility emerged to compare applicants (value 0), and students and alumni (value 1) in a linear relation. In the following analyses the abbreviation EE for 'entrepreneurship education' is used for this recoded variable.

The omission of first year students from the data resulted in a Sample Size of 66. For the mediation model, ATB was not included due to the aforementioned reasons. SN and PBC were integrated as assumed mediators, which influence the relation between EE and EI (see Figure 33 for the mediation model including results).

To test the mediation model, Hayes' (2013) PROCESS procedure Model 4 in SPSS Version 4.2 was employed (Kane & Ashbaugh, 2017; X. Zhao et al., 2010).

To test the mediation effect of SN and PBC on EI, that is the indirect effect of the independent variable on the dependent variable, the 95% bias-corrected confidence intervals (CI) based on 5,000 bootstrap samples for both full and partial mediation models were assessed and examined. The results show that there is a negative but not statistically significant relation between EE and SN (see Table 17). For PBC, the results also indicate that the weak positive effect of EE is not statistically significant (see Table 18).

Table 17 Mediation: Effect of EE on SN

Outcome variable: SN						
	coeff	se	t	p	LLCI	ULCI
Constant	5.4167	.2751	19.6876	.0000	4.8670	5.9663
EE	-.1250	.3042	-.4110	.6825	-.7327	.4827

Table 18 Mediation: Effect of EE on PBC

Outcome variable: PBC						
	coeff	se	t	p	LLCI	ULCI
Constant	3.8750	.3001	12.9119	.0000	3.2755	4.4745
EE	.2855	.3318	.8605	.3927	-.3773	.9483

Table 19 Mediation: Effects on EI

Outcome variable: EI						
R	R-sq	MSE	F	df1	df2	p
.5502	.3027	2.0439	8.9716	3.0000	62.0000	.0001***
	coeff	se	t	p	LLCI	ULCI
Constant	2.1347	1.1164	1.9121	.0605	-.0970	4.3665
EE	-1.4503	.4619	-3.1397	.0026**	-2.3737	-.5269
SN	-.1235	.2128	-.5802	.5639	-.5488	.3019
PBC	.8152	.1951	4.1793	.0001***	.4253	1.2051

Notes: ** $p < .01$ *** $p \leq .001$

Table 19 indicates that SN has a negative but not statistically significant effect on EI, while PBC influences EI positively and statistically significantly with unstandardized $B=0.8152$; $p=.0001$. Furthermore, EE has a negative, statistically significant effect on EI with unstandardized $B=-1.4503$; $p=.0026$. The total effect of EE with PBC and SN on EI is statistically significant but negative with unstandardized $B=-1.2022$; $p=.0231$ (see Table 20).

Table 20 Mediation: Total effect model

Total effect of EE on EI					
Effect	se	t	p	LLCI	ULCI
-1.2022	.5164	-2.3281	.0231*	-2.2337	-.1706

Notes: * $p < .05$

Table 21 Indirect mediation effects

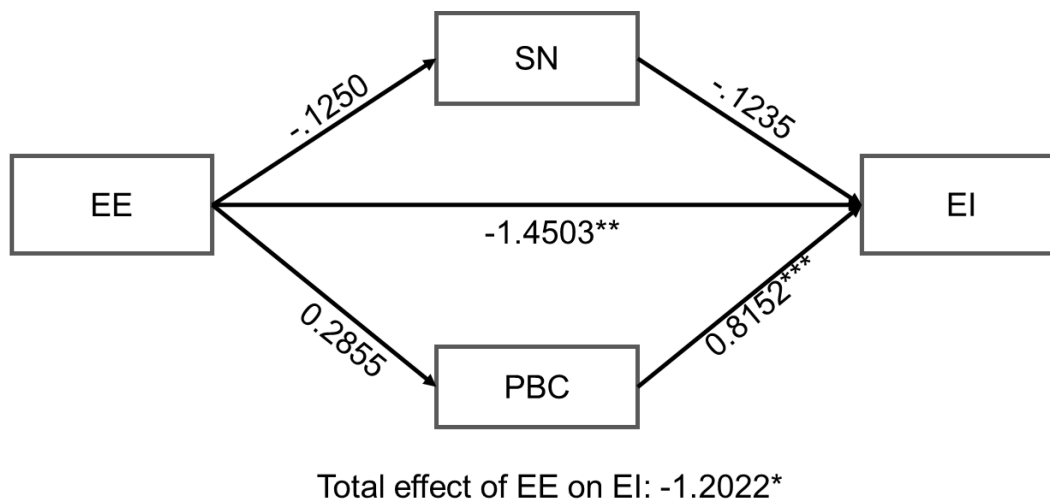
Indirect effect(s) of X on Y				
	Effect	BootSE	BootLLCI	BootULCI
TOTAL	.2482	.3501	-.4101	.9873
SN	.0154	.0906	-.1923	.2087
PBC	.2327	.3581	-.4129	1.0162

Level of confidence for all confidence intervals in output: 95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals: 5,000

To test for the statistical significance of the indirect effect of SN and PBC on the relationship between EE and EI, a bias-corrected bootstrapping of 5,000 resamples was used. It was found that there is no indirect effect of SN and PBC on EI as both 95% confidence intervals do include zero (see Table 21).

Based on X. Zhao et al. (2010), a non-mediated, direct effect is given while there is a likelihood for an omitted mediator which has not been integrated into the model. These findings lead to the conclusion that the data does not support H1.5 (see also Figure 33 below for summary).



Notes: * $p < .05$ ** $p < .01$ *** $p \leq .001$

Figure 33 Mediation model

8.3.2.4 Theory of Planned Behavior and Covariate Analyses

8.3.2.4.1 Working experience

Based on the literature, working experience may have a positive impact on one's EI. Working experience was assessed using five different categories ranging from less than one year to five-ten years. For the given data, the distribution of EI is the same across these five categories of working experience. As can be seen in Table 22, the Kruskal-Wallis Test did not reveal any significant differences between any of the categories. As there is no significant difference, H2.1, which predicted that EI would increase with higher working experience, must be rejected.

Table 22 *Kruskal-Wallis Test for EI in different categories of working experience*

Test Statistics	
Kruskal-Wallis H	1.361
df	4
Asymp. Sig.	.851

Even if EI is not influenced by working experience, it could be plausible that PBC is positively influenced as employment and associated success in solving tasks may lead to a positive assessment of one's own abilities. However, the Kruskal-Wallis Test results show (see Table 23) that such a positive relation does not exist. Therefore, H2.2 must be rejected as well.

Table 23 *Kruskal-Wallis Test for PBC in different categories of working experience*

Test Statistics	
	PBC
Kruskal-Wallis H	4.733
df	4
Asymp. Sig.	.316

8.3.2.4.2 Degree Major

The respondents were asked which major they had during their Bachelor's and during their Master's. They were able to select between different specializations which were categorized into the field of economics and the field of engineering. Using Kruskal-Wallis Test, Table 24 and Table 26 show that the Mean Rank for EI is slightly higher for engineering students, both at the Bachelor's level as well as at the Master's level. However, the differences are not statistically significant (see Table 25 and Table 27).

Table 24 *Mean Ranks of EI and major Bachelor*

	Major Bachelor	N	Mean Rank
EI	Economic	43	52.10
	Engineering	42	57.37
	Other	18	39.22
	Total	103	

Table 25 *Kruskal-Wallis Test for EI of economic vs. engineering students in their Bachelor's*

Test Statistics	
Kruskal-Wallis H	4.655
df	2
Asymp. Sig.	.098

Table 26 *Mean Ranks of EI and major Master*

	Major Master	N	Mean Rank
EI	Economic	72	48.14
	Engineering	25	59.94
	Other	4	60.38
	Not specified	2	75.00
	Total	103	

Table 27 *Kruskal-Wallis Test for EI of economic vs. engineering students in their Master's*

Test Statistics	
Kruskal-Wallis H	4.474
df	3
Asymp. Sig.	.215

Therefore, H3 predicting that economic students have higher EI than engineering students must be rejected as there is no significant relation for the given data.

8.3.2.4.3 Self-Employed parents

Exposure to entrepreneurship within close family can lead to higher levels of EI, SN and PBC. To test if this relation exists, the questionnaire asked for the number of self-employed parents, who could serve as a role model. Precisely, the questionnaire distinguished between having no, one or two self-employed parents. Table 28 shows the Mean Ranks as part of the Kruskal-Wallis Tests that have been performed. Interestingly—although the sample size is very small for the last category (two self-employed parents)—only the Mean Rank for SN increases across the levels of self-employed parents. For EI, the Mean Rank for two self-employed parents is even lower than for no self-employed parent. The Mean Rank for PBC is highest for those with one self-employed parent.

Table 28 Mean Rank of EI, SN and PBC for different categories of self-employed parents

Self-employed parents	N	Mean Rank		
		EI	SN	PBC
No	79	50.66	51.22	48.78
Yes, one	18	58.94	53.33	66.47
Yes, both	6	48.83	58.33	50.92
Total	103			

Table 29 Kruskal-Wallis Test for EI, SN and PBC in the different categories self-employed parents

	Test Statistics		
	EI	SN	PBC
Kruskal-Wallis H	1.201	.364	5.163
df	2	2	2
Asymp. Sig.	.549	.833	.076

Nevertheless, all hypotheses regarding self-employed parents, namely H4.1, H4.2 and H4.3 must be rejected as EI, SN and PBC are not statistically significantly influenced by the variable of self-employed parents (see Table 29).

8.3.2.4.4 Gender

Literature reveals that entrepreneurship is usually argued to be male dominated. Using a Mann-Whitney U test, the null hypothesis is that the distribution of EI is the same across categories of gender. Table 30 shows that there is a significant difference between the EI of male and female participants ($p=.033$).

Table 30 Mann-Whitney U Test for EI depending on gender

Total N	103
Mann-Whitney U	971.000
Wilcoxon W	2801.000
Test Statistic	971.000
Standard Error	149.430
Standardized Test Statistic	-2.135
Asymptotic Sig.(2-sided test)	.033

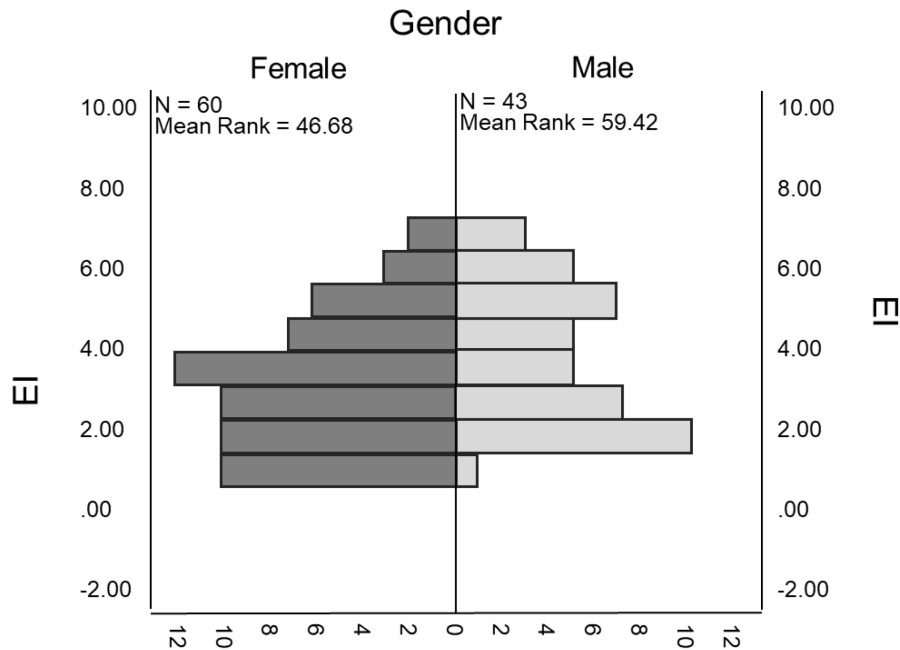


Figure 34 Mean Ranks for gender differences in EI

Figure 34 demonstrates that the Mean Rank for men is 59.42 while the Mean Rank for women is 46.68. Thus H5, which predicted a higher EI for men, can be accepted.

8.3.2.4.5 Activities

To be able to relate the components of theory of planned behavior to actual behavior, the questionnaire contained actions, such as “I spent a lot of time thinking about starting a business” or “I prepared a business plan”, related to entrepreneurship, developed by Rauch and Hulsink (2015). The respondents could answer yes or no. These answers were transformed into the interval-scaled variable activities by calculating the ratio between possible actions taken and actual actions answered with yes. For example, someone who has answered yes for one out of 18 possible actions received the value .06, while someone who has answered yes for five out of 18 possible actions received the value .3. The highest possible value therefore is 1.0.

For EI it can be seen (see Figure 35 and Table 31) that there is a statistically significant correlation with activities ($r=0.562$, $p<.001$, $n=103$). The higher a person’s EI, the higher is the number of entrepreneurial activities that the person has taken.

According to J. Cohen (1988), this is a strong effect. Based on these findings, H6.1 can be accepted.

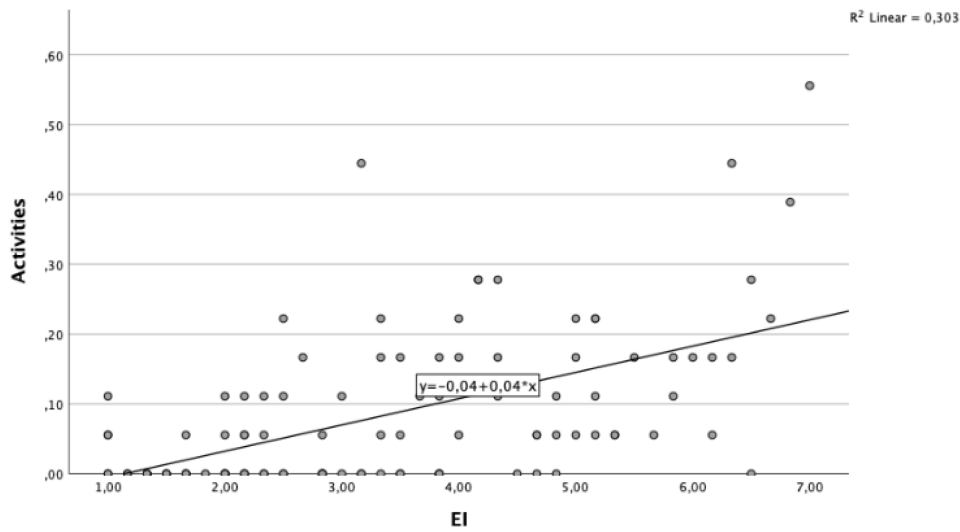


Figure 35 Scatterplot and regression line for EI and activities (linearity is given)

Table 31 Correlation of EI and activities

Spearman's rho	EI	
Activities	Correlation Coefficient	.562**
	Sig. (2-tailed)	<.001
	N	103

There is also a significant correlation between PBC and activities ($r=0.457, p<.001, n=103$). The higher a person's PBC, the higher is the number of entrepreneurial activities that the person has undertaken. According to J. Cohen (1988), this is a moderate effect. Based on these findings, H6.2 can be accepted (see Figure 36 and Table 32).

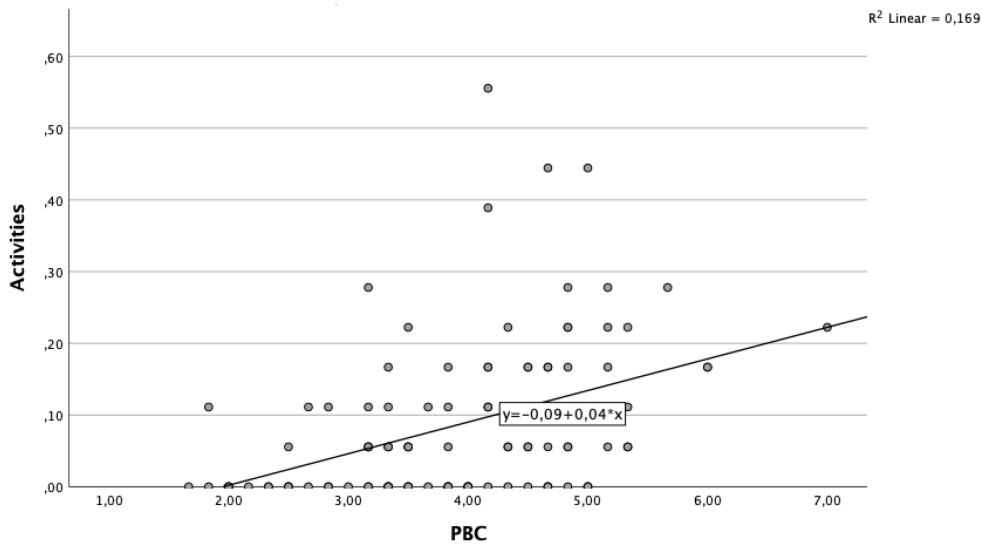


Figure 36 Scatterplot and regression line for PBC and activities (linearity is given)

Table 32 Correlation of PBC and activities

Spearman's rho		PBC
Activities	Correlation Coefficient	.457**
	Sig. (2-tailed)	<.001
	N	103

As presented in chapter 1218.3.2.3.1, there is a negative relation between EI and Level Master studies. Thus, alumni show significant lower EI than applicants. Therefore, a Kruskal-Wallis Test was performed to scrutinize whether the distribution of activities is the same across categories of level Master studies. As shown in Figure 37 and Table 33, there is no significant relation. Thus, H6.3 must be rejected.

Table 33 Kruskal-Wallis Test for Activities taken in different categories of level Master studies

Test Statistics	
Kruskal-Wallis H	3.809
df	4
Asymp. Sig.	.432

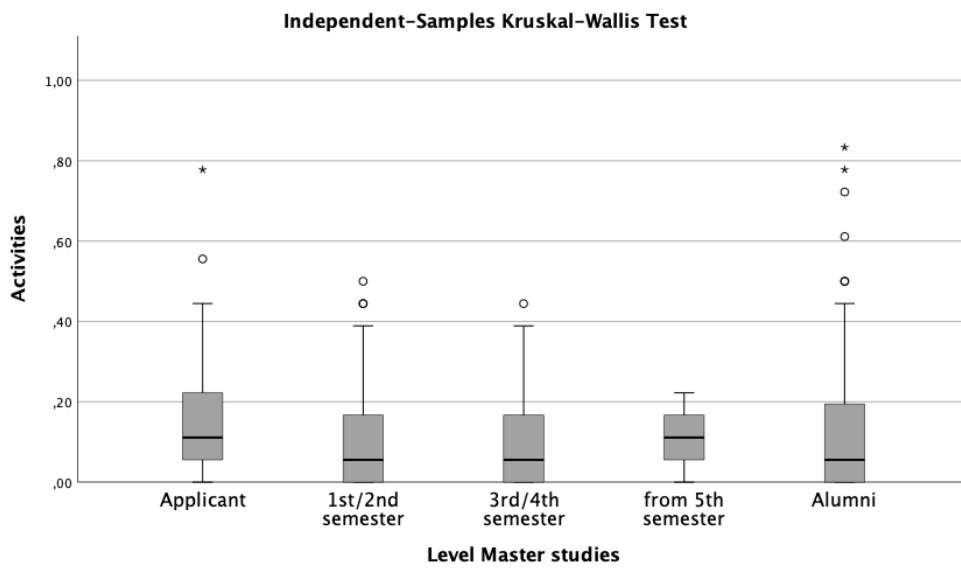


Figure 37 Activities taken in different categories of level Master studies

8.3.3 Written Answers

Besides the statistical part asking for independent, dependent and control variables, the questionnaire also asked for additional comments so participants could provide further insights that were qualitative in nature.

Only a few participants made use of this free field: in total, six answers were given and will be briefly mentioned here.

Two comments focused on the requirements imposed by the state. Germany is seen as a very unattractive place to set up a company, as the bureaucratic challenges and tax burden are very high. Another topic mentioned in two of the comments deals with the more personal challenges when founding a company. Generally, there is uncertainty and having an own company means a lot of work and little free time and, of course, a certain amount of risk. Two of the comments focused on the final execution of founding a business and concluded that the biggest challenge is to move from thinking to acting. One comment described that there are differences due to the different types of ventures that can be founded. Finally, one comment dealt with the participants estimation that he or she has not learned enough about this topic during the studies and therefore wants to follow the idea more intensively after graduation.

These short insights give an idea how complex the topic of EI can be from a qualitative perspective. Thus, these comments were used for the development of the qualitative interview guideline presented in chapter 9.

8.4 Discussion

The results retrieved in this quantitative study aimed for answering the research question *Which effect does a project-based, work-integrated EE program have on the development of EI and its antecedents, namely ATB, SN, and PBC, as well as on the entrepreneurial activities of EE participants?*

Several results need some discussion as they may be intuitively difficult to explain. First of all, ATB was eliminated from the statistical analyses due to having a too high correlation with EI and not being as distinct factor. Thus, the analyses for hypothesis 1.2, which predict that ATB is influenced by EE, and part of hypothesis 1.5,

specifically predicting that ATB would act as mediator between EE and EI, could not be performed. This needs to be discussed, as literature so far has not reported similar effects. Taken the results from the studies analyzed in the systematic literature review, ATB regularly plays an important role. For example, Otache et al. (2021) and Adelekan et al. (2018) report that only ATB has a mediating effect between entrepreneurship education and EI. Chukwuma-Nwuba (2018) additionally found a mediation effect of ATB between SN and EI. Furthermore, Y. Zhang et al. (2014) and Rauch and Hulsink (2015) showed that only ATB is positively related with EI. Although these results all highlight the importance of ATB, they are to some extent contradictory. An explanation for this might be the widespread results for the different items. While the item average for “If I had the opportunity and the resources, I would like to start my own business” is quite high (5.019), the item “Among various options, I would rather be an entrepreneur” is rather low (3.874). This indicates that overall attitude toward entrepreneurship is good, but it is not seen as the best career option.

Dealing with the antecedent SN, hypothesis 1.3, predicting that EE will directly and significantly increase SN, must be rejected as a weak negative, although not significant effect was found. Also, the expected mediating effect of SN between EE and EI, as predicted by hypothesis 1.5, could not be found. Several researchers have found unexpected results regarding SN as well. For example Varamäki et al. (2015) could not confirm the explanatory power of SN in their data, although Engle et al. (2010) supposed in their multi-country study that the other theory of planned behavior antecedents may vary, but SN consistently contributes to EI. In contrast, Rauch and Hulsink (2015) did not analyze SN as part of the model, as this antecedent of EI cannot be influenced by entrepreneurship education. One possible explanation for the slight decrease in SN might be the influence of colleagues in the work-integrated EE setting. Especially those participants that are working for big corporations probably have colleagues who have been working for this company for decades. Such colleagues may have reservations regarding entrepreneurship and self-employment. Furthermore, promoting young colleagues to start their own business may cause higher workload for the remaining colleagues and would therefore not be supported. This is in line with the finding that the SN item concerning colleagues receives the lowest acceptance.

The antecedent PBC did slightly increase as a consequence of EE (see Figure 32), although not at a statistically significant level. Thus, hypothesis 1.4 must be rejected. Figure 33 shows this weak relation within the mediation model while furthermore revealing the strong and highly significant effect of PBC on EI. These findings lead to the conclusion that the data does not support H1.5. Similar results have been found in several other studies. Some researchers could not find differences in PBC in different years of studies in an entrepreneurship education program (Vukovic et al., 2015) but showed that PBC is a reliable predictor for EI (Padilla-Angulo et al.). However, Y. Zhang et al. (2014) could not find a positive influence of PBC on EI while Otache et al. (2021) could not show a mediating effect of PBC. The insignificant effect of entrepreneurship education on PBC is intuitively difficult to explain. One aspect might be that at the time of receiving entrepreneurship education people become aware of their weaknesses, which reduces their self-confidence and subsequently PBC (von Graevenitz, Harhoff, and Weber 2010). However, looking at the single item "I know how to develop an entrepreneurial project", solely this item achieved a mean close to 5 (see Table 9) and thus represents a moderate to high agreement. This item shows a slight increase from applicants to 1st/2nd semester students, then remains at the same level until alumni (see Appendix 4: Figure 46). Consequently, the project-based and work-integrated approach offered by the entrepreneurship education program analyzed in this study seems to have a positive influence on more task-related challenges when it comes to entrepreneurship. The program focus at Steinbeis University is not limited to venture creation and there are no seminars dedicated toward the legal processes. Thus, it is not surprising that PBC items asking for these elements do not receive high acceptance.

The most astonishing result is found for the direct effect of entrepreneurship education on entrepreneurship intention, which is significantly negative. Thus hypothesis 1.1 must be rejected. As Figure 31 shows, the applicants for an EE program express high EI. This can be explained with the high self-confidence of applicants as they have just successfully passed the assessment center (see footnote 22 for explanation) which is in line with Varamäki et al. (2015). A similar explanation for PBC was discussed by Souitaris et al. (2007), who see high self-confidence as reason for high PBC values at the beginning of an EE program, thus

leaving no room for improvement. Subsequently, the EI decreases dramatically for students in their 1st or 2nd semester followed by a slight increase for participants in the 3rd or 4th semester. Then, the expressed EI again decreases for older students and alumni. The first decline can be explained by the aforementioned weaknesses that entrepreneurship education participants become aware of at the beginning of the program. Furthermore, Keim (2018) reported in her doctoral thesis that students at Steinbeis University, who also experienced the *Projekt-Kompetenz-Studium*, assessed their overall competencies as lower several months after the program has started. Consequently, the increase can be explained properly as the students regain self-confidence while proceeding with their studies. The low EI of older students and alumni might be caused by a higher interest in paid-employment at the end of a work-integrated program. Especially good students may get an attractive job offering from the company they work for as a student. Additionally, at the end of the EE program participants know about the challenges of being an entrepreneur, which might reduce their EI (Ajzen, 2002). Several other studies have reported similar results (Mentoor & Friedrich, 2007; Oosterbeek et al., 2010). Furthermore, Varamäki et al.'s (2015) data showed that students' EI, ATB, and SN decreased, while PBC stayed the same. As such, higher education in general does not seem to increase entrepreneurial potential. "Younger people understand better their career options, their own competencies, and requirements of starting their own businesses as a result of going through an educational program" (Varamäki et al., 2015, p. 575).

All in all, these results for the theory of planned behavior model suggest that there is a likelihood for an omitted mediator, that has not been integrated into the model based on X. Zhao et al. (2010). This contradicts the results of a meta-analysis that found ATB, SN, and PBC explain 39% of variance in EI (Schlaegel & Koenig, 2014). However, Heuer and Kolvereid (2014) also stated that the theory of planned behavior must be incomplete as they found a direct effect of EE on EI without enhancing the antecedents ATB, SN, and PBC. This requires future research.

Besides the direct influence of EE on the development of EI, as well as on the antecedents of the theory of planned behavior, several studies have found further influencing variables. One of these variables is the working experience gathered by an EE program participant (A. C. Cooper, 1993). Soria-Barreto et al. (2017) found a negative relation between working experience and EI, while Fatoki (2014) showed

that students with previous working experience have a higher level of EI compared to those without. Furthermore, Xavier et al. (2012) reported that most new business ventures are founded by persons aged 25-35 years, thus most of these persons probably express a certain degree of working experience. For the data of this study, no significant difference between working experience and EI existed, so hypothesis 2.1 must be rejected. Due to the contradictory results reported in literature so far, this result is less surprising. Future research is therefore needed to reveal if there is a relationship and in which direction. Besides this connection between working experience and EI, Dodescu et al. (2021) postulated that the effect of PBC on EI is mediated by working experience. However, no positive relationship was found between working experience and PBC for the data at hand. Therefore, hypothesis 2.2 must be rejected as well. A possible explanation is that participants do not see a high level of comparability between the tasks they have to solve in their paid employment and tasks and challenges someone would face as entrepreneur. As a consequence, this would support the opinion that working experience cannot have a positive influence on EI.

The next variable that might have an influence on the development of EI is the participants' field of study. Again, literature reveals contradictory results. Some scholars report that management students or those from an economic field have higher EI (Paray & Kumar, 2020; Tessema Gerba, 2012) while other researchers show that technology or engineering students have higher EI (Y. Zhang et al., 2014). For students from Steinbeis University, data revealed that engineering students have a higher, although not statistically significantly, level of EI than economic students. Thus, hypothesis 3 must be rejected. Maresch et al. (2016) intensively dealt with this topic in their study. They argue that science and engineering students have not had great exposure to entrepreneurial topics before starting in an EE program. Therefore, EE might have a greater influence on EI for students from the technology field as they probably start with a lower level of EI. For business students, the effect of EE might be incremental without large effects. However, Maresch et al. (2016) also present an explanation for the other direction. People who have already had a certain level of experience "can acquire and process new knowledge more efficiently than those with less exposure to the subject" (Maresch et al., 2016, p. 174). This discussion demonstrates that, again, future research is

needed to clarify the influence of field of study on the development of EI as a consequence of EE.

Although SN are explicitly part of the theory of planned behavior, there are related constructs that may have an influence on the development of EI. For example, past exposure to entrepreneurial activity (N. F. Krueger & Carsrud, 1993; Matthews & Moser, 1996), such as having self-employed parents, may influence SN. Furthermore, self-employed parents influence the entrepreneurial interest and career choice of their children (Crant, 1996; De Wit & Van Winden, 1989). Such role models not only influence SN and EI directly, they may also change how ATB and PBC are related to EI (Athayde, 2009; Boyd & Vozikis, 1994; Dohse & Walter, 2012). In this sense, hypotheses 4.1 to 4.3 postulate that the level of EI, SN, and PBC depend on whether the respective participant has self-employed parents or not. These hypotheses must be rejected as no relation was found. Past research showed inconclusive results as well (Shook et al., 2003). Entrialgo and Iglesias (2018) present a double influence of role models, on both the formation of attitudes and PBC. Thus, testing for direct effects may lead to rather negative results. Considering the indirect path, several studies have indeed been able to demonstrate the positive influence of self-employed parents on the development of EI (BarNir et al., 2011; Castiglione et al., 2013; Pouratashi, 2015). Nevertheless, for the data at hand, it was not possible to show a statistically significant influence of SN on EI. Against this background, this can be an explanation for the missing effect of self-employed parents. Cultural backgrounds and generational differences can vary between studies. As a consequence, EE participants may rate the importance of parental role models differently, depending on country and age.

Finally, gender differences in EI is the most frequent research topic in the review made by Liñán and Fayolle (2015). Several studies acknowledge the direct influence of gender on the development of EI (Marlow & McAdam, 2012) while no literature is available that emphasizes a relation between gender and behavioral intention's antecedents ATB, SN, and PBC. As women generally have a less positive attitude to risk (Dawson & Henley, 2015), which is a crucial element within entrepreneurial activities, the EI of women should be lower than for men. Indeed, men are found to exhibit higher EI (Liñán & Chen, 2009; Souitaris et al., 2007; Strobl et al., 2012). The same result was found for the data of this research, thus hypothesis 5 is accepted.

However, the empirical evidence is still limited and not entirely conclusive (Camelo-Ordaz et al., 2016; Shinnar et al., 2012).

The last block of analyses dealt with the execution of activities in connection with EI. Although intention is considered to be a reliable predictor of behavior, Reynolds (1994) noted that there are often significant time lags from intention to action. Thus, EI is commonly used as outcome variable, although behavior is the dependent variable in the theory of planned behavior emphasized by Ajzen (1991). Based on Gartner and Carter (2003), entrepreneurial behavior comprises several activities taken by individuals that finally lead to new business creation. For this research, the questionnaire developed by Rauch and Hulsink (2015) was used. It contains 18 activities related to entrepreneurship for example, "I spent a lot of time thinking about starting a business" or "I prepared a business plan". Based on yes and no answers a ratio was built ranging from .06 (1/18) to 1.0 (18/18). The data provided support for hypotheses 6.1 and 6.2. Thus, it could be shown that a higher level of EI positively correlates with the number of actions this individual has taken. The same is true for the direct relation between PBC and entrepreneurial actions. This is, to the best of the authors' knowledge, one of the first studies linking both EI and PBC with actual behavior in the field of entrepreneurship. Thus, it was shown that the theory of planned behavior is indeed a valid predictor for individual entrepreneurial activities (N. F. Krueger, 2009; N. F. Krueger et al., 2000; L. Lee et al., 2011; Schlaegel & Koenig, 2014), although Katz (1990) emphasized that the link between intention and actual behavior is quite low in the field of entrepreneurship. Besides this confirmation that the theory of planned behavior predicts behavior, Kolvereid and Moen (1997) supposed that EE directly influences entrepreneurship behavior. So, this study analyzed whether there is positive relation. As can be seen in Figure 37, the overall level of activities taken with regard to entrepreneurship is quite low across all categories ranging from applicant to alumni. A significant difference caused by EE was not found, which leads to the rejection of hypothesis 6.3. However, it must be noted that the questionnaire developed by Rauch and Hulsink (2015) suggested several activities that occur well before the legal foundation of a new enterprise (see questionnaire in Table 7). More precisely, it is possible to answer yes for eight out of 18 entrepreneurial activities (ratio .44) without creating a legal entity or registration with the tax authorities. The scatterplots (see Figure 35

and Figure 36 for EI and PBC respectively) show that—although there is a statistically significant positive relation—the ratio of realized activities is mainly below this threshold ratio of .44. Thus, the final goal of most entrepreneurship education programs to promote venture creation cannot be proved to a final end. Souitaris et al. (2007, p. 586) state that “[...] in the transition to entrepreneurship, a student faces first an attitude-intention-related personal challenge (do I want to be an entrepreneur?) and then a number of ‘implementation’ challenges such as acquiring knowledge, finding and evaluating an opportunity and assembling the resources”. Thus, future research is necessary to analyze how EI and real venture creation are related. Those research designs must consider implementation challenges in order to find out how EE may contribute to overcoming these challenges.

To conclude this discussion, it is clear that there is still a lot of work to do. Heuer and Kolvereid (2014) emphasized that the theory of planned behavior is probably incomplete and fails to totally explain the development of EI, which is in line with some authors stating that there is little evidence regarding the effectiveness of EE programs (Fiet, 2000; Weaver et al., 2006). As discussed earlier, one reason for this problematic evaluation of EE is that a very low proportion of graduates start a business immediately after graduation (Golla et al., 2006; Luthje & Franke, 2003). This substantial time lag between treatment and criterion poses a threat to internal validity and complicates longitudinal studies (Fretschner & Weber, 2013). However, long-term longitudinal studies with rigorous, experimental research design including control groups are needed to reveal reliable results. As such studies require high effort, it is first of all advisable to gain an even deeper understanding on the factors affecting the success of EE programs and the relationship within the theory of planned behavior. Several researchers share this view and call for more qualitative research in this field (Ahmed et al., 2017).

Excursus: Entrepreneurship at Steinbeis University, SIBE, and TU Munich

As described in chapter 8.3.1.1, the quantitative part of this research contained in total 124 respondents, out of which 21 have indicated in the questionnaire that they have already founded a company. This represents 16.9%. Compared to the overall distribution, 16.7% of engineering students and 17.0% of economic students founded a company. This almost equal distribution is thus in line with the finding that there is no significant difference in the EI for participants from different fields of study.

For SIBE, representing the faculty of Leadership & Management and thus the non-engineering part of the sample, additional data exists. The SIBE employment report (SIBE, 2023a) independently presents statistical analyses regarding its graduate's careers: 11% of the alumni have founded a company during the three years after completion of their studies (cumulative n = 1045) and after ten years this amount raises to 16% (cumulative n = 437) including part-time and full-time venture creation. This percentage therefore is close to the results retrieved in this study. However, it must be admitted that the sample of this research is not fully representative. As described, the thesis' questionnaire was distributed using social media and mail. Thus, the people it reached who are founders or have high interest in the topic of entrepreneurship were probably more eager to participate. This probably led to a somewhat higher quotient of founders than for the whole population of Steinbeis University students and graduates.

Comparable data does not exist for the faculty Technology and Engineering from Steinbeis University.

As rather small private institution, Steinbeis University does not play a crucial role within rankings or other analyses that aim for comparing universities. Such data nowadays regularly also comprises key figures dealing with entrepreneurial indicators such as founders or start-ups emerging from the respective institution. Regularly, the Technical University Munich is at the top of such rankings for German universities (Rau, 2023). In 2022, 78 new ventures were created (TU

München, 2023), while there have been 8,982 graduates in the academic year 2021/2022 (TU München, 2024). This leads to a ratio of .86% which is noticeably lower than the ratio found in this research for Steinbeis University or published by SIBE for their graduates. To summarize, although entrepreneurship intention in general seems to be rather low for students and graduates from Steinbeis University, final entrepreneurial behavior in the sense of venture creation seems to be well above the average in comparison to top-ranked universities.

Intrapreneurship

As described, several entrepreneurship definitions are not limited to venture creation but rather see activities that focus on venture growth or exploitation of market opportunities as entrepreneurial as well (S. Shane & Venkataraman, 2000). Huynh (2007) concluded that Schumpeter's definition of an entrepreneur was equivalent to that of a leader. This is way the term intrapreneurship emerged. Thus, the responsibility of leaders to achieve business success and venture growth, for example, by means of implementing innovations, is evident.

In this context, the SIBE employment report (SIBE, 2023a) also offers valuable insights. 52% of the alumni hold a leading position three years after graduation and 82% have a leading position ten years after graduation. This demonstrates that the *Projekt-Kompetenz-Studium* offered by Steinbeis University contributes to the development of creative individuals who think and act entrepreneurially (or rather intrapreneurially), in other words, those who translate their ideas into action—be it in their own companies or as employees (Faix & Mergenthaler, 2015; Walterscheid, 1998).

9 Qualitative Analyses

9.1 Objectives

The systematic literature review has revealed that studies analyzing the effect of entrepreneurship education (EE) on entrepreneurship intention (EI) and components of the theory of planned behavior come to contradictory results. While some showed a positive influence on EI and the antecedents attitude toward the behavior (ATB), subjective norms (SN), and perceived behavioral control (PBC), others failed to prove a positive influence or even found a negative influence of EE thus decreasing EI. Several framework conditions have been discussed to be decisive, such as the pedagogical approach but also more general circumstances such as the economic situation in the respective country.

Therefore, it is not surprising that some authors call for qualitative approaches (Ahmed et al., 2017) to get valuable in-depth understandings about the relevant factors and behavioral beliefs that might influence whether an EE program is effective or not. In order to close this research gap, focus group discussions were executed during which the interviewees were also shown results from the quantitative analyses.

This qualitative part also incorporates the perspective of company founders, which to the best of the author's knowledge has not been done before for the framework of theory of planned behavior and entrepreneurship education (see findings of the systematic literature review in chapter 6).

The leading research questions for this empirical analysis were:

- Which different interpretations regarding entrepreneurship exist and how does this influence the effectiveness of EE programs?
- Which contextual factors have an influence on the effectiveness of EE programs and how do these explain the retrieved quantitative data?
- Which personality traits and competencies can be decisive for an entrepreneur and how does this relate to intrapreneurial behavior?

- Which recommendations arise for a project-based and work-integrated program focusing on the development of entrepreneurial personalities?

With regard to the interpretation and discussion of the results, it is important to understand that this qualitative part mainly focuses on a narrower perspective of entrepreneurship, namely venture creation. However, an attempt was made to transfer the results to the intrapreneurship perspective. While focus group discussions allow analysis of individual and therefore subjective perspectives, it is also possible to analyze differences between the groups.

9.2 Methodical Approach

9.2.1 Rationale for Choosing the Method

To deeply explore the influence of the *Projekt-Kompetenz-Studium* (PKS) offered by Steinbeis University on the development of students' EI, focus group discussions were deemed appropriate as such groups bring together participants with different opinions and experiences. A focus group is an interview format consisting of multiple participants assembled for a specific purpose (R. A. Krueger & Casey, 2015). Based on this, discussions can emerge to diversify insights and to cross-check the results. Furthermore, L. Cohen et al. (2017) point out that individual interviews might be intimidating when it comes to sensitive topics and the interaction between participants can yield data that would not be available through other data sources.

The optimal size for a focus group is between four and 12 participants, which creates a large enough group to facilitate discussions without inhibiting balanced participation. Studies indicate that more information is obtained by conducting two groups of four participants than one group of eight participants (Fern, 1982), while four to eight focus group discussions should provide saturation (Hennink & Kaiser, 2022).

Online focus groups are an extension of the traditional focus groups that have been used in qualitative research for decades. The principles are largely consistent with traditional focus groups. Main advantages for an online format have been summarized by Murgado-Armenteros et al. (2012, p. 79):

1. Possibility to involve geographically remote participants
2. Reduced costs as there is no need for hiring rooms, the moderator does not have travelling expenses, etc.
3. Electronic communication leads to dynamics that encourage the participants to express their opinions
4. The participants make a greater number of comments, although these are shorter and simpler
5. They favor anonymity among the participants, reducing the risk of inhibition on their part
6. Given of suitable tools, simple provisional transcriptions are available as soon as the session ends
7. Access to participants who are typically difficult to recruit
8. Participation is convenient and easy
9. Participation is more balanced in terms of the number of comments made by the members

9.2.2 Definition of the Sample

To receive diverse opinions, the author decided to group people by special criteria. One research interest was to derive recommendations for the PKS. As those recommendations can only be given by people who have at least partially passed the study program, it was not appropriate to have applicants as participants in the focus groups. Instead, the author decided to separately interview current students from the economic faculty as well as students from the engineering faculty. Additionally, one group was set up of participants who had finished their studies. This group consisted of economic and engineering alumni. Lastly, the author formed a group of alumni who have already founded their own business and therefore represent the opinion of self-employed people. As the quantitative survey did not reveal gender issues, the author deemed this criterion as not relevant for the selection process. Also, age is not seen as relevant for the development of EI. Nevertheless, both criteria are documented for each participant. An overview of the resulting focus groups is given in Table 34.

Having defined the different groups, recruiting then took place. Participation was voluntary without offering any incentives to the interviewees. Criteria for inclusion

were a) availability and b) willingness to participate. In total about 80 potential candidates were asked for participation. The recruitment took place via mail and the social media platform LinkedIn, which is a business network platform.

For each focus group, the author defined time slots for the interview beforehand and offered this appointment while searching for participants. Those participants who accepted for the planned appointment were invited for the online discussion and received the link for the online meeting.

Due to the shortcoming that online focus group discussions have a non-binding nature, the author invited more participants for each interview than was deemed necessary. In Group 2 and 4, all invited interviewees were present. In Group 1 one invited person could not participate. In Group 3, two invited people could not participate. Nevertheless, the defined aim of having three to five participants in each focus group was reached.

Table 34 Participants in the focus group discussions

Group 1 ECONOMIC STUDENTS	Group 2 ENGINEERING STUDENTS	Group 3 ALUMNI	Group 4 FOUNDERS
Female, 23 years	Male, 24 years	Male, Engineering, 37 years	Male, Engineering, 33 years
Female, 25 years	Male, 23 years	Male, Engineering, 30 years	Male, Economic, 43 years
Female, 25 years	Male, 24 years	Male, Economic, 25 years	Female, Economic, 30 years
	Male, 26 years		Female, Engineering, 30 years
			Male, technical, 42 years

9.2.3 Conducting the Focus Group Discussions

As mentioned, the focus group discussions took place online. At the beginning of each discussion the interviewees were informed about the rationale for the study and the methodological setting as mixed method approach, following the aim to explain the results received in the quantitative survey, which was conducted prior to the focus group discussions.

The interviewees were informed about the process of the discussion, for example, about the aim to get as diverse opinions as possible without need to reach agreement and the right not to respond to sensitive questions. Lastly, the interviewees were informed about the confidentiality of their statements. Permission to record the discussion and to use the automatic transcription offered by the tool Microsoft Teams was gained verbally at the beginning of each record.

The author used an interview guideline (see Appendix 3) focusing on the personal perception on the topic of entrepreneurship, factors influencing the development of EI, and the results retrieved from the quantitative survey analyzing the effects of the pedagogical approach. However, the author gave room for spontaneous progressions during the discussion to not disturbing the natural conversational flow. The author facilitated the process by, for example, introducing a topic—also, sharing questionnaire results via a presentation, raising questions, and moderating the discussion in terms of social group dynamics.

At the end of each session the author thanked the participants for engaging in the focus group discussion and gave the opportunity to raise additional points or to ask questions.

No technical issues occurred during the interviews. The interviews lasted 80-90 minutes, which is just within the suggestion of Joyner-Payne (2020) that focus groups should last between 60 and 90 minutes to capture robust data.

9.2.4 Transcription, Process of Coding and Qualitative Content Analysis

9.2.4.1 Transcription

Transcription is a crucial step in qualitative research, particularly when dealing with interview data. It involves converting spoken language into written text, ensuring accuracy and reliability in the representation of participants' responses. Due to the online format of the conducted focus group discussions, it was possible to use the transcription tool offered by Microsoft Teams. However, the resulting quality was quite low. Thus, manual transcription was performed subsequently in order to receive adequate results.

The transcription procedure comprised:

1. Recording of the interview as part of the online tool Microsoft Teams.
2. Creating a transcription template that included essential elements such as participant identifiers, timestamps, and a clear distinction between interviewer and participant speech. This template ensures consistency across multiple interviews.
3. Almost verbatim transcription captured not only the words but also non-verbal expressions, pauses, laughter, and any other relevant aspects of communication. The author decided not to note emotional tones as the perception during the interviews did not indicate important emotional expressions. This style ensures a high quality of data.
4. Timestamps were included in regular intervals. This helped in referring back to the original recording during analysis or when specific portions of the interview need to be revisited.
5. Inaudible or unclear sections were marked as such to avoid making assumptions about what was said.
6. Reviewed and proofread the transcriptions for accuracy and completeness. Cross-checked the transcribed text against the original audio to catch any errors or omissions.
7. The transcriptions are stored securely to maintain participant confidentiality. Any identifiable information was removed from the transcriptions.

9.2.4.2 Defining the approach for qualitative content analysis

The author decided to follow the content analysis approach suggested by Kuckartz (2018). This approach mainly allows high flexibility regarding the process and interpretation. In face of the research questions leading to this qualitative methodology, this seemed to be appropriate to emphasize its explorative nature. Although the existing literature was thoroughly analyzed and thus offered extensive opportunities to deductively derive a code system, the author aimed for an open approach that allows the additional of inductive codes as well. Thus, emerging themes arising from the data could be taken into account. Furthermore, due to the

high unpredictability of data, the content analysis approach should allow for quantitative and qualitative perspectives. Kuckartz's (2018) method emphasizes data reduction while still allowing a flexible and iterative approach. Finally, this approach acknowledges the importance of interpretation while being open to a balance between systematic coding and exploratory analysis.

9.2.4.3 Process of Coding and Content Analysis

For the coding, the software MaxQDA was used. This is a qualitative data analysis software that facilitates the coding process in qualitative research. MaxQDA's user-friendly interface and powerful features make it a versatile tool for qualitative researchers engaged in coding and analysis. The software supports an iterative and dynamic approach to data analysis, allowing to continuous refinement and a deeper the understanding of the data.

The coding process took place as follows:

1. The qualitative data was imported into MaxQDA. This import included the four interview transcripts.
2. An initiating text work was performed comprising marking relevant text passages and writing memos in order to capture first thoughts .
3. The code system was created by deductive categorization of the main categories on the basis of the questionnaire and the literature as well as on the basis of the underlying research questions and the initiating text work.
4. Sample coding was applied for the transcription of interview 1 (approx. 25%). The coding scheme was systematically applied. This involved assigning codes to relevant portions of the data based on the established categories.
5. Completed the first coding of all material with the main categories and formation of sub-categories took place. MaxQDA allowed to create a hierarchical code system, where codes can have parent-child relationships. This flexibility was beneficial for organizing and structuring the codes (for the codebook see Appendix 6).
6. The coding of the subcategories within the main categories was performed, followed by coding the entire text with the subcategories.

7. To ensure reliability, the process of coding was repeated by the author several weeks later, thus proving a—to some extent—new and neutral perspective (intra-coder reliability), as there was no possibility to realize coding by a second person.
8. Memo writing was applied for several coded segments. Memos were useful to capture thoughts, interpretations, and ideas related to the coded data.
9. MaxQDA's feature to thoroughly explore code frequencies and retrieve coded segments was used. The software offered code frequency tables and matrices; this was used to understand the prevalence of different codes and to identify patterns, connections, and relationships within the data. This allowed for a deeper understanding of the content and aided in the development of meaningful insights.

9.3 Results and Interpretation

This section presents the main findings of the study through a synthesis of the results from focus group discussions. The analysis of the data collected revealed nine overarching themes across the four focus groups (see Appendix 7: Table 38).

The first theme deals with research question 4: *Which different interpretations regarding entrepreneurship exist and how does this influence the effectiveness of EE programs?* Answers to this question are presented in chapter 9.3.1.

Research question 5, *Which contextual factors have an influence on the effectiveness of EE programs and how do these explain the retrieved quantitative data?*, is mainly answered in the chapters 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, and 9.3.8.

Answers to research question 6, *Which personality traits and competencies can be decisive for an entrepreneur and how does this relate to intrapreneurial behavior?*, emerged in several themes and are mainly present in the chapters 9.3.4, 9.3.7, and 9.3.9.

Revealed differences between groups will be discussed in each section respectively. Overarching themes with high prevalence throughout all groups will be summarized and discussed separately in chapter 9.4.

9.3.1 Entrepreneurship Definition

As the concept of entrepreneurship is very broad and does not have an agreed definition, the focus group interviews started with the individual definition the interviewees had regarding entrepreneurship.

Besides more general aspects that entrepreneurship comprises, such as key topics like starting something new, problem solving, and realizing innovative ideas (which can also be the case as intrapreneur within an existing company), it is also associated with self-employment and starting one's own company. While other researchers found that students seem to link entrepreneurship solely to business creation, and have not thought about entrepreneurship as an attitude to life (Iglesias-Sanchez et al., 2019), this does not seem to be the case for students from Steinbeis University. This indicates that the programs at least positively contribute to the understanding that there is a variety of professional activities that can be summed up under the term entrepreneurship.

Within the narrower definition of entrepreneurship of being self-employed, an interesting differentiation to the term 'start-up' came up as there were different views on what counts as entrepreneurship. Some of the interviewees saw small, locally owned businesses, like a bakery, as entrepreneurial as well, while others defined only innovative start-ups focusing on technical solutions as 'entrepreneurship'.

*Ich kann mich jetzt auch an das Straßeneck stellen und Kaffee verkaufen und dann bin ich auch ein Unternehmer, aber ich verbinde
 >> jetzt mit Entrepreneurship nicht sowas, [...] sondern [...] eher [...] ich <<
 bin Ingenieur und erfinde ein neues Bauteil oder so und mache mich dann damit selbstständig.*

Engineering students, Pos. 26

This discussion has taken place in every focus group and thus demonstrates the importance. So, it becomes clear that even using the terms 'founder' or 'self-employed' provides room for interpretation. There are many different ways in which someone can be an entrepreneur. The details of the business determine which tasks, challenges, and responsibilities someone has. For the development and assessment of EI, this means that it is necessary to precisely define what is meant by a given term. Thus, questionnaires must clearly state how entrepreneurship and other terms are

defined: someone who is interested in founding a bakery must know if this is also an entrepreneurial activity. If this person would themselves define entrepreneurship as founding a high-tech company, then the answer might not be the same.

Ein IT-ler kann sich zum Beispiel gut vorstellen jetzt selbstständig Webseiten [für] jemanden zu programmieren [...]. Aber wenn er daran denken würde, jetzt eine riesen Firma aufzubauen, dass er sich das nicht vorstellen kann und beides ist ja eigentlich ein Unternehmen zu gründen.

Economic students, Pos. 166

9.3.2 Attitude Toward the Behavior (ATB)²³

The second theme emerged from statements of interviewees regarding their attitude toward entrepreneurship. This revealed that personal perspectives of advantages and disadvantages of being an entrepreneur are closely related to concrete EI, which emerged as separate theme. Thus, these topics will be discussed in that section.

Reasons in Favor

The participants of the focus group discussion have been asked what reasons they see to become self-employed. They mentioned several points that can be clustered in three groups.

First, there are arguments about dealing with the opportunity to shape one's life. The interviewees brought up being one's own boss, having independence, freedom and the self-determination to make decisions, thriving in change, and exploiting creativity. This can also include social aspects, for example, the wish to help other humans, animals, or nature in general. These motives represent rather intrinsic motivational aspects.

Second, interviewees suggested extrinsic reasons, such as financial independence or the chance for a higher salary as reasons to become self-employed. Furthermore,

²³ Although the quantitative part of this thesis could not include the variable ATB in the statistical analyses, the interview guideline for the focus group discussions explicitly asked for this variable in order to gain deeper insights.

wanting to earn recognition for the effort someone has taken is mentioned. This is obvious in the fact that many founders name their company after them. In this context, founding a company is seen as the highest economic and occupational challenge. Thus, some nascent entrepreneurs may want to master this and strive for such recognition.

Third, unattractive job opportunities were mentioned by the focus group participants as a more general point. More precisely, this can comprise avoiding unpleasant circumstances and conflicts, for example, ethical aspects regarding the manner in how a company is led and how employees are treated. Dissatisfaction as paid employee may end in health problems or, less harmfully, simply not being willing to make compromises.

»
[...] finanzielle und zeitliche Freiheit, dass ich einfach besser mir meine Zeiten einteilen kann und auch generell, umso produktiver ich arbeite, einfach weniger arbeiten kann. Und natürlich sehe ich auch, dass die Verdienstmöglichkeiten, ja, wesentlich weiter steigen können, wie wenn man im Angestelltenverhältnis ist. Und dann der dritte Punkt ist [...] Menschen zu helfen, verbinde ich mit [...] meinem Lebenszweck [...].
«

Economic and Engineering founders, Pos. 16,

Reasons Against

In turn, the interviewees also discussed unfavorable reasons regarding self-employment. Here, four clusters emerged.

First, personal reservations came up. Founders face immense mental pressure. People may fear the responsibility and the decisions they would have to make as a founder. One may dislike being all alone as, for example, in case of sickness, there is no one to take over, which causes financial uncertainty. There is always a risk of failure and insecurity in what will happen. Additionally, the founder is responsible for keeping the firm running. There never is an end.

Second, the participants of the focus groups discussed that there might also be consequences for others. In some cases, unplanned family support becomes necessary so the personal environment may suffer. This may also occur in times of high workload which causes a shortage of time for family and friends. Furthermore,

if applicable, a founder is responsible for his or her employees and their families. Thus, wrong decisions or poor economic times for the company also negatively impact the life of others

Third, Germany is known to be very bureaucratic with many hurdles with regard to venture creation. Thus, a lot of effort is necessary before a founder even starts to work. Additionally, there might be a high mental pressure to fulfill regularly changing legal requirements.

*Es gibt Länder, da ist es viel einfacher, natürlich mit den ganzen
 » Dokumenten, Anmeldungen und so weiter [als in Deutschland]. «
 Economic students, Pos. 20*

Fourth, the focus group with alumni pointed out that currently job opportunities in Germany are very good, which probably reduces the attractiveness of being self-employed. This topic is not mentioned by students or founders. For students, the reason for not mentioning this point may be that they do not know yet if they will get a job offer. So, they probably do not have the whole picture. However, as the founders also do not mention this topic, it is possible that alumni use this argument as a kind of excuse for not aiming for self-employment.

Indifferent reasons

The interviewees also pointed out that many aspects of being self-employed can be seen positive or negative. Take, for example, the topic of bearing a lot of responsibility. One person may appreciate having responsibility for a whole business, while others do not. Having the responsibility on the one hand is seen positive, as one is independent from the decisions of a supervisor and a founder can decide who does or does not work for them and that the work environment is like. On the other hand, as a founder one is often responsible all alone. So, if a decision was wrong, there is no one else to blame. Thus, several points have advantages and disadvantages regarding the attitude toward entrepreneurship. In relation to the quantitative analyses, the interviewees were shown the result of one item (see Appendix 4: Figure 45), namely "If I had the opportunity and resources, I would like to start a firm" as this item received the highest mean. The interviewees mainly discussed the topic of resources as this seems to be the relevant aspect. The term resource in general comprises several aspects, though

there seems to be a prevalent usage with regard to financial resources. If someone has all the resources needed to found an enterprise, this leads to a high level of desire to found an enterprise. In turn, absent resources do not necessarily lead to lesser attitudes. However, if some prerequisites are fulfilled, things seem to be easier and so more attractive.

(Social) media

The focus group discussions revealed one topic that has not been intensively discussed in literature so far regarding the topic of entrepreneurship. That is the influence of (social) media on ATB. The interviewees stated that they perceive the topic of founding and start-ups as very present in (social) media. They furthermore emphasized that social media especially promotes the positive aspects of being self-employed, such as of earning a lot of money. Thus, (young) entrepreneurs are presented as idols or role models on social media. Several participants of the focus group discussions pointed out that there is almost no negative reporting or even objective descriptions of the challenges a founder has to face. These findings reveal that it is necessary to provide realistic information about self-employment. Otherwise, there is a risk that people refuse such a career option because they conclude that being self-employed can never be that good.

The interviewees conclude that exclusively positive media reports may create a false image. Consequently, someone who does believe that things are as easy as shown in media might fail as founder as he or she underestimated the immense challenges of running a business.

Social Media greift halt tatsächlich die meisten Leute glaube ich heutzutage einfach ab auf den verschiedenen Plattformen und da sage ich wirklich für mich selber, da ist es einfach zu positiv wie es dargestellt wird und zu einfach.

Engineering students, Pos. 49

9.3.3 Subjective Norms (SN)

In general, the topic SN is seen as very important within the context of entrepreneurship, especially when it comes to the commitment of the family. The

single SN items in the quantitative part of this research did not reveal specific results that were worth discussing in a focus group. Thus, the main focus was to find an explanation as to why SN did not have a statistically significant influence on the development of EI within the mediation model.

Personal milieu

The first subtheme in this section is the personal milieu (a person's social environment). Statements of the interviewees in this context did not reveal who exactly was meant (friends or family members). The focus group participants discussed that the social environment should be understanding and support the plan of being self-employed. Furthermore, they summarized that if someone's social environment contains many founders, a person is more likely to become self-employed. In their opinion, one tends to do the same as others within the social environment. This is, of course, not restricted to entrepreneurship, but covers other occupational decisions as well. The interviewees suggested that working part time and starting a business in parallel might therefore be frequently used in order to find out how the social environment deals with the person being self-employed.

Family

The influence of family on the decision to become self-employed was mentioned several times during the discussions, so this topic emerged as another subtheme. The interviewees pointed out that self-employed parents or other family members enhance the probability of becoming a founder. This is especially the case because financing a business might be easier when there are relatives who support the new founder.

*[...] manche Leute sind ja auch in Unternehmerfamilien
aufgewachsen, und da ist es dann für manche schon vorgezeichnet,
dass sie Unternehmer werden.*

Economic and Engineering founders, Pos. 24

In turn, acting against a social environment that does not think well of being self-employed, is seen as challenging, as it may cause grievance and heavy psychological loading. Furthermore, the family of a founder may suffer. This may particularly affect the spouse and children of a founder. More specifically, being self-employed can mean a heavy workload, resulting in less time to spend with the

family. And if the business is affected by hard financial times, this also has a negative impact on the family and its assets.

Friends

The subtheme dealing with friends as important part of one's social environment was only mentioned once. The interviewee stated that self-employed friends can be a role model and offer insights about being self-employed.

New community

The last subtheme revealed a topic that had not emerged regularly in scientific literature so far. The interviewees were in agreement that a nascent founder can actively build up a community with the aim of receiving objective feedback regarding a business idea. This might be particularly helpful when the social environment does not support self-employment. One has to find out if the business idea itself is bad or if it is the personal surrounding of the person that is negatively biased against the idea. This point was also highlighted by a student interviewee who is not self-employed. This demonstrates that this option of building a new community is also known by entrepreneurially unexperienced persons. Consequently, there is an awareness on how to overcome negative subjective norms. The interviewees suggested that this can, for example, occur by actively seeking contact to founders such as via engaging in specific, sometimes content related, networks. Finally, there is a consensus that the social environment develops over time, especially when one does not have self-employed parents. This seems to be particularly important for the interviewees, as having a group of supporters is seen as highly essential. In contrast, it seems to be difficult to convince one's current personal environment of their own opinion on self-employment.

» [...] ich denke auch in dem Punkt ist einfach auch wichtig, dass im Privat-Umfeld auch vielleicht das Verständnis einfach dafür da ist [...]. Wenn das halt nicht vorliegt, dann lohnt es sich vielleicht manchmal auch in dem Punkt auch sich dann eine eigene Community aufzubauen beziehungsweise das Netzwerk zu suchen, wo sich die Leute vielleicht mit ähnlichen Ideen identifizieren können. «

Engineering students, Pos. 45

This last subtheme offers an explanation as to the contradictory findings revealed in the literature so far. If a nascent entrepreneur is aware of opportunities to build favorable networks, this reduces the relevance of subjective norms caused by family, friends, study peers, and colleagues. This aspect will be discussed in more detail later on.

9.3.4 Perceived Behavioral Control (PBC)

To gain a deeper understanding why the antecedent PBC has not significantly changed during the course of the EE program as analyzed in the quantitative part of this research, focus group participants were shown the results of that analysis. Through this discussion, several subthemes emerged that will be discussed subsequently. The influence or rather the absence of influence of EE on PBC will be discussed in chapter 9.3.8.

Competencies

One important subtheme in the context of PBC is the competencies of the nascent entrepreneur²⁴. The participants of the focus groups discussed that founders may overestimate their own competencies. This is seen as, in some sense, positive because this might raise self-confidence and therefore leads to the positive decision toward becoming self-employed. If someone did not believe that he or she was capable of managing the planned company on the basis of existing competencies, a positive decision to found it would probably not have been made.

» *Also ich glaube, man neigt generell immer dazu seine eigenen* «
Kompetenzen bei einer Gründung zu überschätzen.

Economic and Engineering alumni, Pos. 50

²⁴ This subtheme was not mentioned very often. Thus, there are some interpretative shortcomings regarding the relevance for the *PKS* this research focuses on. However, the author wants to mention that this might be a matter of understanding regarding the term 'competency'. It seems possible that this term is highly used in the context of education and thus not very common outside this field. This is supported by the fact that the terms 'experience' and 'knowledge', which are conceptually partly included in the term competency, are used more frequently.

However, there seems to be a conviction that founders need several different competencies and not everyone can fulfill all of them. As a consequence, the interviewees suggested that professional support could be used to improve weaker competencies. Alternatively, a competency gap can be filled either by booking in external expertise to achieve the desired goals or by hiring a teammate to compensate with the competencies required for the specific business.

Experiences and Knowledge

The interviewees saw experience as highly relevant. They pointed out that the decision to become a founder mainly depends on one's experiences during paid employment. On the one hand, this experience may lead to the conviction that one has all needed skills and competencies. On the other hand, experience can show how many hurdles need to be taken or demonstrate that self-employment seems to raise responsibility.

The difficulty regarding experience, as supposed by the focus group participants, is that it is only by being an entrepreneur that one can gain the real experience. Thus, it seems impossible to truly simulate this experience, leading to an insurmountable gap. This is also underlined by the fact that mainly students mentioned this aspect. Students, therefore, must be supported in gaining relevant experience that is as realistic as possible to develop the necessary self-confidence.

Furthermore, the topic of general knowledge or market knowledge in particular was regarded as important. Such knowledge, both leads to coming up with a business idea and provides the confidence that this idea is good and valid. This is in line with Renko et al. (2012) who found that business founders usually do so later in life and bring in some managerial experience.

» *Aber ich kann mir auch vorstellen, dass eben Erfahrungen, gerade je nachdem in welchen Bereichen man die gemacht hat, einen dann auch dazu bewegen können, dass man eben sagt: „Hey, ich bin soweit, ich habe alle wichtigen Aspekte bisher gesehen, ich habe so viele Erfahrungen gesammelt, ich glaube, ich könnte das jetzt auf jeden Fall machen“.* «

Economic students, Pos. 39

However, the importance of experience and knowledge must be evaluated in relation to the specific working environment. If someone plans to become self-employed in a totally different field, existing experience, and knowledge become less important. This topic was also mentioned in a free-field at the end of the quantitative questionnaire.

Networks

Another subtheme that was brought up by the interviews is the network a nascent founder has. A strong network (perhaps with a thematic focus) is seen as important and can provide the opportunities to make things easier. Experts in a network can add expertise (such as knowledge and competencies) to the business. Additionally, the focus groups discussed several useful aspects that can be reached through a good network, for example, capital, industry contacts, potential co-founders, new employees, and business partners (clients, suppliers, and so on). If a nascent founder is aware enough to have such a reliable network, PBC might be much higher than if such a network is missing.

The interviewees stated that such a network can develop easier or earlier through a work-integrated study format. However, the time needed to develop a strong network was discussed. Thus, career starters might not have this advantage.

[...] im Vergleich mit halt einem normalen Studium, das ich an einer Uni mache, [gibt es Leute] die ebenfalls Industrieerfahrung haben [...], die mehr Expertise da mit reinbringen können, die vielleicht auch Geldgeber sein können unter Umständen. [...] die Wahrscheinlichkeit solchen Leuten, denen gegenüber stehen zu können ist glaube ich exponentiell höher als bei einem normalen Studium deswegen für mich ist glaube ich der größte Unterschieds-Faktor Netzwerk.

Engineering students, Pos. 75

Shared responsibility

Besides the opportunity to add experience and knowledge to one's business through using network partners, the interviewees discussed the topic of shared responsibility in the sense of starting a business with at least one co-founder. This subtheme emerged as important in different ways. First, the focus group participants saw the

chance to add competencies when having a co-founder. This was discussed as a way to enhance business success prospects and therefore increases PBC. This is especially true in case of possible errors, as a second opinion can be helpful in detecting or preventing errors at an early stage. Second, being self-employed means that there is no back-up plan, for example, in case of (longer) diseases. As a consequence, business success may be at risk. A co-founder reduces this risk, which again increases the feeling of overall control. Third, it might be even more satisfying to share the business success in a team—although this aspect does not really affect PBC.

» *Warum ich auch viele kennengelernt habe, die, wenn sie ein Unternehmen gegründet haben, mindestens mal einen Co-Founder mit reingenommen haben, nur aus dem Grund damit sie diese Art von Verantwortung so ein bisschen, ja, traghafter machen können.* «

Engineering students, Pos. 36

The interviewees furthermore discussed that there are advantages and disadvantages when having a co-founder. One disadvantage is that decisions have to be made together, which reduces the degree of freedom a founder has.

Crises, competition, and economic & political challenges

The next subtheme summarizes multiple aspects. All have in common that they are out of control of a business founder to a certain extent. The interviewees for example discussed that market competition could be high or increase over time, customer and supplier structures could change, or new legal or political regulations could be introduced that influence how a business can be run.

» *Aber wenn jetzt zum Beispiel ein Konkurrenzprodukt auf den Markt kommt, dann habe ich ein Problem, dann muss ich darauf reagieren und ob ich das schnell genug kann, [...] kann man nicht selber entscheiden zu hundert Prozent.* «

Engineering students, Pos. 81

The discussion in the focus groups did raise that founders have an influence on the success of their business and that they need to react to a changing environment. However, the interviewees mentioned that there are several external factors, like

the Ukraine war or Covid-19 pandemic that can harm business income and that the founder cannot do anything about.

The interviewees also emphasize that the economic situation has an influence on the development of PBC. This applies in particular to the financing options for start-ups. For example, the interest rate situation depends on the economy. In addition, investors are currently cautious due to sensational negative examples of failed start-ups. In addition, the assessment of potential customers about the economic situation is relevant: Inflation and global uncertainty are reducing purchasing power.

[...] die letzten knapp 10 Jahre waren für Start-ups und Unternehmens-gründung, ich sag mal, mehr oder weniger ja fast die goldenen Jahre. [...] Geld mit wenig [...] Zinsen. [...] Und jetzt gerade die letzte Zeit mit hoher Inflation, Krieg und, ich sag mal, Unsicherheiten in globalen Bereichen, sind glaube ich auch so ein bisschen dafür verantwortlich, dass wahrscheinlich weniger Leute jetzt gründen werden.

Engineering students, Pos. 38

Such external circumstances seem to have a massive influence on the development of PBC as well as on the actual realization of EI. As the quantitative part of this research did take place in an economic phase which can globally be seen as at least tense, this might have led to rather pessimistic estimations of study participants.

9.3.5 Entrepreneurship Intention (EI)

Motivation

A subtheme that emerged in the focus group discussions is the overarching topic of motivation. There is a consensus that high engagement is needed to learn all the necessary things and to deal with regulatory prerequisites. True entrepreneurship intention (EI) possibly derives mainly from intrinsic motivation. However, the interviewees supposed that the motivation to be self-employed may depend on already having required resources, although the effort that must be made does not decrease even if the resources are available. Thus, motivation must be high. The

amount of motivation/commitment for the idea is crucial in deciding how much one is willing to sacrifice.

Interestingly, this topic of motivation as a strong reason for being a founder was only mentioned by interviewees who have not (yet) founded themselves. Founders did not mention this point. A possible explanation might be that successful founders probably do not regret their decision. They might conclude that it was totally worth putting in the effort and the high motivation that has been necessary at the very beginning might have fallen into oblivious memory. In turn, those without self-employment experience do not know if the effort would be worth it.

Entrepreneurial Ideas

A somehow related subtheme is the idea for the enterprise to be founded. The interviewees supposed that this might be the decisive factor why someone changes from extrinsic to intrinsic motivation.

Wenn ich keine Idee habe und nur darüber nachdenke, ein Unternehmen [...] zu gründen, dann stehe ich einfach in dem Fall, glaube ich, eher hinter den Motivationsfaktoren wie vielleicht Ansehen, Unabhängigkeit und so weiter und sofort. Habe ich aber plötzlich eine Möglichkeit oder eine unglaublich tolle Idee, die ich umsetzen will, dann sind [das] komplett andere Motivationsfaktoren, die einen dazu natürlich bringen könnten.

Economic students, Pos. 93

The discussions furthermore pointed out that self-employment provides the opportunity to realize one's ideas. Ideas can emerge from market gaps, so that the product/service either brings advantages compared to existing offers or, as an invention, brings a totally new solution. Being unable to realize such an idea as an employee can be the reason to become a founder. However, even good ideas can become victims of applicable legal frameworks, for example, when there is no permission for a special product under the given circumstances. As a consequence, high EI would suddenly come to an end as the framework conditions do not allow the realization of the idea.

Although the entrepreneurial idea is discussed as crucial element of self-employment, the interviewees also were aware that having a good idea is not the sole aspect that is crucial for success or failure.

This topic was not discussed equally in all groups. The founders themselves did not talk about it at all, maybe because they were convinced that they are following a good idea. It would be interesting to understand whether founders would repeat their decision when being forced to realize a different business idea. Maybe it is rather the chance to earn money and the opportunity for own decisions that causes the highest value. This is in line with the presented reasons in favor of becoming self-employed. Nobody mentioned that working on their own idea is more fun probably because one is aware that there will be challenging and unpleasant tasks. Whether an idea is good or bad, therefore, does not depend on whether the daily work a founder must do is joyful or not. Instead, the idea is evaluated on whether it is seen as promising with regard to business success.

Opinion regarding failure

Another subtheme that was identified through the focus group discussions is participants' opinions regarding failure. There seem to be only two types. Those who are really afraid of failure and those who take a more relaxed view. The formers are afraid of the reactions of others. Achieving bad results in paid-employment does not cause much attention in one's family. Whereas failure as founder always receives some kind of publicity of friends and family, followed by the necessity for justification and to explain the reasons that caused the failure. Furthermore, interviewees discussed the possibility that mistakes and failure may lead to the situation that the founder is in worse situation than before.

The other perspective being discussed is that the worst thing that can happen due to failure is becoming an employee again. This is supported by the point of view that—especially at the very beginning of a new venture when the risk of failure is highest—one can only harm oneself. After failing as founder, you can either find a new business idea to follow or return to being an employee.

» *[...] und wenn das schiefgeht, ist das wahrscheinlich auch okay.* «
 » *Es wäre schön, wenn es klappt.* «

Economic and Engineering founders, Pos. 19

The more optimistic perspective was mainly brought up by focus group participants who were founders. Maybe this mindset, in which failure is always possible and that luck and confidence are needed, is a protective mechanism taken by founders as they reject to face possible threats. One self-employed interviewee reported that his first business perished but he did not give up and founded another one. This opinion regarding failure is, on the one hand, a personal perception. On the other hand, the mindset in this case is also culturally influenced. Based on Hofstede (1980), Germany is rated rather risk-averse. Thus, changing this intentional aspect seems very challenging and hard to achieve within the framework of entrepreneurship education (EE) programs.

Change of EI

Another important topic that emerged in the discussions of the interviewees is that EI is seen as something that can change over the course of time. On the one hand, EI may decrease over time as an employee because one gets into a rut or due to attractive (financial) offerings. Furthermore, being an employee may become increasingly convenient. This is in line with Soria-Barreto et al. (2017) who found that working-experience reduced EI.

*[...] und irgendwann glaube ich auch, dass man [...] als Absolvent
irgendwann auch in so einem Trott drin ist und [...] gar nicht mehr so
weit schauen würden [...] sich [...] selbstständig [zu machen].*

Economic students, Pos. 47

On the other hand, experiences in a company may increase EI. The circumstances as an employee may cause someone to realize that one would do better as a founder and that they have gained experience and knowledge (see also 9.3.4) may lead to higher self-confidence.

9.3.6 Entrepreneurship Behavior

Literature points out that the framework provided by the theory of planned behavior, which supposes a strong relation between intention and behavior, might not be strong for the area of entrepreneurship. Therefore, special attention was put onto this topic during the focus group discussion.

Support

One important aspect that was discussed is the extent of institutional support that a nascent founder receives. The interviewees reflected that there are many aspects of being self-employed that are neither taught at school nor at university. One has to find out for oneself; there is no manual on how to be an entrepreneur. The effort to learn what is needed must be taken by everyone who wants to realize a business idea. While interviewees, on the one hand, discussed the wish for more assistance, they, on the other hand, recognized that there cannot be any support for quitting one's old job.

Es gibt ja keinen klaren Weg, keine klare Anleitung. Jetzt gehst du hier hin, klar zum Notar gehen und so weiter, das kriegt man alles noch hin.

» *Aber darüber hinaus gibt es keine Anleitung. Von daher ist das glaube* «
ich, [...] wo viele Ideen dann einfach auch aufhören an der Stelle.

Economic and Engineering founders, Pos. 39

The wish for more support was mainly mentioned by interviewees who are not currently self-employed. Founders, instead, were conscious of the lack of the support as well, but they retrospectively know that a proper support in some scenarios would not have been possible as the specific challenges and resulting tasks vary highly depending on the type of venture creation. Thus, this might also be some kind of excuse for not becoming self-employed.

This topic is not mentioned by students, probably because they are focused on their study program and thus have not yet taken serious steps toward self-employment. As a consequence, the students probably have no or only limited information regarding this subtheme.

Final Action

Concerning the final entrepreneurial behavior, the interviewees furthermore discussed aspects that influence this very last step. For example, there are several things that need to be done prior to the actual creation of a business, such as market research. The decision to realize the business idea strictly depends on the result revealed by such analyses. In this context the shortcoming of assessing entrepreneurial behavior with the measures supposed by Rauch and Hulsink (2015)

becomes obvious. A nascent entrepreneur may have taken several steps on this list of activities, but the final venture creation may not occur. Additionally, the interviewees supposed that EI can abruptly decrease as soon as one realizes which (legal) hurdles have to be taken before actually being self-employed. It may take months or even years to deal with the founding procedure. This again demonstrates the very high commitment and passion that is needed on the way.

The interview participants concluded that it finally comes to the decision 'yes or no'. This represents a sticking point. The final achievement *to be a founder* might be attractive for many people. But putting in the effort is a different thing.

» *Also das ist ein großer Unterschied zwischen erstmal eine Idee haben, eine Vision irgendwas zu verwirklichen und dann tatsächlich auch in die Umsetzung zu gehen und all die Stolpersteine und Meilensteine [...] mitzunehmen und in Realität dann das Ganze auch nachhaltig langfristig zu verfolgen.* «

Economic and Engineering alumni, Pos. 111

Respondents also discussed the possibility of starting a business as a sideline. Although the hurdles would not be lowered, there would be the opportunity to gradually approach the ultimate goal of starting a business. In this case, delays or setbacks will have less impact during the course of working life.

Unexpected opportunity

As already discussed, EI for venture creation can vanish suddenly due to different reasons. However, the reverse can also occur, as discussed by the interviewees. Possible triggers for founding a company can be either a favorable opportunity or a good idea that wants to be realized unconditionally. This is in line with Shapero and Sokol (1982); they suggested that there might be events that trigger the decision to start a business venture.

Such an opportunity can be offered to someone unexpectedly and may lead to the sudden wish to be a founder.

Ich hatte dann einen bekannten Kumpel mit dem ich mal zusammengearbeitet habe, [...] der mich gefragt [hat], ob ich dabei bin. [...] Wenn er [...] da jetzt nicht gewesen wäre, mein Mitgründer, dann hätte ich das sicherlich nicht gemacht. Also ich hätte auch gar nicht gewusst was.

Economic and Engineering founders, Pos. 45

Also, a good business idea often comes out of nowhere, for example, based on daily challenges that cannot be solved so far. As already discussed, this may also massively increase the intention to become self-employed.

These examples demonstrate that a measured intention to start a business may be very low at a certain time. However, intention and the related subsequent behavior may suddenly develop.

Influencing factors

The discussions of focus groups' participants also revealed influencing factors that are partially already present in scientific literature. For example, the effect of age was discussed, with the result that age can have a positive or negative influence. Discussing this aspect did not reveal new insights that could nurture future research. The interviewees also discussed the influence of gender and concluded that men usually are more likely to become self-employed, which is in line with most literature.

One point was brought up that has so far received less research interest as a potential control variable in quantitative analyses. That is the influence of having children. Children lead to certain obligations, inter alia regarding financial commitments. Especially young children may decrease the intention to become self-employed. Possible reasons include reduced flexibility due to a high workload (which reduces time with the young family) but also the mental strain of securing an income.

The interviewees of all focus groups also discussed the influence of having sufficient starting capital or not. This is, for example, a restriction with regard to the very first decision as to which legal form should be chosen for a company. The intent to become active as a nascent founder might be very low if someone knows that there are no financial resources available and everything must be collected beforehand. Although applying for funding can be an opportunity for people without their own resources, the interviewees concluded that those are hard to get and that one might

refuse to take external money. This consequently reduces possible engagement with regard to the behavior of venture creation.

[...] ich brauche nur einen Computer mehr oder weniger, aber trotzdem musste ich tatsächlich erstmal eine fünfstellige Summe investieren [...] und das muss man auch erst mal haben.

Economic and Engineering founders, Pos. 41

9.3.7 Personality Traits

The influence of personality traits on the development of EI has been intensively discussed by scholars. Therefore, this thematic focus was also set for the focus group discussions and the subsequent content analysis. During the coding process several personality traits emerged as being relevant. At this point, it is important to notice that possessing a specific trait does not always constitute a favorable condition. There are also personality traits that may hinder becoming or wanting to become self-employed. This section only presents those aspects that have received less scientific attention so far. Furthermore, traits that have been mentioned by interviewees less frequently were also excluded from in-depth content analysis²⁵.

General aspects

The interviewees recognized that, in general, personality plays a crucial role. They discussed that personal prerequisites influence how someone handles the challenges of being self-employed. Although there is an agreement that some traits enhance the probability of venture creation, it seems hard to assign specific personality traits to specific types of entrepreneurship. More specifically, the interviewees did not identify any characteristics that distinguish founders of a copycat²⁶ from founders with high-tech inventions.

²⁵ The following personality traits were mentioned in the discussion but were not analyzed in-depth: solution-orientation, eagerness to experiment, striving for recognition, loading capacity, assertiveness, discipline, team spirit, creativity, ambition, decisiveness, confidence, self-reflection, and risk taking.

²⁶ A copycat is a startup or company whose idea has been taken over by another company or startup and only slightly modified, if at all. It is therefore an imitator of an existing idea Herzog (2016).

Ich wollte noch die, sage ich mal, die psychische Konstitution ins Felde führen. Ich denke, [...] die muss man einfach mitbringen ansonsten wird es eine Qual.



Economic and Engineering founders, Pos. 50



During the discussion, the point came up that people may underestimate to what extent certain personality traits are needed as a founder. For example, if one of the reasons for self-employment is that one believes being self-employed is a way of dealing with a lack of discipline, this may not be the case, as a founder needs to be even more disciplined.

The interviewees saw personality traits as more important than specific expert or technical knowledge as a founder has the possibility to get such expertise from external sources or to build up required knowledge.

Resilience

One personality trait that emerged is resilience. Resilience describes the ability to cope mentally and emotionally with a crisis (Terte & Stephens, 2014). This aspect was indeed only discussed in the group of founders, which highlights the importance. A related concept is the individual perception of pressure, which also depends on one's personality. In this context, the topic of self-assessment was raised. Before one becomes self-employed, it seems almost impossible to imagine what it will actually be like. As a result, one may have to admit to having misjudged oneself once in the situation. This again demonstrates that individual experiences or perceptions are context-bound.

Das heißt, das Fachliche kann ich mir aneignen. Ich glaube, es geht mehr um die Eigenschaften als Person. Psyche wurde angesprochen, aber auch das Thema Resilienz.



Economic and Engineering founders, Pos. 54



Passion

This personality trait already emerged within the discussion of other subthemes. But, as the interviewees regularly mentioned this aspect, it seems appropriate to separately discuss this trait. Furthermore, this trait seems to be relevant in different shapes.

First of all, it seems that passion for the business idea is necessary to make the final decision to become a founder. Knowing that it is possible and wanting to follow one's own ideas as a founder seems to be more important than the desire to make a lot of money.

Besides this initial element of passion for the idea, the interviewees also see the necessity for founders to overcome several resistances. To successfully do so, passion seems to be the crucial trait to get through tough times.

Additionally, the focus group participants discussed that the business may become even more important than family and friends, at least sometimes. Willingness to accept this shift demands high passion. Souitaris et al. (2007) said one must 'fall in love' with the entrepreneurial career.

Interestingly, this topic was not mentioned by founders. Instead, mainly men from the engineering field talked about this trait. The latter can possibly be explained by the widespread stereotype of engineers as tinkerers who forget time and space when they are working on an idea.

Braveness

The interviewees discussed the personality trait of braveness in some relation to that of ambition. In the context of self-employment and entrepreneurship, both traits are regarded as positive. However, ambition may not always be entirely positive when it comes to other situations.

Braveness is discussed in the focus groups as a crucial factor to finally make the decision to become a founder. This trait outperforms other arguments and influencing factors. Without braveness, no venture creation seems possible at all.

» *Also Gründen, denke ich, dafür braucht es einfach Mut.*

Economic and Engineering alumni, Pos. 51



Again, this topic is not mentioned by the founders and is only talked about by men. The latter seems quite obvious as braveness is commonly perceived as a trait that is possessed in greater amounts by men. Men may therefore be inclined to emphasize this trait. One possible explanation as to why founders do not mention this aspect could be that they are looking back on a currently successful venture creation at the time of the interview. Therefore, the interviewed founders might not

remember how important these personality traits were in the initial phase. This effect has been described as 'rosy retrospection bias' (Mitchell et al., 1997).

Legal awareness

In Germany, there are a lot of legal aspects that you need to be aware of as a founder. This is also emphasized by the interviewees. Ignoring or being unaware of such regulatory frameworks can lead to serious situations as a founder. Thus, the desire to fulfil legal requirements causes high pressure.

This means that having less legal awareness as a nascent founder can be supportive in taking entrepreneurial action, potentially due to a belief that everything will work out in the end.

» *Das heißt, es ist schon eine/ eine ganz große Last, die da auf*
einem ist, wenn man es irgendwie rechtskonform alles machen «
möchte

Economic and technological founders, Pos. 37

9.3.8 Entrepreneurship Education (EE)

This section gives insights regarding the experiences of by students and graduates of Steinbeis University. The interviewees shared their impression of the project-based and work-integrated study program. Thus, the interviewees could directly connect their studies with the educational objective of developing EI.

The important aspect of deriving recommendations to improve the *Projekt-Kompetenz-Studium* will not be discussed in this section. This topic will be presented in-depth in chapter 11.1.

Project

Regarding the project that the students worked on during their studies, the interviewees appreciated this approach because it gave them the opportunity to explore for themselves how such business projects are implemented. They were able to accompany a project from the very beginning to the end with responsibility transferred to them. Thus, they learned what it means to manage a project and, also, to bear the consequences for decisions they made.

In addition, the interviewees discussed recognizing that each project is different and that it is not a case of 'having seen one, you have seen it all'. As the students also get to know the projects of their peers, through groups works and discussions, they found that learning by doing is necessary in every single project. Furthermore, the focus groups discussions revealed that the students realize that theory regularly differs from practice.

However, the interviewees discussed that realizing a corporate project within the study program fundamentally differs from being self-employed. One aspect in this regard was the fact that being self-employed never comes to an end. Although founders can, of course, experience success, having one's own company means that the results can always be even better. Thus, success is seen as a relative value. In particular, the focus group discussion with founders revealed that being self-employed comprises much more than solely realizing a project.

»
[...] nur weil jetzt ein Projekt bei der SIBE so verläuft und ich auch einen Erfolg sehen kann, heißt das nicht, dass wenn ich dann eigenständig ein unternehmerisches Projekt auf die Beine stelle, es dann genauso klappen wird.
«

Economic students, Pos. 114

Content

In addition to the personal evaluation of the study-integrated project, the interviewees also discussed their impression of the content taught in relation to entrepreneurship. This revealed that seminars on topics like marketing, finance, or even innovation management are not really perceived as related to entrepreneurial activities.

The interviewees concluded that there is a lack of information on basic legal frameworks and requirements, such as legal forms for businesses or trade registration. The Master's programs provided by Steinbeis University offer a lot of examples and best practices, as well as some relevant seminars but this is seen as rather superficial by the interviewees.

»
[...] mit einem MBA Studium, ich meine, da kratzt man ja jedes Thema nur an der Oberfläche an.
«

Economic and Engineering founders, Pos. 54

The focus group discussion also revealed that there is an understanding that there are tasks and duties of a founder that cannot be taught. There are aspects that each founder has to figure out for him- or herself.

This topic is not mentioned by students who participated in the focus group discussions, which can be explained by the fact that they have not yet completed their studies and therefore do not know for sure which content might still be missing.

Influence

Based on the focus group discussions, it was possible to derive insights how the project-based and work-integrated format of Steinbeis University study programs might impact the development of intention to become self-employed.

First, the positive influence shall be presented and discussed. The interviewees mentioned that the Master's program provided practical business market knowledge without being limited to theory. They got to know processes within companies, thus the program showed that business success depends on several important aspects and that it is not solely the quality of the business idea. For some interviewees, this new insight marked the thought-provoking impulse to become self-employed. Furthermore, the structure of the program provided useful conditions. For one thing, the work-integrated format offered the possibility to develop professional expertise, which may lead to enhanced self-confidence and the belief that one may master the challenges of self-employment. This is achieved through the project-focus that demonstrates that learning by doing is an important aspect in life. Additionally, the interviewees appreciated the scientific project approach, as the ability of keeping a holistic view and applying structured approaches was fostered. Thus, applicants for a Steinbeis University Master's program who have never previously thought about self-employment gain experiences and become aware of the opportunity.

[...] ich habe 2005 mein MBA Studium damals bei Steinbeis abgeschlossen und der Initial-Impuls überhaupt Unternehmer zu werden, kam tatsächlich durch das Studium, weil ich einfach gesagt habe, ok, zwei Jahre Theorie, ich habe Lust irgendwie das mal voll auszuprobieren.

Economic and Engineering founders, Pos. 15

The other thing is that some students gain their very first working experience within the program. This may lead to the insight that working for others is not satisfying enough or that the heavy work-load is challenging providing fertile ground for the presented opportunities for self-employment.

Second, the interviewees also discussed unintended or possible negative outcomes of the Steinbeis University program. First, applicants who were already interested in self-employment before starting the Master's program might realize that there are attractive opportunities working for a corporation. Second, the program might demonstrate that one has less knowledge than expected, at least for some topics. This would be in line with the result that EI declines for students in their first and second semester.

In summary, the study program provides knowledge on the subject of founding a company. The participants of the focus group discussions pointed out that the effect of this mainly depends on the prior expectations, experiences and career plans. As a consequence, some perceive the new insights as positive and others as negative while taking the same educational program.

[...] manche [...] sagen, oh, jetzt habe ich so viel mehr Wissen, ist ja viel komplizierter und komplexer, wie ich gedacht habe, deswegen mache ich es nicht. Und die anderen, auf den gleichen Inhalt reagieren darauf, danke, dass ihr mir das gesagt habt, das ist ja ganz einfach, ich habe es mir noch viel schlimmer vorgestellt und deswegen mache ich das.

Economic and Engineering founders, Pos. 105

This discrepancy was mainly present in the focus group discussion with the founders. One interviewee had the perception that the advertisement for the Steinbeis University Master's programs focuses on self-employment and therefore attracts applicants already interested in becoming self-employed.

However, the work-integrated format and, partially, big corporates as partnering companies may attract applicants who hope for the chance to stay with the company after finishing their Master's program. Such applicants, in contrast, bring a rather low interest in becoming self-employed.

*Ich hatte vorher null Komma null Gründungsabsichten und durch manche
 » [...] Seminare war das ein bisschen geweckt, Bewusstsein dafür «
 geschaffen, dass das überhaupt möglich ist.*

Economic and Engineering founders, Pos. 75

Besides the prior interest in venture creation, the interviewees were mainly in agreement that applicants to Steinbeis University are highly ambitious, as the work-integrated format leads to a high workload. Furthermore, a high interest in research was noted, which allows the assumption that applicants possess higher levels of curiosity and have the desire to realize their potential. Such characteristics have a certain connection to the topic of entrepreneurship, in this case clearly also comprising intrapreneurship.

Changes in EI and Antecedents due to EE

Next, the influence of EE on EI and its antecedents shall be presented. To facilitate discussion on this subject, the quantitative results of this study were shown to the interviewees during the focus group discussions.

For EI, the graph for overall intention was presented (see Appendix: Figure 47). This figure shows a decrease of EI over time from applicant to students in their 1st/2nd semester followed by a moderate increase for students from 3rd/4th semester before decreasing again for alumni. The interviewees suggested that the first decrease can be caused by the realization how incomplete and insufficient one's knowledge is, thus applicants' high level of self-confidence vanishes. As the course progresses, this self-confidence increases as learning occurs. At the same time, the high workload, especially towards the end of the study program, may lead to interest in self-employment as this promises a more flexible and self-determined working environment. The decrease of EI for alumni is probably caused by the relief of this pressure after finishing the studies. Furthermore, graduates often find themselves in a comfortable position because many students get the chance for a permanent position in the company after their degree.

Also, the results for the lowest ranked item EI3 "I will make every effort to start and run my own firm" were presented (see Appendix: Figure 48). Although on a slightly lower level, the graph shows the same up and down with means of around 4.5 for

applicants and 2.0 for alumni. The curve is similar for item ATB3 “If I had the opportunity and resources, I would like to start a firm” (see Appendix: Figure 45). However, this item achieves much higher means, with close to 7.0 for applicants and 5.0 for alumni. In this context, the interviewees again pointed out the relevance of existing resources. This seems to be one of the decisive factors in whether or not someone develops EI.

The interviewees also discussed two graphs showing PBC (see Figure 32 and Appendix: Figure 46). The overall mean for PBC is rather low and shows a slight increase only for students in their 3rd/4th semester. For the item PBC5 “I know how to develop an entrepreneurial project”, the level is somehow higher. Additionally, a marginal increase occurs from applicant to 1st/2nd semester students. The interviewees discussed recognizing that each project is different. As the students also get to know the projects from their peers, through group works and discussions, they stated that learning by doing is necessary in every single project. Furthermore, the focus groups discussions revealed that the students realize that theory regularly differs from practice. Students also learn that it is not only the business idea that is important. Several external factors influence business success and not all of them can be controlled. Consequently, EE can provide the knowledge and strategies on how to deal with such contextual and environmental influences.

Value for companies

The interviewees also discussed how the Steinbeis University programs might be evaluated by the companies that provide the work-integrated setting. The assumption is that these companies benefit from the realization of an innovative project within the study program. Furthermore, companies benefit from the ideas, competencies and the knowledge derived from the program, as those can also be used in a corporate setting.

[...] ich habe [das] duale Studium gemacht in Innovationsmanagement.

» *Und klar, für meinen Chef war super, dass ich direkt irgendwas* «
entwickelt habe, dass ich so viel mitgebracht habe

Economic and Engineering founders, Pos. 73

Furthermore, one founder precisely stated that within his own company he appreciates entrepreneurial thinking as those employees need less guidance. In addition, entrepreneurial thinking is seen as relevant for leadership positions.

[...] mein Anspruch [...] an Mitarbeitende bei mir im Unternehmen [ist], dass sie unternehmerisch denken können. [...]. Das heißt ja nicht >> jeder, der jetzt unternehmerisch denken kann oder agieren kann, dass << er dann auch wirklich selber gründet. Aber ich denke in jeder Führungsfunktion [...] hilft es aus meiner Sicht [...].

Economic and Engineering founders, Pos. 135

9.3.9 Intrapreneurship

The previous section has shown that companies benefit from the EE that employees have received. Although only a minority of graduates start ambitious enterprises, most young people who have gone through EE could use their acquired entrepreneurial knowledge and skills in many professions and organizations, and so raise the level of expertise and innovation in small and medium-sized companies and all different types of organizations (Draksler & Sirec, 2021). Thus, this builds a link to the related but somehow delimited topic of intrapreneurship.

Prerequisites in companies

The first subtheme that emerged within the focus group discussions regarding intrapreneurship refers to the necessary prerequisites within companies. The interviewees said that the whole company must be ready for intrapreneurship, including the willingness to take risks. There seem to be more or less favorable corporate structures. For example, establishing corporate start-ups was suggested as adequate measure. Big corporates regularly seem to have too strict guidelines and thus hinder innovation or intrapreneurial activities. Furthermore, leadership, corporate culture, and hierarchies are seen as meaningful as there is a need for adequate communication regarding sharing information on personal competencies and strengths to foster innovation.

» *[Entrepreneurship ist] innerhalb eines Unternehmens eine sehr schwierige Angelegenheit, weil dafür muss das ganze Unternehmen bereit sein und [...] alle Mitarbeiter und Vorgesetzten.* «

Engineering students, Pos. 61

Nevertheless, the interviewees pointed out that the degree of satisfaction resulting from intrapreneurship may depend on the person's personality. People who are really interested in founding probably do not want to work for a big company even if they would have good opportunities to shape corporate future through implementing innovations or as an intrapreneur. This brings us to the personal advantages and disadvantages of being self-employed.

Personal motives

One perspective is that intrapreneurship offers a great opportunity to realize ideas without having the final responsibility for decisions and without a lot of pressure. In addition, the interviewees discussed that there is a much higher financial security as an employee and therefore intrapreneurial activities are less risky and the impact on the personal life is much lower compared to being self-employed.

As an intrapreneur, one's curiosity can be explored, which is satisfying on a personal level. Related to this, the interviewees discussed the advantage that intrapreneurial activities usually come to a planned end, meaning success can be evaluated and learning can take place in a structured way. In contrast, founding a firm does not have a foreseeable end and always continues.

In addition, it seems to be easier to get support for activities within a company, and to integrate the expertise, knowledge and skills of colleagues. For example, when it comes to legal regulations there might be an expert within the company who takes over this task. Thus, as an intrapreneur, it is not necessary to deal with every single aspect that is needed to realize an innovation.

Personal disadvantages

There are two main points that were mentioned by the interviewees regarding disadvantages that may occur for someone who engages in intrapreneurial activities. One thing was that, as an employee, it is not always possible to have full control of the realization of innovative ideas. As implementing innovations is a matter

of company budget, personal activities can be fruitless. The second thing is that the person who is responsible for an intrapreneurial activity is not always the one who gets the reward. Ideas sometimes are stolen by supervisors, meaning the person with the ideas gets lost and acknowledgement is missing. In the end, the result can still be positive if the goal of creating an innovation has been achieved.

Both points may lead either to the employee's decision to become self-employed as this somehow ensures that ideas can be realized or the employee terminates his or her intrapreneurial activities.

9.4 Discussion of the Effect of Entrepreneurship Education

This section deals with the discussion of those results that have special relevance for the design of entrepreneurship education programs, their influence, and their effectiveness. Particular attention is paid to newly emerging aspects which have not received extensive research interest so far. These aspects add in-depth insights and perspectives. Furthermore, the discussion provides explanations for former partially inconsistent findings. This especially is the case as recent literature performed few qualitative analyses and thus cannot provide deeper explanations (see results of the systematic literature review (SLR) in chapter 6).

Attitude toward the behavior (ATB)

Most of the studies analyzed in the SLR confirm the positive influence of ATB on the development of EI (Padilla-Angulo et al.; Shah et al., 2020; Varamäki et al., 2015). The interviewees did not present any opposing opinions. However, not all studies report a positive effect of EE on ATB. For example, Fretschner and Weber (2013) found that EE enhances PBC, but not SN or ATB.

The focus group discussions revealed some doubts regarding the true nature of self-employment. This consequently is connected to either positive or negative ATB. EE can have a valuable effect by providing deep insights into how the self-employed life and the daily business of a founder actually looks. This is a prerequisite to develop a realistic view in order to enhance one's ATB based on an individual evaluation.

Subjective Norms (SN)

Past research revealed contradictory results for this variable. For example, Varamäki et al. (2015) could not confirm the explanatory power of SN in their data, while Engle et al. (2010) supposed in their multi-country study that theory of planned behavior antecedents may vary but that SN is consistently a contributor to EI. Rauch and Hulsink (2015) argue that SN, as beliefs of friends and family, cannot be influenced directly by entrepreneurship education.

The results of the focus groups' discussions show that family and friends play an important role for the development of EI, while study peers and colleagues did not play a role in the discussions. There is a consensus that founders need advocates for their ideas and plan.

However, and more interestingly, the opportunity to seek out a positive community emerged. Nascent founders perform easier with social support and thus can actively seek new contacts. This might be advisable when their personal surrounding otherwise has reservations regarding the idea of founding a business. New contacts provide a more objective and external perspective on the business idea, while possibly providing professional expertise as well. This reduces the relevance of SN to some extent, as family, friends, study peers, and colleagues lose importance and can be supplemented with relevant professional contacts.

With regard to EE, the building of a new community can be actively supported. Educational institutions may offer platforms or events for their students to promote contacts. This would add to a positive social surrounding which then may have a positive effect on individual SN.

Perceived Behavioral Control (PBC)

The importance of a favorable social environment, including seeking a new community, has a direct link to the variable PBC. The focus group discussions revealed that one's personal network may have a massive influence on the evaluation of individual PBC. A useful network may provide expertise, knowledge, and business contacts, who can, for example, help in receiving funding as well as providing contact to possible customers and clients or suppliers. The interviewees stated that such a network can develop more easily or earlier through a work-integrated educational format, which thus represents an unquestionable advantage of programs offered by Steinbeis University.

A strong network can only develop over time. Thus, career starters cannot have this advantage. This is a possible explanation for the time lags between intention and behavior that are presented in the literature. While a valid network is missing, EE programs might not result in high EI immediately after the program (Kolvereid & Moen, 1997) or even entrepreneurial behavior (Reynolds, 1994).

This network aspect is related to another important topic. An individual's PBC might be higher when having a partner or co-founder for the planned business. Sharing responsibility and adding competencies leads to the perception of reducing risk and thus enhances PBC. Educational institutions can actively and efficiently provide networking opportunities, including dedicated activities with the aim to find co-founders or partners. In doing so, at least those EE participants who do not wish to become self-employed without support by a co-founder have the chance to find a fitting partner.

An individual's PBC also depends on the knowledge they have gained as well as their experiences made during an educational program. EE can increase PBC by enhancing beliefs about one's ability to engage in entrepreneurial behavior, for example, by providing mastery experiences in entrepreneurship-related tasks (Kuehn, 2008). EE participants start the program with different levels of knowledge and experiences as well as with different expectations. EE may cause people to become aware of their weaknesses, which reduces their self-confidence and subsequently PBC (von Graevenitz, Harhoff, and Weber 2010). Furthermore, some participants may lose their excessive optimism about entrepreneurship and therefore reject the idea of becoming an entrepreneur after the program (Oosterbeek et al., 2010). Contextual factors that influence PBC are current crises and the economic situation. Founders must deal with such situations that occur out of the blue; however, they are not able to have full control. EE programs cannot change these circumstances, but an EE program can consider current situations. As a consequence, a special focus can be placed on acquiring resilience strategies and on providing knowledge on how to handle crises.

The project-based approach from Steinbeis University offers the chance to gain real world professional experience within a safe framework to learn and to reflect. Students learn what it means to manage a project and to bear the consequences for decisions they made. However, the course of the project as well the conditions within

the company or the team are to a high degree out of control from Steinbeis University. To summarize, PBC can be influenced by contextual factors like education and (past) experiences (Hollenbeck & Hall, 2004; Markman et al., 2002).

Entrepreneurship Intention (EI)

Participants of EE programs bring a certain extent of EI from the beginning which might be either low or high. Varamäki et al. (2015) showed that this initial level of EI is relevant to evaluate the effectiveness of EE program (at least for compulsory programs), which contain participants with different levels of EI. EE must, on the one hand preserve high levels of EI while, on the other hand, aim for actively increasing lower levels of EI. Assessing EE participants' level of EI is therefore not only relevant to evaluate program effectiveness. Institutions offering EE programs might even adapt the didactical approach offered to the participants based on their individual level of EI.

Regarding the development of EI, a person's business idea has a lot of relevance as to whether the person will accept the high effort necessary. High commitment to a passionate idea is either given or not. This relevance is also underlined by Souitaris et al. (2007, pp. 586–587), who found that it is the emotional 'chemistry' between the individual and the business idea which affects the decision to exploit; 'falling in love' with the entrepreneurial career is rather driven by emotion and personal preference than by rational evaluation. EE has a good influence on the development of ideas. It can offer ideation or design thinking elements dedicated toward idea generation. It can also link toward the previously discussed networks and communities, connecting people with similar interests, which may enhance the probability to uncover ideas. This seems to be even more important as the topic of business ideas is only mentioned by interviewees who have not (yet) founded a venture themselves. This means that founders lose the awareness of this topic, maybe because they are already in the process of realizing their idea and thus taking this aspect for granted.

Entrepreneurship behavior

The results of the focus group discussion revealed a high consensus regarding the final action, more precisely new venture creation. Although EI might be high and although there might have been activities toward self-employment for example

related to the list provided by Rauch and Hulsink (2015), final venture creation does not necessarily take place.

The reasons for this emerged within different thematic settings. First, taking steps toward self-employment, such as performing market analyses may result in immediate termination of entrepreneurial behavior depending on the retrieved results. Second, it is necessary to have the required resources, including starting capital. Third, as mentioned, the economic situation should be favorable as it affects funding possibilities or overall purchasing power. Fourth, and maybe most important as this aspect cannot be changed in the short term, the personal and family situation is decisive. If the family situation does not allow high commitment to a venture, intentions come to an end. For example, having financial obligations to children or banks in the form of loans may lead to the realization that venture creation is not possible at that time. There are important contextual issues that cannot be influenced with regard to entrepreneurship education programs, yet nevertheless affect the outcomes of entrepreneurship education (Ettl & Welter, 2010).

Summary of most relevant factors influenced by EE

The qualitative part of this thesis revealed highly relevant insights on the design of EE programs and on the variables that influence their effectiveness. Figure 38 shows that EE may have a positive influence on all three antecedents of behavior namely attitude toward the behavior, subjective norms and perceived behavioral control. With regard to ATB, the crucial role of EE is to provide a realistic view on tasks and responsibilities of a founder. This especially is important as social media might glorify how self-employed people live. This aspect has not received research attention so far.

For SN, the qualitative analysis revealed that EE can actively support building or finding a new community for nascent entrepreneurs. Such a community can provide a balanced perspective on entrepreneurial ideas by giving unbiased feedback (in comparison to family members and friends). This aspect has also not been present in literature until now.

Concerning PBC, several aspects were found to be influenced by EE. Participants gain knowledge and experience, representing the primal objective of educational programs. Furthermore, work-integrated educational settings especially provide the

chance to build robust business networks or to find co-founders, which facilitate venture creation and successful operation. This last aspect again has not found intensive research interest so far.

Finally, EE may also positively influence idea development, which represents the core of entrepreneurship intention. Dedicated activities, such as workshops or ideation sessions, may lead to a business idea that catches the participant on a highly emotional level, resulting in a strong intention to realize this idea.

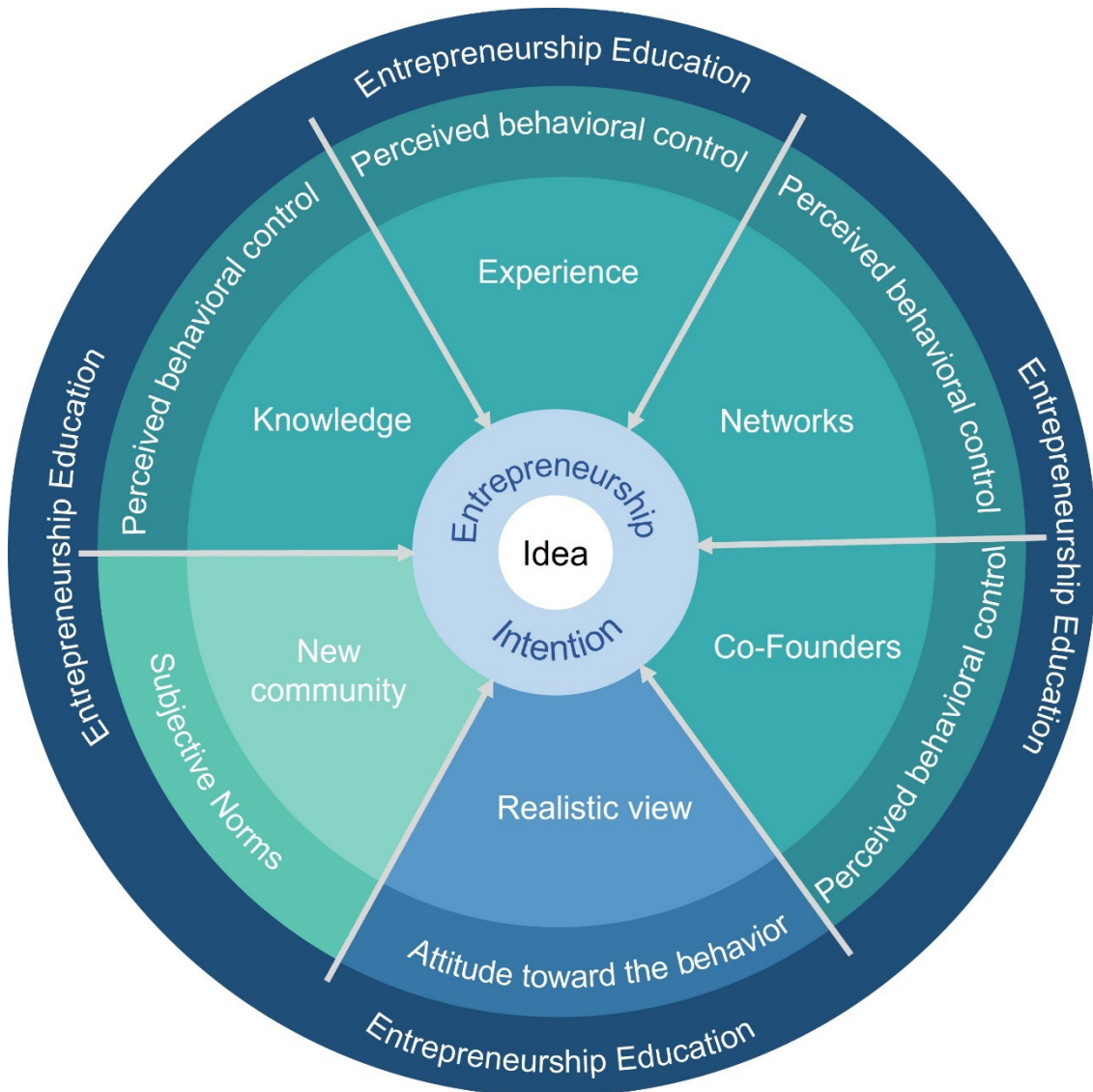


Figure 38 Schematic presentation of the most relevant factors influenced by EE (own illustration)

CONCLUSIONS

10 Consolidating Discussion of All Results

This final discussion will reflect on all retrieved insights and results, thus combining perspectives from literature, quantitative analyses as well as in-depth qualitative data. In doing so, the research questions presented in chapter 3 will be brought into a larger context.

Entrepreneurship definition

European countries promote entrepreneurship to foster economic growth and job creation (Audretsch et al., 2007; Lackéus, 2015; Urbano et al., 2019). However, the differentiation between entrepreneurship and self-employment is not precise. Entrepreneurship definitions vary between rather narrow and notably broader approaches. The latter is, for example, represented by Shane and Venkataraman (2000), who see entrepreneurship as the realization of value and profit for organizations by identifying business opportunities and exploiting them. In a narrower perspective, entrepreneurship was defined solely as the creation of new ventures.

This unclear definition represents one noteworthy issue that has been identified in this research. Not only scientific consensus is missing but also the general public's understanding seems to lack clarity. This is still the case within the narrower perspective of venture creation. As the focus group discussions revealed, some would describe someone as a founder when he or she starts a high-tech company while others consider opening a bakery as entrepreneurial as well. Thus, participants of entrepreneurship education (EE) programs may enroll themselves in such programs for a variety of reasons. As a consequence, educational goals must be defined more precisely as prerequisite for assessing a program's influence: also, scientific questionnaires aiming for program evaluation must be more precise.

This is in line with the discussion presented by Sitaridis and Kitsios (2017), who argue that different entrepreneurship definitions can cause unexpected results or complicate interpretation. Therefore, they call for more accuracy regarding terms and definitions.

The Theory of Planned Behavior to assess Entrepreneurship Education's Effectiveness

It is important to identify the mechanisms that influence the development of entrepreneurship intention (EI) as such knowledge provides the opportunity to conceptualize relevant entrepreneurship courses or programs for future entrepreneurs (Edelman et al., 2008).

Attitude Toward the Behavior

Most studies analyzed in the systematic literature review confirm the positive influence of one's attitude toward the behavior (ATB) on the development of EI (Padilla-Angulo et al.; Shah et al., 2020; Varamäki et al., 2015). However, not all studies report a positive effect of EE on ATB. For example, Fretschner and Weber (2013) found that EE enhances perceived behavioral control (PBC), but not subjective norms (SN) and ATB. Vuković et al. (2016) analyzed how ATB changes during a course of study and were able to show a significant change of ATB for students in a higher year. Interestingly, they also reported lower levels for ATB, SN, PBC, and EI for second year students compared to first year students, although this decrease failed to reach statistical significance. This initial decrease is in line with the findings of this research that show ATB and EI decrease shortly after the start of the program.

For the quantitative part of this research, ATB could not be included in statistical analyses due to problematic results for correlation and factor loadings. However, descriptively analyzing single items showed large differences with regard to item means. The item with the highest mean was: "If I had the opportunity and the resources, I would like to start my own business" (5.019). The item "Among various options, I would rather be an entrepreneur" obtained the lowest mean (3.874). This shows that, for this sample, attitude in general was somehow good, but being an entrepreneur is not seen as the single best career option. The reason for this might be missing resources (such as finance) as revealed within the focus group discussions. This is in line with results retrieved by Lichtenstein and Brush (2001) highlighting the relevance of available resources. Furthermore, the interviewees suggested that immense bureaucratic effort may lower ATB, which is enhanced by attractive paid-employed opportunities the German labor market currently provides.

A topic that has newly emerged in the interviews here is the influence of social media. Postings of successful founders are predominant while neutral reporting is rare. High ATB and thus EI for the applicants to the EE program in the quantitative part could be a result of lacking maturity to evaluate the credibility of such social media postings. Experience is gained over the course of the EE program, leading to the awareness that the enthusiastic founders seen in media might be only one side of the story. Against this background, EE plays a decisive role in conveying a realistic view and can thus also foster the positive development of ATB.

Subjective Norms

Several researchers have found unexpected results regarding SN. For example Varamäki et al. (2015) could not confirm the explanatory power of SN in their data. while Engle et al. (2010) supposed in their multi-country study that theory of planned behavior antecedents may vary but that SN is consistently a contributor to EI.

The quantitative part of this thesis revealed a low negative, but not statistically significant effect of SN on EI. The item dealing with the influence of colleagues received the lowest mean. This can be a hint that this social group plays a crucial role for participants of a work-integrated EE program. Colleagues who have been with the company for a long time may have reservations regarding entrepreneurship and self-employment. However, the interviewees did not emphasize such a relation.

Instead, the new topic of building communities emerged during the focus group discussions. If a nascent founder is aware about the opportunity and the relevance to build favorable networks, this reduces the influence of SN caused by family, friends, study peers, and colleagues. Thus, this can be an explanation as to why the quantitative part of this thesis failed to demonstrate the impact of SN on the development of EI. Based on this result, the conceptual framework of SN within the theory of planned behavior should be extended by the possibility to build new communities, at least in the complex context of entrepreneurship. Against this background, it is indeed possible, contrary to the opinion expressed by Rauch and Hulsink (2015), that EE influences the development of SN by supporting community building. The crucial role of such new communities is to provide neutral feedback regarding a business idea. If this is the case, this aspect of SN can also have positive influence on ATB and PBC. This, for example, was shown by Sun et al. (2017).

Perceived Behavioral Control

PBC is a variable also showing contradictory results in literature. Some researchers could not find differences in PBC over different years of studies in an EE program (Vukovic et al., 2015), but showed that PBC is a reliable predictor for EI (Padilla-Angulo et al.). However, Y. Zhang et al. (2014) could not find a positive influence of PBC on EI, while Otache et al. (2021) could not show a mediating effect of PBC.

In the quantitative part of this thesis, PBC stays rather low in overall mean (3.926), but shows a positive and significant influence on EI. However, EE does not have a significant positive influence on PBC. A reason for this could be that EE reveals personal shortcomings (von Graevenitz, Harhoff, and Weber 2010), which may even reduce PBC. However, the single item "I know how to develop an entrepreneurial project" achieved a mean close to 5 (see Table 9), representing a moderate to high agreement. Consequently, the project-based and work-integrated approach offered by the EE program analyzed in this study seems to have a positive influence on project-related challenges. However, this item did not increase significantly during the course of study. An explanation was revealed from the focus group discussions: although experiences with regard to entrepreneurial projects increase, students become aware of the fact that all projects are different and future challenges are perceived as just as high. Furthermore, real self-employment experience cannot be provided during the EE program. Most interviewees see a project as totally differing from self-employment. Furthermore, expressed PBC may depend on the field of business that one has in mind when it comes to EI. If venture creation is going to take place in the known business field, PBC might be high. However, if one would like to found a business in a totally different business field, PBC might be low.

Two quite new topics emerged through the focus group discussions that are relevant to the concept of PBC. First, the importance of networks. The availability of a network that may provide expertise, funding, customers, or suppliers seems to have a massive influence. This relevance of networks has already been pointed out by Burt (2000) as well as Grandi and Grimaldi (2003). Second, the possibility to share responsibility. Including a co-founder seems to positively influence the evaluation of personal PBC. Although this assessment rather aims for the very individual perspective, spreading responsibility and risk across several shoulders seems to be

highly attractive. This is in line with findings from Etzkowitz (2003) stating that individuals might have higher interest to found collectively. Interestingly, both aspects relate to the frequently expressed sorrow of interviewees of being 'all alone.' Furthermore, the wish for more support—from educational perspective as well as from political sides—is in line with these findings.

To summarize, the variable PBC is influenced by numerous conditions. Although there might be many EE participants who learn a lot and gain confidence with regard to entrepreneurship, there are others who realize how complicated and strenuous self-employment would be. The interviewees of the focus group discussions emphasized several valuable aspects with regard to the EE program offered by Steinbeis University: 1) The work-integrated study format facilitates the development of a reliable business network; 2) the research- and project-based approach teaches holistic thinking, which is seen as relevant business competency; 3) the working experience gained during the program reveals worthwhile business insights which can be useful for self-employment; and 4) the long-term interactions with study peers can serve as a platform to find co-founders for a business idea. These findings are in line with several suggestions that entrepreneurship education should apply active learning approaches by emphasizing action, experimentation, and practice (Hoidn & Kärkkäinen, 2014; Neck et al., 2014).

Entrepreneurship Intention and Behavior

While many studies stress the role of EE in shaping EI (Fayolle & Liñán, 2014; Hattab, 2014; Iacobucci & Micozzi, 2012; Malebana & Swanepoel, 2015), they tend to neglect the influence of environmental hostility in shaping EI and other associated variables (Ndofirepi & Rambe, 2018). There is a number of situational constraints that hinder the development of entrepreneurial behavior—for example, entry barriers, lack of financial resources, the absence of attractive opportunities, or fear of failure (Rauch & Hulsink, 2015, p. 199). Accordingly, several studies have revealed a gap between preference levels and actual levels of entrepreneurship, which indicates that intentions do not necessarily result in behavior (Blanchflower et al., 2001; Grilo & Irigoyen, 2006).

The quantitative part of this research shows that applicants for the EE program at hand express high EI. Subsequently, EI decreases significantly, indicating a negative influence of EE. In order to explain this result, the qualitative results of this

thesis emphasize the enormous relevance of the economic situation as well as the presence of global crises, which is in line with Malecki (1993). In this case, this study was performed during a time of rather tense economic and political circumstances. Thus, the results probably suffered from a pessimistic atmosphere. Indeed, this was specifically said by one founder during the focus group discussion; given the current situation he would not repeat the decision to become self-employed. Environmental circumstances seem to dominate over personal abilities and the feeling of control regarding success as a founder. In particular, the alumni, who have finished the study program and thus may realize self-employment immediately, express current and not future or former EI. Maybe three years ago or a few years in the future, the results would be different with a more stable world economy. Furthermore, there are other explanations for the significant decrease of EI. Even Icek Ajzen, who developed the theory of planned behavior, suggested that at the end of an EE program participants know about the challenges of being an entrepreneur, which might reduce their EI (Ajzen, 2002). This can be explained with the high self-confidence of applicants, as they have just successfully passed the assessment center which is in line with Varamäki et al. (2015). Furthermore, the pedagogical element of reflection is a decisive part of the *Projekt-Kompetenz-Studium* (PKS) at Steinbeis University and therefore in line with recommendations given for entrepreneurship education program (Cope, 2003; Gordon & Jack, 2010). Thus, participants learn what they want from life. This may, of course, also lead to the insight that being a founder is not a career option for them. This means that even if an EE program has a negative impact on EI, this is still beneficial because the participants have been saved from making a wrong decision. And this is very important, as it is by no means the intention of higher education institutions and governments to enhance self-employment that is fruitless and doomed to failure. Vodă and Florea (2019) suggest that EE enhances general employability, which is recognized by future employers. Thus, graduates from such programs have good paid-employed chances, which in turn decreases EI. Especially for Germany the job market has recently been very good, offering interesting, paid-employed opportunities. This may lead to decreased EI as suggested within the focus group discussions. This also is in line with Khalifa and Dhiyf (2016). To conclude: “Younger people understand better their career

options, their own competencies, and requirements of starting their own businesses as a result of going through an educational program.” (Varamäki et al., 2015, p. 575).

One topic that emerged during the focus group discussions is the crucial role of having a concrete business idea. This idea will be the cornerstone on which to develop EI as well as to execute this intention in terms of behavior. The common questionnaires do not include this aspect and mainly focus on the being of an entrepreneur or founder instead of considering what one would actually do or deal with thematically. Souitaris et al. (2007, p. 586) found that inspiration was the only benefit of EE driving EI, which has wider theoretical implications regarding the role of emotions. Furthermore, Cardon et al. (2009) state that the importance of entrepreneurial passion and how it is generated, maintained, and regulated has no theoretical foundation so far. EE can have a valuable influence on idea generation by organizing ideation sessions or other activities.

Assessment of Intention vs. Assessment of Behavior

As presented in the results of the systematic literature review (SLR), most studies assessed EI intention without considering final behavior. The reason for this probably is the reported time lag between graduation and starting a business (Golla et al., 2006; Luthje & Franke, 2003). However, it is known that intention and behavior show rather low correlation in the area of entrepreneurship (Katz, 1990); Gollwitzer (1999) stressed that intentions are not sufficient to predict behavior because people are wrapped up in their daily routines.

The quantitative part of this research shows that higher levels of EI result in higher levels of behavior. This, at first sight, underlines the theoretical assumption proposed by the theory of planned behavior. However, it must be noted that the questionnaire developed by Rauch and Hulsink (2015) suggested several activities that occur well before the legal foundation of a new enterprise. Thus, it is possible that someone performs entrepreneurial activities as consequence of high EI, but without performing final venture creation. Nevertheless, Ho et al. (2014) found that steps taken by students in their entrepreneurial journey reflect their commitment and effort to realize their entrepreneurial aspirations. Such an engagement represents a closer approximation of entrepreneurial behavior than any measure of EI. In this sense, scholars are encouraged to apply implementation intention theory because

individuals who form an implementation intention are more likely to pursue their intention (Gollwitzer & Sheeran, 2006).

Whether intention results in behavior (or, more precisely, venture creation) depends, among other things, on the steps taken on the way. For example, performing market analyses may stop further efforts immediately when the results differ from expectations. Furthermore, other influencing factors and situational constraints may inhibit the development of entrepreneurial behavior. This will be discussed below. In terms of increasing the likelihood of entrepreneurial behavior, during the focus group discussions the effect of sudden opportunities emerged. An upcoming idea, changes within one's network or financial offerings may lead to a rather unplanned realization of EI. This leads to the conclusion that entrepreneurial behavior should be considered when assessing the effectiveness of EE.

Other Influencing Factors

Literature has presented several variables that might impact the development of EI and have thus been included in this study, mainly for the quantitative part as focus group discussions offered possible insights on the role of these variables. The first variable was working experience. Soria-Barreto et al. (2017) found a negative relation between working experience and EI, while Fatoki (2014) showed that students with previous working experience have a higher level of EI compared to those without. Based on these contradictory results, it is not surprising that no effect was apparent within the quantitative sample of this thesis. The reason might be that solely assessing working experience does not contain information about the quality of experience, which might be either positive or negative. Furthermore, a possible explanation is that participants do not see a high level of comparability between the tasks they have to solve in their paid employment and activities someone would face as an entrepreneur. The second variable analyzed was the field of study. Some studies suggest that engineering students are more likely to report intention to become self-employed than business students (Kuckertz & Wagner, 2010). Others studies suggest the opposite (Ertuna & Gurel, 2011; Karhunen & Ledyeva, 2010). This study revealed higher levels of EI for engineering students. However, this result does not truly contribute the literature as, generally speaking, results remain contradictory. This is especially the case because the focus group discussions did not reveal any explanations regarding this variable. Third, the

variable of having self-employed parents regularly occurs within quantitative analyses. Such role models not only influence SN and EI directly, they also may change how ATB and PBC are related to EI (Athayde, 2009; Boyd & Vozikis, 1994; Dohse & Walter, 2012). However, this study did not reveal any relation. Nevertheless, the interviewees suggested that parents might not solely influence individual SN or PBC; they suggested in addition a rather practical connection—financing venture creation might be easier with self-employed parents. The fourth and last variable analyzed was gender. As expected, men expressed higher level of EI in the quantitative part of this study. However, the empirical evidence is still limited and not entirely conclusive (Camelo-Ordaz et al., 2016; Shinnar et al., 2012). Interviews were not able to add in-depth understanding but admittedly this has not been the locus of the focus group discussions.

Intrapreneurship

Finally, one objective of this thesis was to understand the relation between EE and intrapreneurial behavior (acting entrepreneurially within an existing business corporation is specifically called intrapreneurship (Pinchot, 1985)). Intrapreneurial behaviors (and this is analogously the case for entrepreneurial behavior) are characterized as a combination of proactive, innovative, and risk-taking behaviors (De Jong et al., 2015) with the aim to increase value (Stevenson & Jarillo, 2007).

Past literature has shown that although only a minority of graduates start ambitious enterprises, most young people who have gone through EE could use the acquired entrepreneurial knowledge and skills in many professions and organizations and thus raise the overall level of expertise and innovation (Draksler & Sirec, 2021).

The quantitative as well as the qualitative part of this research has shown that applicants for the Steinbeis University Master's programs in general bring high levels of ambition. The work-integrated format leads to a heavy workload and students must meet the high demands coming from the companies as well as from university. Thus, after completing the program, they are in general suited to becoming successful in their professional life no matter if they start their career with an own business or as an employee. Working on an innovative project offers EE participants the chance to recognize opportunities as an employee. This, thus, is an explanation for the decrease of EI during the course of study within the quantitative

part: the EE participants get to know attractive paid-employed offerings. Furthermore, they learned within the EE program how to exploit business opportunities. Thus, they bring the best prerequisites to fulfill intrapreneurial tasks. As described, Schumpeter has intensively dealt with the responsibilities of an entrepreneur, which is mainly to realize innovation. In this sense Schumpeter's definition of an entrepreneur is equivalent to that of a leader (Huynh, 2007). Based on this, the term entrepreneurial leadership has emerged (McGrath & MacMillan, 2004) as a behavioral strategy with the aim to cope with the fast changing business environment "to exploit opportunities to reap advantage for the organization before and faster than others" (Karmarkar et al., 2014, p. 160). Thus, a link to leadership positions is given and EE graduates have a good chance to become entrepreneurial leaders, with high levels of responsibility and reputation combined with financial attractiveness. The point of reputation is in particularly strong connection to the described educational goal to build personalities (being a personality as appreciation from others). In this sense, intrapreneurship might be a highly attractive opportunity and EE participants who did not know about this may rather follow this path, especially during times of worldwide crises. However, besides the personal engagement for intrapreneurship, those activities usually require management support (Elenkov & Manev, 2005; Hohensee et al., 2014). As discussed in the qualitative part of this research, several prerequisites within a company are needed comprising corporate culture and communication as well as specific structures. In case this is fulfilled, acting intrapreneurial seems to be an attractive opportunity for EE graduates and provides rich potential to exploit.

This is in line with Shane and Venkataraman (2000), who see entrepreneurship broadly as the realization of value and profit for organizations by identifying business opportunities and exploiting them. Thus, companies profit as well. This was also shown by the focus group discussions. The realization of an innovative project within the EE study program leads to the acquisition of competencies and knowledge to implement new ideas. Furthermore, resulting corporate prosperity also positively impacts the regional economy, which can be seen from the gross domestic product (GDP).

These aspects are also evident in the employment report by SIBE described on page 142 and following (SIBE, 2023a). 52% of the alumni hold a leading position three years after graduation and 82% have a leading position ten years after graduation. This demonstrates that the PKS offered by Steinbeis University contributes to the development of creative individuals who think and act entrepreneurially (or rather intrapreneurially) (Faix & Mergenthaler, 2015); Walterscheid, 1998).

11 Recommendations and Practical Contributions

This section separately deals with the research question 7: *Which recommendations arise for a project-based and work-integrated program focusing on the development of entrepreneurial personalities?*

Furthermore, recommendations that are more general in nature when it comes to entrepreneurship education also emerged, as did recommendations for educational activities also focusing on intrapreneurship will be given, thus representing practical contributions.

11.1 Specific Recommendations for the *Projekt-Kompetenz-Studium*

One objective of the focus group discussions was to derive recommendations how the *Projekt-Kompetenz-Studium* (PKS) offered by Steinbeis University can be improved. The suggestions can be clustered in four thematical fields: content on entrepreneurship, the innovative project as part of the program, ideas for new activities, and the lecturers.

Content on Entrepreneurship

Regarding the content of the entrepreneurship education program offered by Steinbeis University, several suggestions and ideas have been presented within the focus group discussions. First, case studies could be used in a more intensive way to provide the opportunity to work on an imaginary start-up for a longer period for example in groups. This would complement specific seminars that shall be added to the curriculum comprising, for example, the legal frameworks for founding a venture or financing opportunities for venture creation.

Furthermore, the interviewees discussed about the relevance to present the opportunity of copycat-foundings²⁷. This is connected the already described discrepancy in terms of different definitions of entrepreneurship. Seminars

²⁷ A copycat is a startup or company whose idea has been taken over by another company or startup and only slightly modified, if at all. It is therefore an imitator of an existing idea (Herzog, 2016).

presenting only high-tech start-ups and unicorns²⁸ with radical impact make them seem the only possibility for venture creation. There exist less radical opportunities that might be easier and more realistic to achieve and should therefore be emphasized as well. Thus, the widespread activities that are summarized under entrepreneurship should be presented equally.

» [...] der Fokus [im Studium] war oft auf Firmen, die [...] fast Monopolist eigentlich schon sind. [...] wenn ich mir nur angucke, was noch niemand gemacht hat und das als Idee sehe, [...] das ist ja nicht realistisch. Man kann ja genauso gut ein Me-too-Produkt machen, aber ein anderes Service-Modell oder ich mache Me-too und mache einen günstigeren Preis. [...] es gibt so viele Möglichkeiten, die man sich eigentlich verbaut, wenn man im Vornherein schon sagt ich, ich will nur das neue iPhone entwickeln. «

Economic and Engineering alumni, Pos. 126

Besides these ideas for seminars, which are mainly focused on venture creation, the interviewees also suggested more general content such as communication and self-marketing skills to promote a business (for example, making an elevator pitch to get financing), project management, employee management, and personal development. Additionally, topics like sense of life, common good, and sustainability were seen as relevant. These ideas are not restricted to entrepreneurship-employees in charge of intrapreneurial activities would benefit from such content.

The programs offered by Steinbeis University do not pay special attention to providing knowledge on how to handle crises. Based on the results retrieved in the focus group discussions, this knowledge seems relevant in order to build reliable self-confidence. Thus, the curriculum should be supplemented by content on resilience and/or business strategies to identify upcoming crises at an early stage and thus allow for sufficient time to deal with respective challenges.


²⁸ Unicorns are start-ups with a market valuation of more than one billion US dollars prior to an initial public offering or an exit (i.e., a planned exit of investors from an investment) as described by A. Lee (2013).

New Activities

In addition to the content that is part of the entrepreneurship education (EE) program curriculum, interviewees also suggested new activities that would be valuable. The first element of them would focus on idea development. As shown, this is seen as a very important aspect when it comes to entrepreneurship intentions (EI). In this context, EE should foster opportunity recognition or even enhance personal creativity leading to business ideas. To actively support idea generation, hackathons or innovation contests would provide good opportunities to do so.

Another element the focus groups wishes for new activities to focus on was the funding of new venture creations, as it is seen as crucial and can be decisive as to whether an idea finally comes to venture creation or not. Thus, providing and organizing specific networks or an entrepreneurial infrastructure for Steinbeis University would be a helpful tool. Then graduates would have the chance to reach out to fitting investors. Furthermore, these elements additionally provide the chance to find partners for the planned venture creation. As described, having a co-founder may significantly increase EI. Finally, creating a favorable network may also enhance individual perceived behavioral control (PBC), which positively contributes to the development of EI.

Further suggestions arose around exchanging with founders to get to know their perspectives and experiences. Activities to do so include talks or round tables with founders or start-up accelerators. This would provide the chance to get real life insights regarding the success and failure of new ventures, to learn about the do's and don'ts, and receive other recommendations, such as how to handle pressure and risk. One step further would be to offer coaching or mentoring programs with active founders to accompany nascent founders during the whole process. Finally, the interviewees suggested organizing short term internships during which students work in a real start-up.


*Kontakt mit zum Beispiel einem Start-up Accelerator wäre voll gut,
weil da siehst du als Studierender die Leute, die wirklich gründen,
die am Anfang sind.*


Economic and Engineering founders, Pos. 133

With regard to the aforementioned influence of social media, interacting with established founders would provide a realistic perspective, counteracting the one-sided story shown on social media and altering the students' attitude toward the behavior (ATB). Otherwise, there is a risk that people would refuse such a career option just because they conclude that being self-employed can never be that good. However, as also discussed, the real experience of being a founder only comes with final venture creation.

Project

As presented, the innovative project that is the central element of the EE program at Steinbeis University cannot be directly compared to the tasks and challenges of being self-employed. Nevertheless, these projects provide the chance to gain professional experience, to acquire relevant market knowledge, and to build a business network. The important role of market knowledge was emphasized by Ardichvili et al. (2003). Furthermore, students at Steinbeis University have the chance to gain insights from other projects as well due to presentations and discussions with their peers. This important element should be emphasized as students might be frightened by the fact that every project seems to be completely different.

The companies partnering with Steinbeis University regularly suggest which projects could be realized by a student. In this context, two aspects were mentioned as important by the interviewees. First, Steinbeis University needs to ensure the innovative character of the suggested projects to prevent students from working on merely routine tasks. This makes defining the project adequately a prerequisite. Second, students should receive the chance to make their own decisions and even mistakes without being controlled by supervisors or lecturers. Then students may perceive the project as to some extent similar to an 'own company,' which leads to the development of innovativeness. In this sense, also the selection of partnering companies might be relevant. Projects in smaller companies or companies that face a big transformation may provide more opportunities to be innovative.

Finally, the interviewees saw a need to emphasize the relevance and advantages that companies gain through offering a study project. Steinbeis University therefore should point out how students positively influence the realization of innovative

activities within the company. Furthermore, the companies learn about scientific methods and approaches to solve problems. This knowledge can also be used for following projects or in other parts of the company.

[...] ich glaube jedes Unternehmen wird sich auf die Fahne schreiben, ja wir fördern Unternehmer, weil es zum guten Ton gehört. Realität ist anders. [...] der Nährboden für Unternehmertum ist gar nicht da [...]

» *Und das einzige was sie da wirklich machen können [...], die großen Unternehmen sozusagen [ist] ein Spin Off machen oder eine kleine Abteilung raus gründen [...], um quasi Start-up-Mentalität, Innovationskraft auch wieder zu kultivieren.* «

Economic and Engineering founders, Pos. 137

Lecturers

As briefly mentioned, the lecturers have an influence as well. They accompany the students to successfully realize their innovative project within the company. This may require some strict guidance for some projects. However, giving the students the opportunity to fully exploit the project would increase the amount of responsibility while risking project success. A balance must be struck. The interviewees suggested that lecturers who have founded by themselves would be good to share their experiences. But, again, it would be important for the students to make their own decisions to learn how to handle risks while also accepting that mistakes may occur.

11.2 General Recommendations for Entrepreneurship Education

The participants of the EE program offered by Steinbeis University gave specific recommendations within the focus group discussions about how the program could be improved. However, the suggestions regarding content, network, activities and idea generation can also be realized by other institutions offering EE programs. There have also been more general recommendations that can be supplemented with advice, which emerged during this research project.

First of all, institutions offering an EE program must define what is meant with entrepreneurship. This is important for the participants of such a program, as they

must understand the exact objective of the program in order to know if they fulfill the educational goal. If this is the case, the evaluation of the EE program becomes more reliable. Then participants are aware of whether their EI fits the program's definition and can express agreement accordingly. Furthermore, educational institutions may assess the level of EI and its antecedents before starting the program. This would help to find out how to keep EI high for those students with high intention and how to enhance intention for those with lower intention prior to starting the program. This is especially the case for compulsory programs. Based on this information, EE institution may think about offering specific courses or methods fitting the prior level of EI, ATB, SN, and PBC.

Second, as shown, EE can increase PBC, which subsequently impacts EI. The belief of being able to engage in entrepreneurial behavior can, for example, be enhanced by providing mastery experiences in entrepreneurship-related tasks (Kuehn, 2008). However, the qualitative part of this research has also shown that there are several influencing factors, such as the overall economic situation. As this economic situation is not stable over time, institutions offering EE should actively deal with this topic. This seems to be important as participants must learn how unfavorable conditions can be handled and what they can affect, for example, the possibilities to collect funding or risk capital may depend on the economic situation. Thus, EE institutions should provide information on alternatives or effective strategies. As a consequence, EE curricula require some kind of flexibility. Exaggeratedly speaking, the economic situation may change from one year to another, as was the case during the Covid-19 pandemic. Furthermore, different countries may face different situations thus respective content must be adapted adequately.

Third, the interviewees suggested offering EE much earlier in the educational career, for example, during primary or secondary education, which is in line with several researchers (do Paco et al., 2011; Kourilsky & Walstad, 1998). Rauch and Hulsink (2015, p. 199) pointed out that the inspirational part of Ajzen's (1991) model might be more relevant in earlier stages of an entrepreneurial career while "experience-based perceptions about the availability of resources may become more important in the later stages of the entrepreneurial process."

11.3 Education for Intrapreneurship

The previous two sections dealt with recommendations for entrepreneurship education in the narrower sense comprising self-employment and venture creation. As outlined several times, entrepreneurship can also be seen in a wider framework mainly designated as intrapreneurship, which comprises venture growth and opportunity recognition. Although this was not apparent for the participants of the qualitative part of this thesis, it seems that, generally speaking, students link entrepreneurship to business creation, and not as an attitude to life (Iglesias-Sanchez et al., 2019).

However, economic wealth depends decisively on the ability of companies to implement innovations and thus on realizing intrapreneurship. Thus, education in general should focus on the development of competencies needed for venture growth and opportunity recognition. Furthermore, it is essential to prepare students to cope with the personal setbacks and disappointments (Benjamin & O'Reilly, 2011). In this sense, narrower EE is also suitable as most young people who have gone through EE could use the acquired entrepreneurial knowledge and skills in many professions and organizations and thus raise the level of expertise and innovation (Draksler & Sirec, 2021).

12 Contributions to Research

Strategic papers by the German Council have set the focus of higher education to the aim to educate people into professionals who are able to find solutions for challenges associated with technical, economic, or societal change (Wissenschaftsrat, 2015). Additionally, the EU Agenda for the Modernization of Higher Education focuses on the “knowledge triangle” and the role of entrepreneurship in linking education, research, and innovation (Maassen & Stensaker, 2011). In order to do so, educational institutions are encouraged to expand multidisciplinary knowledge sharing by implementing programs based on real-world problems to develop the innovation competence of future professionals (European Commission [EC], 2012, 2017).

However, the influence of entrepreneurship education on intention and behavior is still under researched (Bird et al., 2012; Pittaway & Cope, 2007), especially regarding how programs should be designed to maximize their effectiveness (Heuer & Kolvereid, 2014), as for now there are no conclusive findings regarding the link between entrepreneurship education (EE) and entrepreneurship intention (EI) (Aparicio et al., 2019). Thus, the aim of this research was to analyze the effectiveness of a project-based and work-integrated entrepreneurship education program on the development of EI, while also considering the intentions’s relevant antecedents and resultant behavior that is not limited to venture creation but also includes intrapreneurship.

As presented, there is no model which is yet totally elaborated and suitable as the single best solution in order to analyze the effect of EE on the development of EI (and subsequently behavior). As the theory of planned behavior is seen as well suited for the research on entrepreneurship, this thesis made use of it, following the call made by Shook et al. (2003) to reduce the amount of variety regarding intention models that are scholarly used. Thus, this research aimed to add further scientific insights regarding the appropriateness and validity of this model.

As the systematic literature review revealed, research so far has included hardly any qualitative approaches. For example, Fretschner and Weber (2013) analyzed the change of positive and negative beliefs about being self-employed and found that financial aspects become even more important after EE. Therefore, this thesis paid

particular attention to qualitative aspects and was thus able to gain in-depth understandings. To the best of the authors knowledge, this is the first study using the theory of planned behavior as framework that 1) interviewed founders who have finished the EE program and thus revealed insights toward the theoretical framework, 2) asked graduates of the EE program to derive recommendations on how to improve the program, and 3) was able to derive a connection to intrapreneurial activities.

Based on this approach it was possible to add several new aspects that should be considered. For example, the relevance of social media has not been discussed in research so far. From the author's perspective, this influencing factor has emerged quite recently and probably will continue to be relevant, thus should be considered when it comes to attitude toward the behavior. Additionally, the opportunity of nascent founders to actively shape a supportive community within their subjective norms has not been present in literature so far. This aspect is related to the digital developments and networking chances that have increased in the last couple of years.

Considering the quantitative part of this thesis, some improvements compared to earlier studies were possible as, until now, only a few studies have made the connection between EI and entrepreneurial behavior. Furthermore, the theoretical framework suggested by Ajzen (1991) comprises a direct relation between perceived behavioral control and respective behavior, which has so far received almost no research interest. Thus, this is, to the best of the author's knowledge, one of the first studies linking both EI as well as perceived behavioral control (PBC) with actual behavior in the field of entrepreneurship.

The results retrieved in this thesis thus contribute to research mainly with regard to the theoretical concept, namely the theory of planned behavior. While attitude toward the behavior (ATB) could not be included into quantitative analyses for statistical reasons, subjective norms (SN) neither showed an influence on EI nor was influenced by EE. For PBC, a strong relation with EI was revealed although EE also did not influence this antecedent. Instead, a direct and negative effect of EE on EI was shown. All in all, the results of this thesis suggest that there is a likelihood for an omitted mediator that has not been integrated into the theory of planned behavior. This contradicts the results of a meta-analysis that found ATB, SN and

PBC to explain 39% of variance in entrepreneurial intention (Schlaegel & Koenig, 2014). However, Heuer and Kolvereid (2014) also stated that the theory of planned behavior model is at least not complete, as they found a direct effect of EE on EI without enhancing the antecedents ATB, SN, and PBC. Furthermore, research tends to neglect the influence of environmental hostility in shaping EI and other associated variables (Ndofirepi & Rambe, 2018). Souitaris et al. (2007) have not included 'exogenous' influences as Tkachev and Kolvereid (1999) found that adding them to the theory of planned behavior did not significantly increase the explanation of the variance in individuals' self-employment intentions.

Furthermore, contributions regarding the questionnaires used in the quantitative part arise. First of all, the entrepreneurial intention questionnaire developed by Liñán and Chen (2009): This questionnaire aimed to overcome existing incommensurability and for providing a standard instrument to measure EI (Liñán & Chen, 2009). Although the establishment of this questionnaire is still in process (Fretschner & Weber, 2013), it is validated and the author decided to use it to contribute to comparability, as several scholars criticize that generating new assessment tools reduced comparability. In this context, the present thesis demonstrated that assessment tools must precisely define what is meant by "entrepreneurship." Even if entrepreneurship is described as founding a new venture or being self-employed, there is room for misunderstandings. Participants of EE programs, and consequently study participants, may exclude some forms of entrepreneurship (for example, founding a new bakery) from their personal understanding of entrepreneurship, which could cause expression of low EI. In turn, if participants are aware that copycat-foundings are also defined as entrepreneurship, they may announce higher EI. With a precise definition and universal understanding of entrepreneurship, the evaluation of the EE program becomes more reliable. Furthermore, this research wants to suggest adding some questions to the questionnaire as these could support analyzability. The first question would add to SN items asking for the awareness of building a new favorable community that supports entrepreneurial ideas. Two additional questions would contribute to PBC, one asking if having a co-founder would increase the chance to become self-employed and another asking for the appraisal of whether the current economic situation is perceived as rather positive or negative. Finally, a

question should be aimed at the initial expectation towards the educational program in order to find out to what extent acquired knowledge and experiences correspond to this expectation.

The second part of the questionnaire used in this thesis was based on Rauch and Hulsink (2015). They suggested several activities to assess whether someone has realized entrepreneurial behavior. This is in line with Ho et al. (2014) who found that steps taken by students in their entrepreneurial journey reflect their commitment and effort to realize their entrepreneurial aspirations. However, the list of activities provided by Rauch and Hulsink (2015) also comprise steps that occur well before the legal foundation of a new enterprise. Thus, it is possible that someone performs entrepreneurial activities as consequence of high EI, but without performing final venture creation, for example, because market analyses for the business idea revealed unfavorable conditions. If this problem is considered null and void, this research has shown that higher EI indeed leads to more entrepreneurial activities. Consequently, research lacks a reliable questionnaire or method to predict if EI in fact leads to venture creation. Furthermore, future assessment should also comprise whether a study respondents may have engaged in intrapreneurial activities instead.

13 Critical Reflection and Outlook for Future Research

This doctoral work ends with a critical reflection on the methodologies that have been applied while further looking at opportunities for future research.

For the quantitative part of this research, it must be said that the sample size was rather small, especially when it comes to the percentage of applicants. However, the aim was to get a first impression which effects the *Projekt-Kompetenz-Studium* offered by Steinbeis University has on the development of entrepreneurship intention and its antecedents. The study followed a cross-sectional design without pre/post-testing, as the two-year Master's program would barely allow a longitudinal approach within the framework of a doctoral thesis. There was no opportunity to identify a reliable control group: 50% of the curriculum is realized in a project-based and work-integrated format and therefore is dedicated toward entrepreneurship. Thus, it was not possible to follow different methodologies or to randomize participation. The questionnaire has been distributed using social media and mail. Thus, founders or people with a high interest in the topic of entrepreneurship were probably more eager to participate, which may lead to a bias. However, as the overall EI that has been assessed is rather low, this does not seem to be a relevant constraint. Moreover, the assumption was made that students enrolled in the entrepreneurship program are randomly selected. However, it is possible that a student who desires to be an entrepreneur would purposely enroll on an entrepreneurship program. As a consequence, there might be a self-selection bias. Regarding the program offered by Steinbeis University, in turn, the partnering companies offering the work-integrated setting for students – which are mainly large corporates – might be unattractive to possible founders as those companies are known for being less open for innovative ideas. Thus, these two aspects probably equalize each other. Based on the insights retrieved in this thesis, a repetition of this quantitative approach would be advisable in order to set up a research approach with a higher sample size.

The qualitative part of this research has some limitations as well. First, the focus group discussions occurred online as this brings several advantages that have been presented. However, Murgado-Armenteros et al. (2012, p. 79) found some disadvantages of the online setting, such as the fact that information from non-verbal

signs cannot be used adequately and that the topics of discussion and the group dynamics are limited. Another limitation for the qualitative part was that the coding was done solely by the author of this thesis. However, the author applied a repetitive approach, meaning that the coding process was performed twice with several weeks of time space. In doing so, intra-coder reliability is given raising the meaningfulness of the results retrieved.

More general in nature, there is another aspect that should be critically reflected. The study was conducted with participants from a single context although it is known that there are regional and cross-country differences in entrepreneurial behavior (Reynolds et al., 2005). Nevertheless, the Spanish studies included in the systematic literature review revealed how complex the evaluation of entrepreneurship education programs is. J. C. Sánchez (2011) showed a positive effect for an elective, eight month entrepreneurship education program that was practically oriented. However, another study analyzing a similar program (elective, 1 semester, action-oriented) could not show a positive effect of entrepreneurship education on perceived behavioral control and entrepreneurship intentions (Entrialgo & Iglesias, 2018). This shows that two studies conducted in the same country, thus providing the same cultural context and a comparable economic situation, can result in contradictory findings.

This leads to suggestions for future research. First of all, selection effects on research must be addressed with regard to the evaluation of entrepreneurship programs. This would be possible with a research design in which students are randomly assigned to treatment and control groups. The study design should, furthermore, preferably be longitudinal. As discussed, there usually is a time lag: graduates often do not start their own business immediately after finishing the EE program. Thus, it would be helpful to know more about this delay and what happens in between, as the qualitative part of this research has suggested several incidents that may hinder behavior. This may contribute to the whole theory of planned behavior, as other behaviors (remember the example of the computer course) apparently are less vulnerable for events that interrupt the realization of an intention. Additionally, it would be interesting to develop more theory about the correct timing of outcomes of entrepreneurship education.

Furthermore, the need for comprehensive program descriptions is evident when analyzing the effectiveness of entrepreneurship education programs. This seems to be a matter of relevance when it comes to the interpretation of results. Scholars should especially take care to provide information regarding design and duration of analyzed the entrepreneurship education program. This would subsequently allow the execution of meta-studies to achieve conclusive results in the long term.

Raising the number of studies with rigorous research design would help to find patterns and explanations for the results retrieved so far. Once a deeper understanding of the developmental processes to build entrepreneurship intention is given, it may be possible to draw conclusions about the best practice pedagogical approaches in the future. Therefore, it is also necessary to agree on one theoretical approach and to set up a consistent terminology ensuring that future studies can easily be compared regarding their results.

On a more detailed level it would furthermore be interesting to analyze how exactly attitude toward the behavior is influenced by social media and how exactly the opportunity to build up a favorable network influences subjective norms. Also, the newly emerged topic of how perceived behavior control changes if starting self-employment happens together with a co-founder should be addressed.

Finally, the effect of educational programs on intrapreneurship behavior of participants should get more research attention. This should not only comprise the student perspective. Instead, research should also focus on the prerequisites within companies so that graduates find a fertile ground for the exploitation of opportunities and to successfully use the competencies acquired through education.

14 References

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APPENDIX

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1. Test for Normality

Table 35 Test for Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
Being an entrepreneur implies more advantages than disadvantages to me	.949	103	<.001
A career as entrepreneur is attractive for me	.897	103	<.001
If I had the opportunity and resources, I would like to start a firm	.854	103	<.001
Being an entrepreneur would entail great satisfaction for me	.913	103	<.001
Among various options, I would rather be an entrepreneur	.941	103	<.001
My close family would approve my decision to be an entrepreneur	.919	103	<.001
My friends would approve my decision to be an entrepreneur	.885	103	<.001
My colleagues would approve my decision to be an entrepreneur	.938	103	<.001
My study mates would approve my decision to be an entrepreneur	.897	103	<.001
To start a firm and keep it running would be easy for me	.939	103	<.001
I am prepared to start a viable firm	.940	103	<.001
I can control the creation process of a new firm	.942	103	<.001
I know the necessary practical details to start a firm	.938	103	<.001
I know how to develop an entrepreneurial project	.891	103	<.001
If I tried to start a firm, I would have a high probability of succeeding	.935	103	<.001
I am ready to do anything to be an entrepreneur	.937	103	<.001
My professional goal is to become an entrepreneur	.913	103	<.001
I will make every effort to start and run my own firm	.897	103	<.001
I am determined to create a firm in the future	.911	103	<.001
I have very seriously thought of starting a firm	.912	103	<.001
I have the firm intention to start a firm some day	.904	103	<.001

a. Lilliefors Significance Correction

2. Test for Linearity

To test for linearity, it was necessary to transform the variable Level Master studies from a categorical to an interval scale. Applicants were given value 0, students from 1st/2nd semester received value 1.5, from 3rd/4th semester value 3.5, and students from 5th semester as well as alumni were given value 5.5. This variable is called Stage Master degree. The value represents the degree of education the person has taken so far.

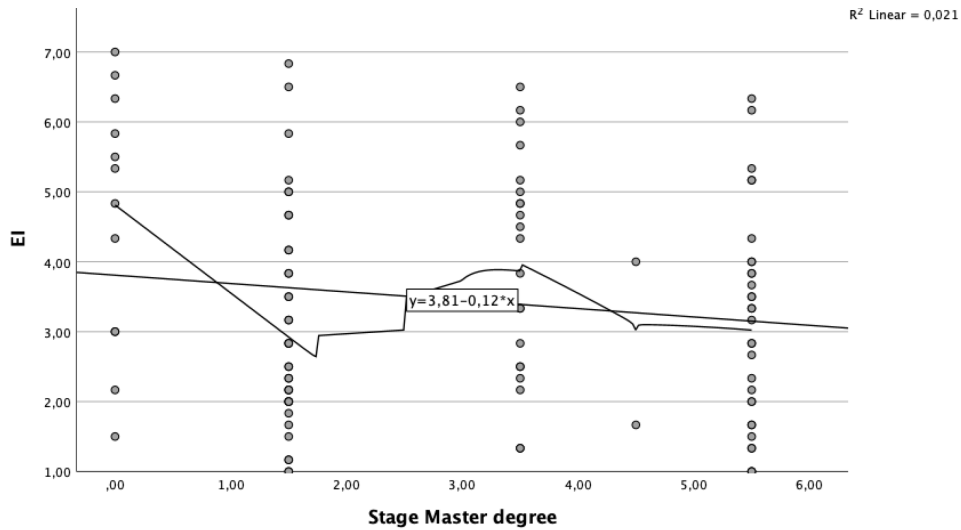


Figure 39 Relation between Stage Master degree and EI

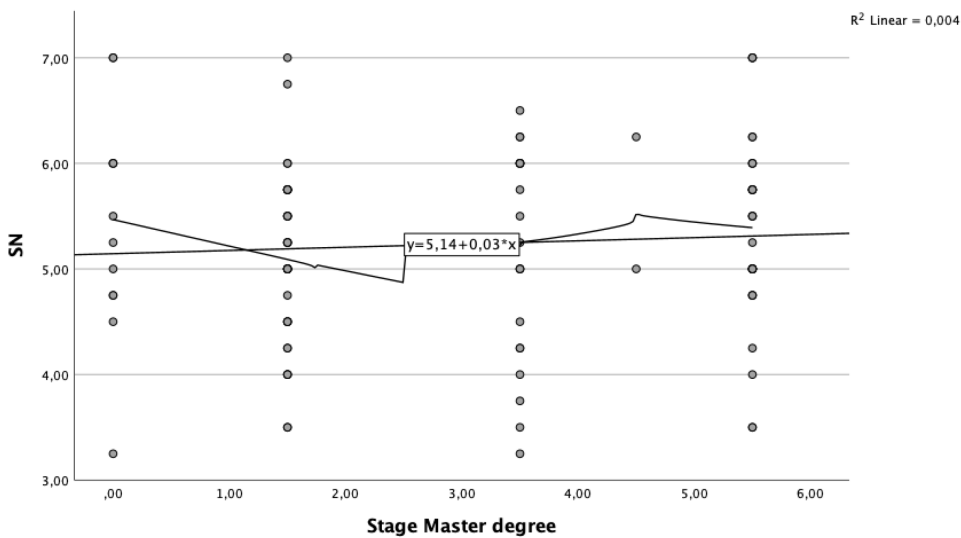


Figure 40 Relation between Stage Master degree and SN

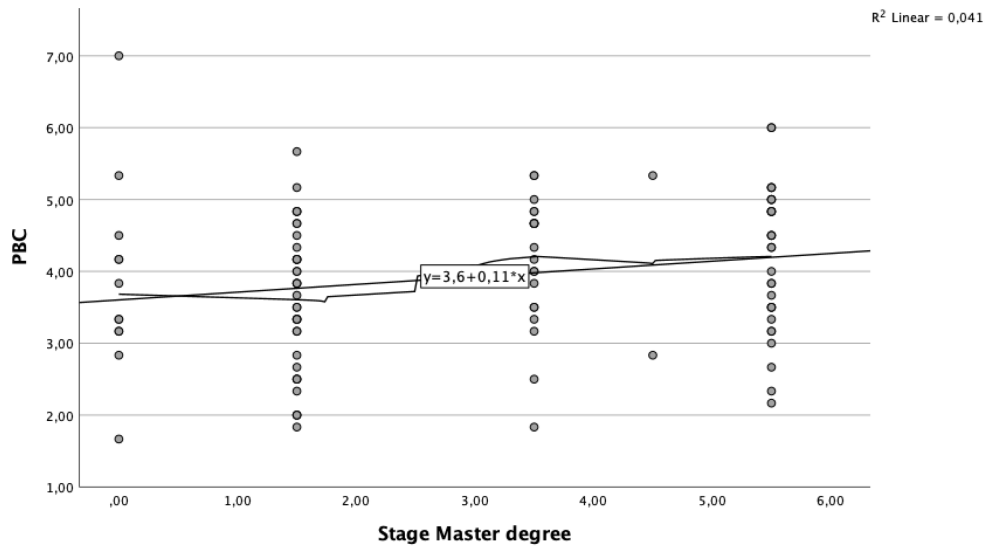


Figure 41 Relation between Stage Master degree and PBC

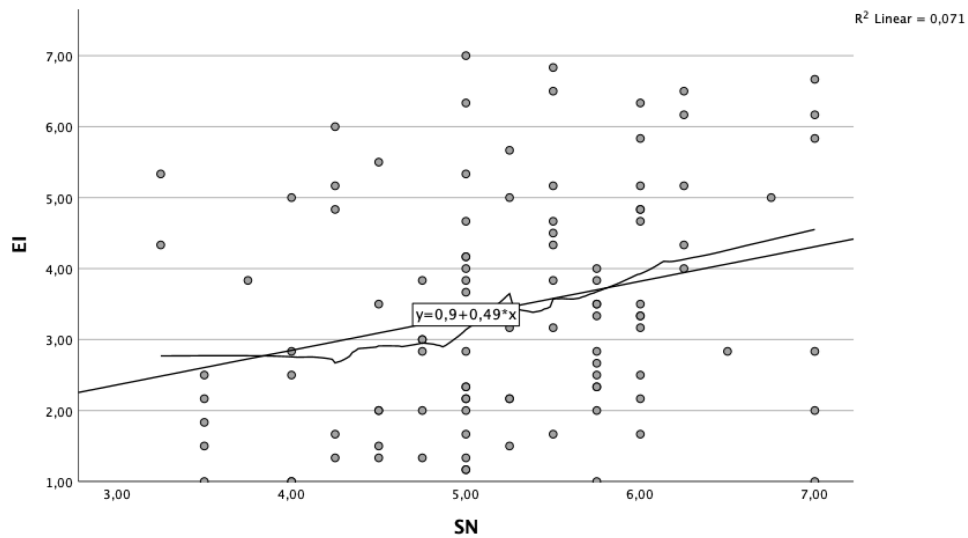


Figure 42 Relation between SN and EI

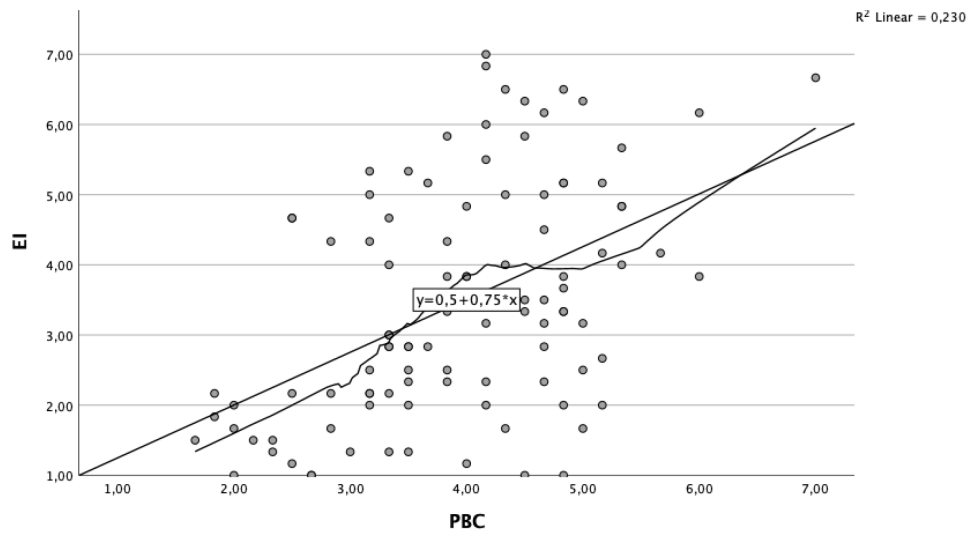


Figure 43 Relation between PBC and EI

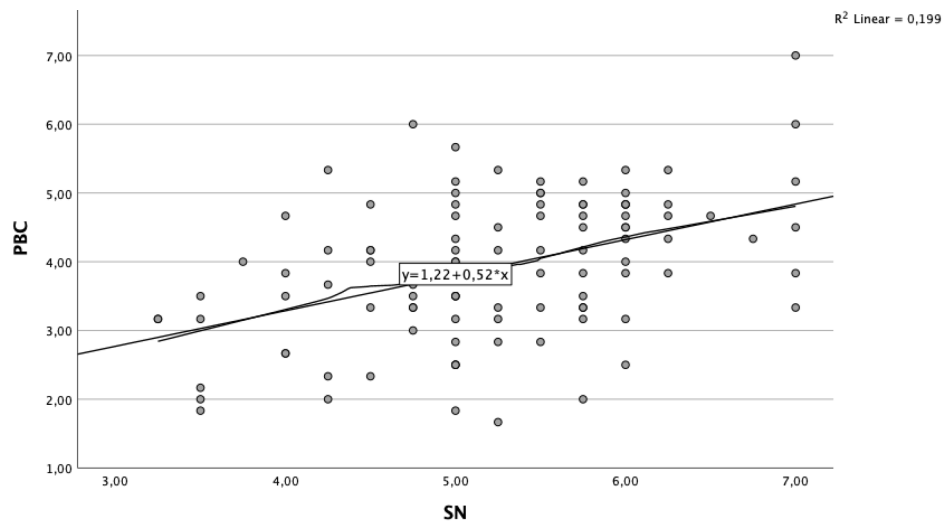


Figure 44 Relation between SN and PBC

3. Interview Guideline for Focus groups

Table 36 Interview guideline

Mein Name ist Liane Windisch, ich arbeite seit 5 Jahren an der SIBE der Steinbeis Hochschule. Ich denke ihr wisst vermutlich, dass es die verschiedenen Institute an der Hochschule gibt. Das SCMT ist eher technisch und die SIBE eher wirtschaftlich ausgerichtet. Im Zuge meiner Promotion an der LMU beschäftige ich mich mit dem Thema Entrepreneurship. Zunächst einmal hoffe ich, dass es für alle in Ordnung ist, wenn wir uns duzen.

Wir sind hier, um über die Einstellungen und Erfahrungen von Steinbeis-Studierenden im Zusammenhang mit dem Thema **Entrepreneurship** zu diskutieren. Aus diesem Grund habe ich offene Fragen vorbereitet, die ihr frei und umfassend beantworten könnt, um das Thema zu vertiefen. Vorangegangen war eine Online-Umfrage, an der vielleicht auch jemand von euch bereits teilgenommen hat.

Diese Fokusgruppe wird es mir ermöglichen, den Kontext hinter den in der Online-Umfrage gegebenen Antworten zu verstehen, und sie wird mir dazu verhelfen, diese Themen detaillierter zu erforschen. Ziel dieser Fokusgruppe ist es daher, über das zuvor genannte Thema zu diskutieren. Das heißt vor allem, dass es kein richtig und falsch gibt. Es zählen eure ganz persönlichen Meinungen, sodass es eben auch explizit gewünscht ist, dass ihr darlegt, wenn ihr den Aussagen der anderen ggf. nicht zustimmen könnt. Wir wollen ein breites Spektrum an Meinungen hören. **Wir versuchen nicht, einen Konsens zu erreichen**; wir sammeln Informationen.

Meine Rolle heute ist es, dafür zu sorgen, dass wir eine konstruktive Diskussion führen und die Meinung und Anmerkungen der Gruppe zum ausgewählten Thema zusammenzufassen.

Die Diskussion wird aufgezeichnet und die wichtigsten Ergebnisse fließen in meine Doktorarbeit ein. **Das erfolgt natürlich vollständig anonymisiert.**

Wir werden **maximal 1,5 Stunden** brauchen, wenn jemand früher gehen muss, ist das völlig in Ordnung. Dann bitte einfach **kommentarlos das Meeting** verlassen, damit die anderen ungestört weiter diskutieren können. Danke!

Ich starte nun die Aufzeichnung und die automatische Transkription.

Aufzeichnung des Fokusgruppen-Interviews am XX.XX.XXXX um YY:YY Uhr

Beginnen wir damit, uns vorzustellen. Bitte nennt euren **Namen** und bestätigt kurz, dass ihr mit **der Aufzeichnung einverstanden** seid. Dann könntet ihr in wirklich nur einem Satz euer **berufliches Umfeld** beschreiben. Bitte nennt auch euer **Alter**.

	Thema	
	Einleitung	
1	a) Kurze Vorstellung der Teilnehmer, Einverständnis, Alter nennen	
	b) Aufforderung: Was ist euer erste Gedanke zum Schlagwort Entrepreneurship im Sinne einer Definition? <i>Könnte es auch noch andere Definitionen geben?</i>	

	Gründungsabsichten	
2	<p>a) Welche persönlichen Motive gibt es zu gründen? <i>Was spricht denn gegen eine Gründung?</i></p> <p>b) Welche Einflussfaktoren seht ihr, die dazu beitragen, ob jemand gründen möchte oder nicht? <i>Ggf. Nachfragen zu selbständigen Elternteilen, politische / gesellschaftliche Rahmenbedingungen, Zufriedenheit am Arbeitsplatz, Berufserfahrung, Selbstvertrauen/ Kompetenz/ Eignung, Alter, Gründung im Team einfacher?</i></p>	
	Ergebnisse Umfrage - EI	
3	<p><i>Hier sehen wir eines der Ergebnisse der Umfrage, die ich im Vorfeld mit Bewerber:innen, Studierenden und Alumni durchgeführt habe. Die Antworten wurden auf einer Skala von 1-7 im Sinne von „stimme überhaupt nicht zu“ bis „stimme absolut zu“ gegeben. Zusammengefasst sehen wir die Zustimmung zur Frage, ob die Absicht besteht ein Unternehmen zu gründen. Die schwarze Linie innerhalb des blauen Balkens gibt den Median an, also die Mitte der Datenverteilung. Bei den Bewerber:innen ist die Gründungsabsicht mit rund 5 also recht hoch ausgeprägt - bei den Alumni mit unter 3 recht gering.</i></p> <p>a) Die Gründungsabsicht verändert sich stark über den Verlauf des Studiums. Wie könnte man diesen Verlauf erklären? <i>Achtung: Wirklich in Bezug auf Gründungsabsicht antworten!</i></p> <p>b) <i>Hier sehen wir zwei Fragen aus der Online-Umfrage. Und die Ausprägung der Zustimmung dazu.</i> Wo ist der Unterschied in den Fragen? Woran könnte es liegen, dass diese Zustimmung bei den beiden Fragen zu Möglichkeiten/Ressourcen und Bemühungen zu Gründen so verschieden ausgeprägt ist?</p>	
	Intrapreneurship und Innovation statt Gründungen	
4	<p><i>Hier sehen wir eine Definition von Entrepreneurship, die sehr weit ausgelegt ist. In diesem Sinne wären also auch die Entwicklung und Einführung von Innovationen innerhalb eines Unternehmens als Entrepreneurship zu verstehen.</i></p> <p>a) Wenn man Entrepreneurship also im Sinne von Innovationsmanagement oder Unternehmertum innerhalb eines UN begreift, welchen Einfluss könnte das in Bezug auf die eben diskutierten Motive haben? Als eine Alternative Option?</p>	
	Erfolgte Gründung	
5	<p><i>Hier sehen wir eine kleine von uns erhobene Statistik zu den Gründerzahlen. Mit 16 % liegt diese deutlich höher als bei anderen Universitäten (rund 2 %)</i></p> <p>a) Wie könnte es zu diesem Unterschied in der recht niedrigen Gründungsabsicht der befragten Alumni und der doch hohen</p>	

	<p>Gründerquote kommen? <i>Führt Absicht wirklich zu Handeln? Ist Absicht der „einzige“ Grund für Handeln?</i> <i>Welche Rolle spielt hier wieder das Thema Ressourcen / Möglichkeiten?</i> <i>Welche Rolle spielt die Zeit?</i> <i>Könnte es auch umgekehrt kommen? Hohe Absicht aber doch keine Gründung</i></p>	
	Einfluss des PKS	
6	<p><i>Hier sehen wir eine generelle Einschätzung aus der Umfrage. Es gut um die Kontrollierbarkeit einer erfolgreichen Gründung. Diese nimmt im Verlauf des Studiums bis hin zu den Alumni nur minimal zu.</i></p> <p>a) Woran könnte das liegen? <i>Das Projekt-Kompetenz-Studium soll ja insbesondere auch die selbständige Bearbeitung von neuartigen Aufgaben fördern.</i></p> <p>b) Ggf. Animation einblenden → auch die Bearbeitung eines Projekts im Studium erhöht das Zutrauen in die eigene Kompetenz nur geringfügig. Wie lässt sich das erklären?</p>	
	Handlungsempfehlung für Steinbeis Projekt Kompetenz Studium (<i>bitte nur auf das Thema Gründung bezogen, keine allgemeinen Empfehlungen zur Verbesserung des Studiums</i>)	
7	<p>a) Was könnte getan werden, um die Gründungsabsichten der Steinbeis-Studierenden zu befördern? (Hoch zu halten?)</p> <p>b) Welche Elemente im Studium müssten geändert oder neu eingeführt werden mit Blick auf das Thema Gründung?</p> <p>c) Was ergibt sich insbesondere in Bezug auf die Projekt-Kompetenz?</p> <p>d) Inwiefern müssten Bildungsansätze, die das Thema Gründung fokussieren ggf. früher in der akademischen Laufbahn erfolgen (Erststudium)?</p> <p>e) Inwiefern würden denn die projektgebenden Unternehmen von einer Bildung in Sachen Entrepreneurship profitieren?</p>	
	Abschluss	
8	a) Fällt euch noch etwas ein, dass noch nicht erwähnt wurde?	
	Bedankung	
	Ich stehe gerne für einen weiteren Austausch zur Verfügung	

4. Quantitative results shown in focus group discussions

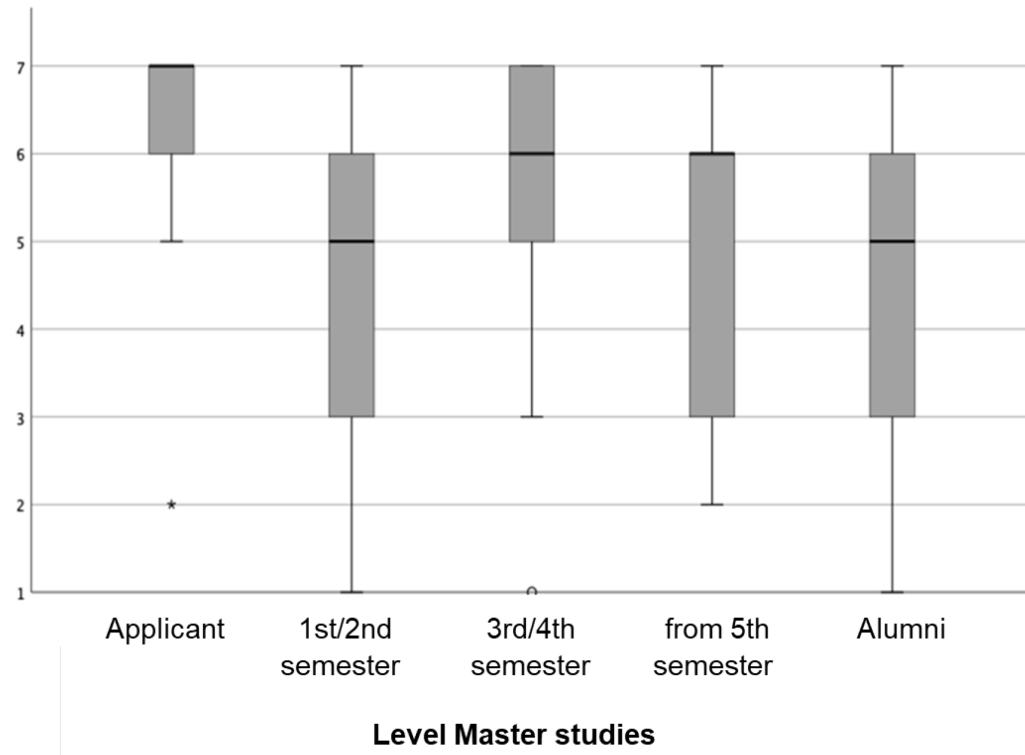


Figure 45 Item ATB3 “If I had the opportunity and resources, I would like to start a firm”

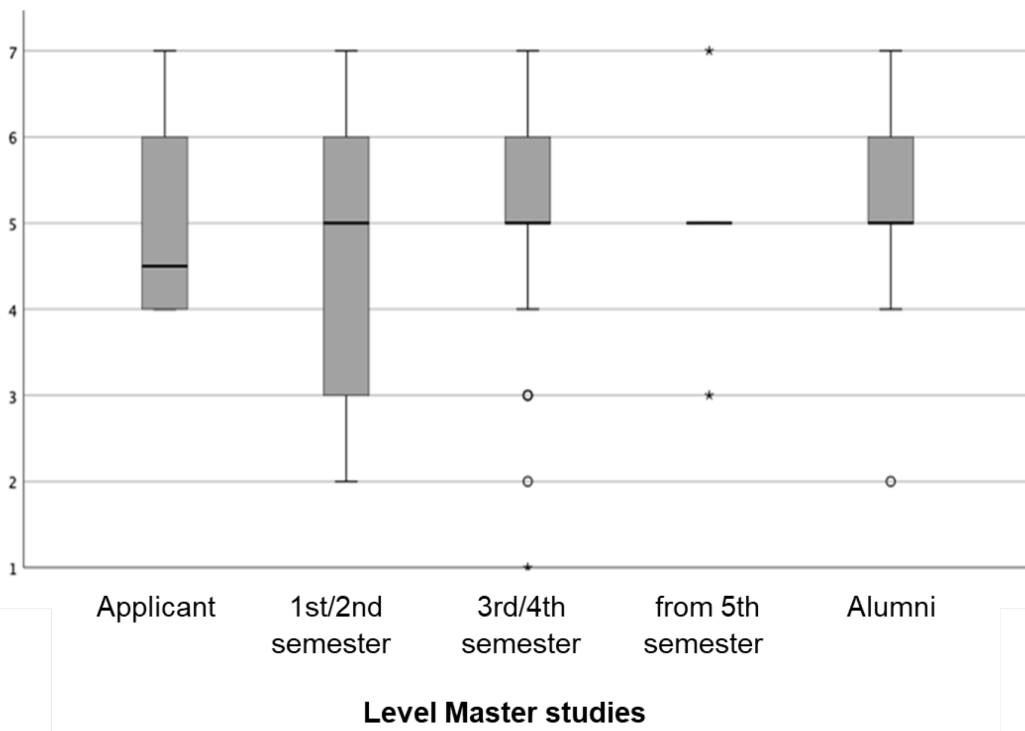


Figure 46 Item PBC5 “I know how to develop an entrepreneurial project”

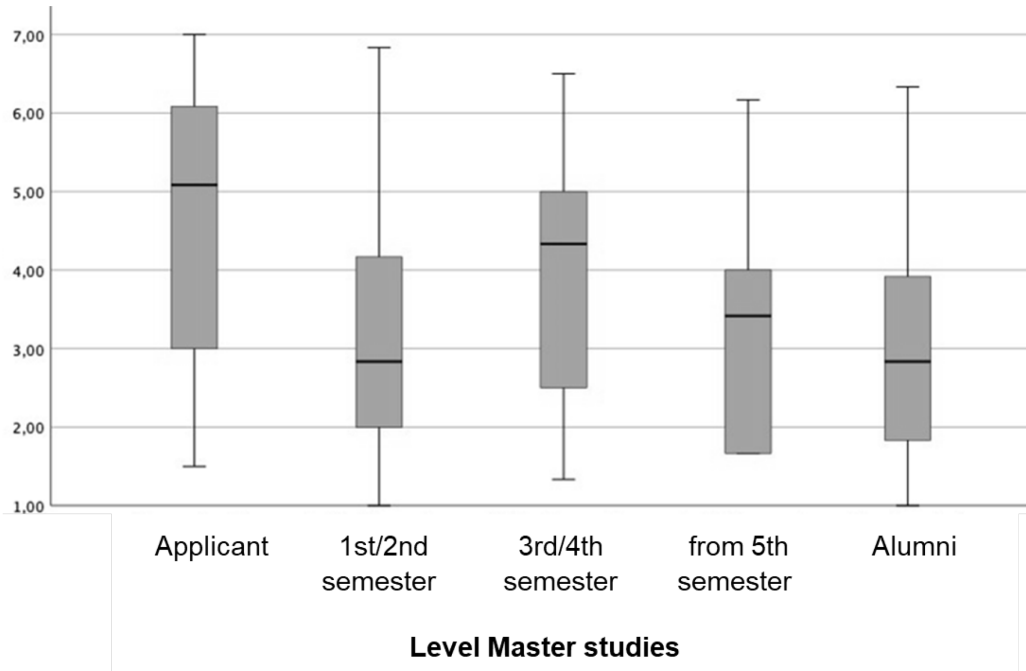


Figure 47 Mean of all items EI

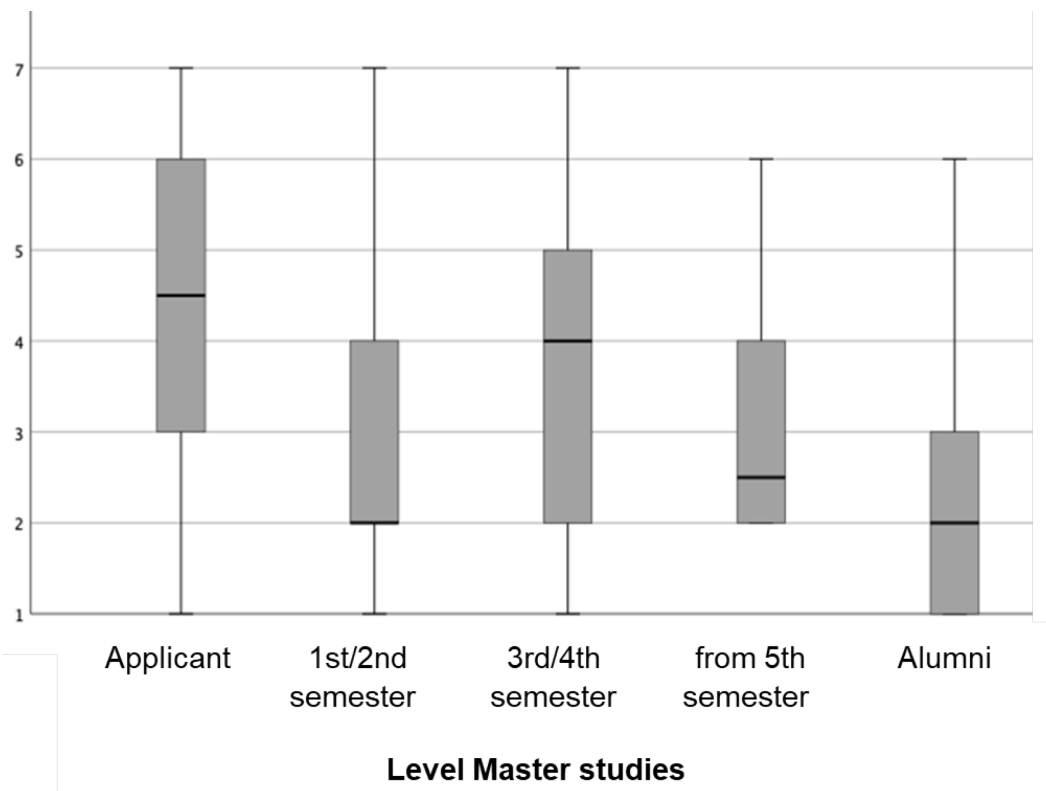


Figure 48 Item EI3 'I will make every effort to start and run my own firm'

5. Codebook

Table 37 Final codebook and descriptions

Code / Subcode		Description / Coding Rules	Example
Entrepreneurship definition		Is coded when possible definitions of entrepreneurship are mentioned, even if an entrepreneurial reference is recognizable. Is also coded when different forms of founding are mentioned, e.g., service vs. product or solopreneur vs. tech start-up	“Also bei Entrepreneurship kommt mir hauptsächlich so was Neues in den Sinn, was Neues gründen, was Neues anfangen.”
Attitude toward behavior	Reasons in favor	Is coded when aspects of being self-employed are seen as positive. Contains positive aspects of a founding that influence the decision. Describes advantages of being self-employed.	“Zum einen also Unabhängigkeit in jeder Art und Weise, dass man eben auch nicht finanziell und also abhängig ist von seinem (), sondern quasi erstmal auch so viel verdienen kann, wie man eben macht mit seinem Geschäft.”
	Reasons against	Is coded when aspects of being self-employed are seen as negative. Contains possible obstacles and arguments for not founding a company. Describes disadvantages of being self-employed.	“[...] also viele Leute sind glaube ich nicht bereit das Risiko einzugehen teilweise ja, auch weil sie irgendwelche finanziellen Bindungen haben, beispielsweise die Miete zahlt sich natürlich nicht von alleine.”
	Indifferent reasons	Is coded when talking about the general attitude towards new ventures or the general perception of the topic, also in relation to the founder reality. Is also coded when aspects of being self-employed are seen as positive and negative at the same time.	“Ist meiner Meinung nach aber sehr unrealistisch ((lacht)), gerade das Promotion von sehr viel Freiheit. JA hat man aber als unsere mit der Verantwortung die man hat auch doppelt so weniger viel Freiheit ((lacht)), es ist was es ist. Also es hat Vorteile Nachteile.”
	Media	Is coded when mentioning media that influence the perception of entrepreneurship.	“[...] ich sehe es überall, sei es jetzt auf LinkedIn, Tic Toc, Instagram, dass irgendwelche Leute halt posten, ja (--) mach dich doch selbständig, dann kannst du endlich, dass das und das. So also ich finde es auch ein ganz großer Einfluss von außen, der da gerade auch kommt.”
Subjective norms	Personal milieu	Is coded when talking about the social environment that influences the decision. This includes, above all, family, friends, colleagues and communities. Is not coded if it is about getting outside help for the actual implementation.	“Ja, ich denke auch in dem Punkt ist einfach auch wichtig, dass im Privat-Umfeld auch vielleicht das Verständnis einfach dafür da ist, was man vielleicht für ein Vorhaben hat.”
	New Community	Is coded if it is mentioned that you can also consciously surround yourself with contacts who react	“Wenn das halt nicht vorliegt, dann lohnt es sich vielleicht manchmal auch in dem Punkt auch sich dann

		positively to the topic of founding a company, also in order to receive feedback for the business idea.	eine eigene Community aufzubauen beziehungsweise das Netzwerk zu suchen, wo sich die Leute vielleicht mit ähnlichen Ideen identifizieren können."
	Friends	Is coded when precisely friends are mentioned as part of the personal social environment.	"Vielleicht auch dazu, im Freundeskreis, wenn man irgendwie im Freundeskreis Personen hat, die gründen und dann vielleicht einen mit einladen oder man sieht das und denkt sich, okay, ich habe da die Verbindung dazu, ich/ ich will das auch probieren."
	Family	Is coded when precisely family members are mentioned as part of the personal social environment.	"Und dann vielleicht, manche Leute sind ja auch in Unternehmerfamilien aufgewachsen, und da ist es dann für manche schon vorgezeichnet, dass sie Unternehmer werden, das kann der Fall sein, ja."
Perceived behavioral control	Shared Responsibility	Is coded when it is mentioned that it may be easier to form a team, for example because responsibility can be transferred or you have more competencies in the team, shared decisions, etc.	"Warum ich auch viele kennengelernt hab, die, wenn sie ein Unternehmen gegründet haben, mindestens mal einen Co-Founder mit reingenommen haben, nur aus dem Grund damit sie diese Art von Verantwortung so ein bisschen ja traghafter machen können."
	Networks	Is coded when talking about how the establishment and operation of a company can be controlled through support from the network you have e.g., you already have customers, partners or investors	"Netzwerk-Möglichkeiten ganz klar umso mehr Netzwerke man hat denke ich umso einfacher funktioniert das, insbesondere wenn man gute Beziehungen hat."
	Crises / Challenges	Is coded when talking about how successful operation of a company is at risk due to the influence of crises or external circumstances that cannot be directly controlled by the founder. Besides these more or less global or at least national challenges this code is also used from company specific challenges a founder has to deal with such as new competitors.	"Also ich habe gerade auch viel an Krisen gedacht. Ich habe halt mein sicheres Einkommen et cetera erstmal bei so einer Krise, sei es jetzt wie bei Corona, wo halt dann viele erstmal in Kurzarbeit zumindest gegangen sind, aber sie haben halt immer noch ein fixes Gehalt, während viele Selbstständige halt ja erst mal wirklich vor einer finanziellen Herausforderung standen."
	Competencies	Is coded for statements on the skills and abilities required to set up and successfully manage a company. The presence or absence of competencies is decisive for the perception of personal control regarding founding a new enterprise.	"Also ich habe gerade auch viel an Krisen gedacht. Ich habe halt mein sicheres Einkommen et cetera erstmal bei so einer Krise, sei es jetzt wie bei Corona, wo halt dann viele erstmal in Kurzarbeit zumindest gegangen sind, aber sie haben halt immer noch ein fixes

			Gehalt, während viele Selbstständige halt ja erst mal wirklich vor einer finanziellen Herausforderung standen.”
	Experience & Knowledge	Is coded when it comes to the necessary (practical) experience that serves as a basis for having the confidence to start a business. In addition, this also includes the relevant knowledge required in the thematic environment of the business start-up.	“[...]dass man einerseits schon mal gearbeitet hat und dementsprechend auch schon bis zu einem gewisse Punkt Abläufe kennengelernt hat, wie eine Firma wirklich funktioniert. Weil von außen sieht das immer alles so/ so einfach sage ich jetzt mal aus, wenn man das wirklich mal miterlebt hat, ist etwas ganz anderes.”
Entrepreneurship intention	Opinion regarding failure	Is coded when it comes to the question if someone's intention to start a business depends on his or her attitude towards failure.	“Es kann natürlich auch alles schief gehen und dann steht man vielleicht danach dann schlechter da als davor.”
	Motivation	Is coded when it comes to statements that the intention to start a business depends on the level of personal motivation.	“[...] diese intrinsische Motivation, sag/ sage ich jetzt mal, dieses Feuer dafür, ich mache das jetzt, und das ist jetzt richtig und ich weiß, wie ich es machen muss, oder ich hole mir eben Hilfe.”
	Ideas	Is coded for statements that indicate that the existence of a good idea (one's own or someone else's) from one's own perspective has an influence on the intention to found.	“Es ist eben, sage ich mal zum einen, denke ich das Mindset der Person und zum anderen das Brennen für die Idee, für die Geschäftsidee egal ob es ein Produkt ist oder ein Service.”
	Change of EI	Is coded for statements that make clear that the entrepreneurship intention can change in the course of life. This can either be an increase or a decrease in intention.	“Es gibt halt vielleicht auch Leute, die dann nach einer gewissen Zeit einfach sagen, Ok, ich bin mittlerweile vielleicht auch an meinen Eigenschaften, Skills und allem möglichen gereift, dass ich es mir mittlerweile doch zutraue [...]”
Entrepreneurial behavior	Support	Is coded when for statements regarding existing social and political support on the way to a start-up.	“Es braucht irgendwie eine hohe Eigeninitiative, diese Sachen zu lernen wie Unternehmertum funktioniert also das wie das wirklich geht, das wird einem nirgends beigebracht, weder in der Schule noch im Studium. Tatsächlich ist das ein Probieren. Von daher.”
	Finally acting	Is coded when it comes to carrying out the behavior of founding or not. This also involves the nature of the intention and factors that favor or hinder the final decision.	“Und ich glaube da ist halt nicht so, dass man sagen kann, ich will jetzt gründen und morgen gründe ich, sondern ich glaube, viele informieren sich dann Monate oder sogar jahrelang im Voraus über die ganzen rechtlichen Regelungen.”

	Opportunities	Is coded for statements on favorable or unfavorable opportunities that influence a founding decision. Favorable opportunities lead to an unexpected venture creation, while unfavorable opportunities prevent a planned venture.	“Ja, ich denk, vielleicht hat man auch gar nicht die Möglichkeit dazu. Also das ist sehr schön, sich etwas zu wünschen, aber manchmal ist man einfach in Situation/ Lebenssituationen wo man die Möglichkeit nicht hat, die Dinge umzusetzen, um ein Unternehmen zu gründen.”
	Influencing factors	Is coded for all statements that are of a general nature and can influence behavior. This includes age, gender, family situation (children), and financial aspects.	“Tatsächlich (am Ende kostet es auch) einfach Geld. Also manche Sachen kosten einfach Geld, also das/ jetzt/ ich meine/ ich meine ich bin jetzt ziemlich schlank aufgestellt, ich brauche nur einen Computer mehr oder weniger, aber trotzdem musste ich tatsächlich erstmal eine fünfstellige Summe investieren, dass das überhaupt mal/ überhaupt anzufangen und das muss man auch erst mal haben.”
Intrapreneurship	Prerequisites in companies	Is coded when talking about the corporate relation and which circumstances must be fulfilled in a company for intrapreneurship to be successful.	“Also das ist eine Frage von/ von Führungskultur, von Entscheidungs/ von Hierarchien, von/ das spielt denke ich so mit die größte Rolle. Auch Kommunikation im/ im jeweiligen Unternehmen.“
	Personal disadvantages	Is coded when reasons are given as to why working as an intrapreneur is worse than founding a company yourself.	“Ich hatte auch vorher in einem Großkonzern gearbeitet und da ist es halt sehr häufig passiert, dass Leute gute Idee hatten, die teilweise sogar umgesetzt wurden. Aber im Endeffekt dann von weiter oben als eigene Idee verkauft wurden.”
	Personal motives	Is coded when reasons are given as to why working as an intrapreneur is better than founding a company yourself.	“Ich glaub auch es nimmt ein bisschen so den Druck weg, weil da wird man kreativer, dadurch, dass man einfach nicht diese diesen extremen Druck hat von der Verantwortung und es muss klappen.”
Entrepreneurship Education	Value for companies	Is coded for statements that make it clear that an entrepreneurship education program can also have positive aspects for companies if employees have received this education.	“Also ich denke, dass jemand zu haben, das in einem Unternehmen, das an so einem Programm arbeitet, kann Vorteile für ein Unternehmen haben, egal aus welcher Perspektive. Also ich/ ich kann nur Vorteile sehen.”
	Project	Is coded for statements about the project that was completed as part of the Master's degree program.	“[...] jedes Projekt letztendlich ist auch ein bisschen anders, erfordert vielleicht dann auch nochmal andere Perspektiven, die man beachten muss.”

	Content	Is coded for statements about the content that was offered and dealt with during the Master's degree program.	"Vom Masterstudium Steinbeis (-) man hat viel gesehen. Es gab immer viele Beispiele. Also das war so ein bisschen Best Practice (-) oft, da hat man schon viel gesehen, was man machen kann."
	Recommendations	Is coded for any type of recommendation that is made. This may concern the content, the project or general organizational aspects of the Master's degree program.	"[...] wenn man die Leute vielleicht zum Gründen auch bewegen möchte, vielleicht auch mal Vorträge von Start-ups vorbei kommen zu lassen oder Entrepreneur, die dann vielleicht von ihrem Start berichten."
	Influence	Is coded when it comes to the influence of studies on the intention to start a business. This can be the case in both a positive and a negative direction.	"Ich habe 2005 mein MBA Studium damals bei Steinbeis abgeschlossen und der Initial-Impuls überhaupt Unternehmer zu werden, kam tatsächlich durch das Studium, weil ich einfach gesagt habe, ok, zwei Jahre Theorie, ich habe Lust irgendwie das mal voll auszuprobieren."
Personality traits	General aspects	Is coded if personal characteristics are mentioned or the topic of character / personality is addressed. Is not coded if there is talk of skills or experience.	"Und ich denke, da gibt es Leute, die haben einfach nicht die entsprechende psychische Konstitution und das ist nichts Schlechtes. Es ist einfach nur so."
	Legal awareness	Is coded for statements how someone deals with legal requirements that are related to venture creation and management.	"Das heißt, es ist schon eine/ eine ganz große Last, die da auf einem ist, wenn man es irgendwie rechtskonform alles machen möchte."
	Resilience	Is coded when the topic resilience is mentioned.	"Ich habe gedacht ich bin sehr resilient auch/ und kann sehr viel Druck und Stress vertragen."
	Passion	Is coded if interviewees discuss the relevance of passion.	"Das bedeutet du musst dich halt extrem/ musst dich halt voll darauf commiten und das bedeutet in fast allen Fällen dass Familie, Freunde et cetera wird alles hinten ran gestellt."
	Braveness	Is coded for statements related to braveness that is necessary for a founder.	"Also Gründen, denke ich, dafür braucht es einfach Mut."

6. Codes and number of positions

Table 38 Codes and number of positions

Code name	Number	Code name	Number
1 Entrepreneurship Definition	22	6 Entrepreneurial Behaviors	47
2 Attitude toward the behavior	59	6.1 Support	4
2.1 Reasons in favor	25	6.2 Final acting	16
2.2 Reasons against	23	6.3 Opportunities	11
2.3 Indifferent reasons	5	6.4 Influencing factors	16
2.4 Media	6	7 Personality Traits	31
3 Subjective Norms	15	7.1 General aspects	13
3.1 Personal milieu	3	7.2 Legal awareness	3
3.2 New Community	5	7.3 Resilience	4
3.3 Friends	1	7.4 Passion	6
3.4 Family	6	7.5 Braveness	5
4 Perceived Behavioral Control	38	8 Entrepreneurship Education	82
4.1 Shared Responsibility	6	8.1 Value for companies	6
4.2 Networks	7	8.2 Project	13
4.3 Crises / Challenges	9	8.3 Content	8
4.4 Competencies	4	8.4 Recommendations	30
4.5 Experience & Knowledge	12	8.5 Influence	25
5 Entrepreneurship Intention	38	9 Intrapreneurship / Innovation	27
5.1 Opinion regarding failure	8	9.1 Prerequisites in companies	6
5.2 Motivation	12	9.2 Personal disadvantages	6
5.3 Entrepreneurial Idea	11	9.3 Personal motives	15
5.4 Change of EI	7		