

Academic entrepreneurship at the TU/e

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Academic entrepreneurship at the TU/e

FINAL REPORT FOR THE STEERING GROUP, MAY 2020

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Executive Summary

Introduction

This report investigates the current needs of students and researchers regarding academic entrepreneurship*. Using the input of students, researchers, support staff, academic experts, external stakeholders, as well as the literature, we analyze the current situation. We also discuss the desired future state, which can serve as a starting point for the TU/e Executive Board to create a convincing vision on academic entrepreneurship.

Key findings

TU/e is in a transition towards a more entrepreneurial university and it finds itself halfway between the traditional and the emerging perspective on academic entrepreneurship. The ambiguity of TU/e's position towards entrepreneurship is evident from three findings:

- Both students and researchers find the IP policies of the university not clear and unfair
- Students and researchers have a similar type of needs (e.g., networks for financial and legal support), but are currently not adequately supported
- External stakeholders attach great importance to collaboration with the university in the area of entrepreneurship, but have difficulties establishing and sustaining such collaborative ties

Key implications and recommendations

To make sure that stakeholders are willing to cooperate and are aligned, we propose the following process:

1. Develop a convincing vision on academic entrepreneurship, in line with the emerging perspective on academic entrepreneurship (Siegel and Wright, 2015) and the recommendations of Graham (2014)
2. Translate this vision into transparent and fair procedures, and establish accessible support facilities for students & researchers
3. Use the implications and recommendations on the next pages as input for the procedures and support facilities

*list of definitions and abbreviations present on page 9.

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Introduction & Approach

RESEARCH QUESTION – TEAM – METHODOLOGY – DEFINITIONS & ABBREVIATIONS

This chapter explains the research question and describes the approach to answer it.

1. The Executive Board wants to learn how entrepreneurship can be improved at TU/e



Main Research Question

What are **the needs** of students & staff regarding **entrepreneurship**? And how can TU/e **service** these needs?



The Executive Board (EB) asked the Department of IE&IS to investigate the entrepreneurial climate at the TU/e. This study draws on the input of entrepreneurial students & staff, academic experts, support staff and external stakeholders (see page 7). We will focus on the below described topics, where funding will be incorporated into the support mechanisms:



Entrepreneurship culture & mindset

How can a culture of entrepreneurship be stimulated at TU/e? Are the current teaching and learning modules fostering such a culture? If not, what is needed?



Support Mechanisms

How to organize the optimal support to entrepreneurial activities of staff and students? How to optimize (access) to funding of entrepreneurs at the different stages of (the creation of) their companies? Are the current in-house mechanisms and infrastructures still appropriate? Is there a need for a 'one stop shop'?



Boundary conditions

How can we optimize the boundary conditions (rules, regulations, etc.) to enhance entrepreneurship in a societally acceptable way?

2.1 A team of researchers and consultants performed the entrepreneurship study



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TU/e innovation Space

Project for TU/e, ASML,
and HERE technologies



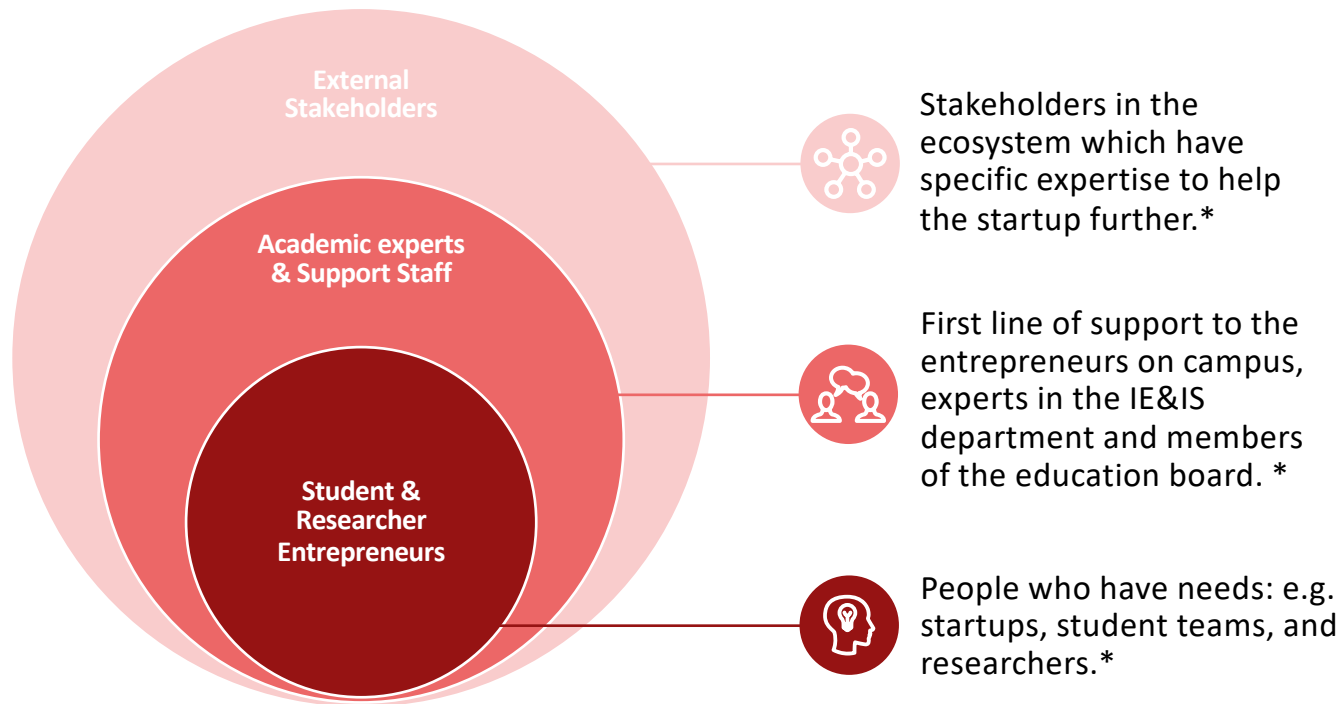
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Expert on
entrepreneurship

Projects for ASML, Renewi,
Rabobank

2.2 Open interviews with students, researchers, experts, support staff, and external stakeholders



Interview questions

We developed two sets of interview questions:

- A set of questions to interview students, staff, experts and support staff. Questions are asked in a different way to each group.
- A second set of questions to interview external stakeholders. Here, we focus on collaboration with the university.

Appendix II contains the lists of questions.

* Full list of interviewees in Appendix I

2.3 Recommendations are developed via interviews and a co-creation session

Phase 1:
Needs of
entrepreneurs



28-11-2019

Interviewee list &
Interview questions



09-01-2020

Introduction & first results
with Robert Jan Smits



12-02-2020

Presentation of results to
steering group

Phase 2 & 3:
Current &
future states



06-04-2020

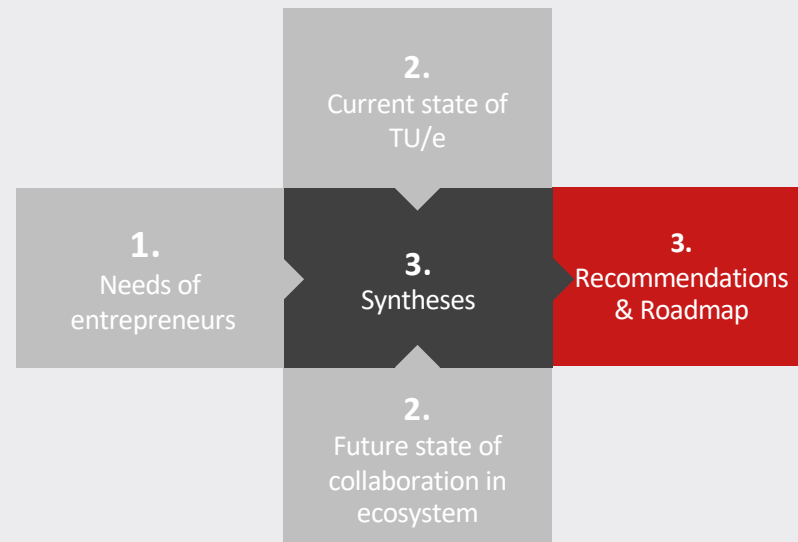
Webinar with
steering group

Methodology

In the first phase, the team focused on the needs of (potential) entrepreneurs. These are presented to the steering group on the 12th of February.

In the second phase, interviews are held with support staff & academic experts to gain more insights in the current state. Also, future collaboration of TU/e with the entrepreneurial ecosystem is envisioned, based on interviews with external stakeholders.

The third phase synthesizes all information into a current and future state. Here, also benchmarks are used from other universities. Then, the research team provides recommendations and a roadmap to get to the future state of entrepreneurship at TU/e.



2.4 Definitions & Abbreviations

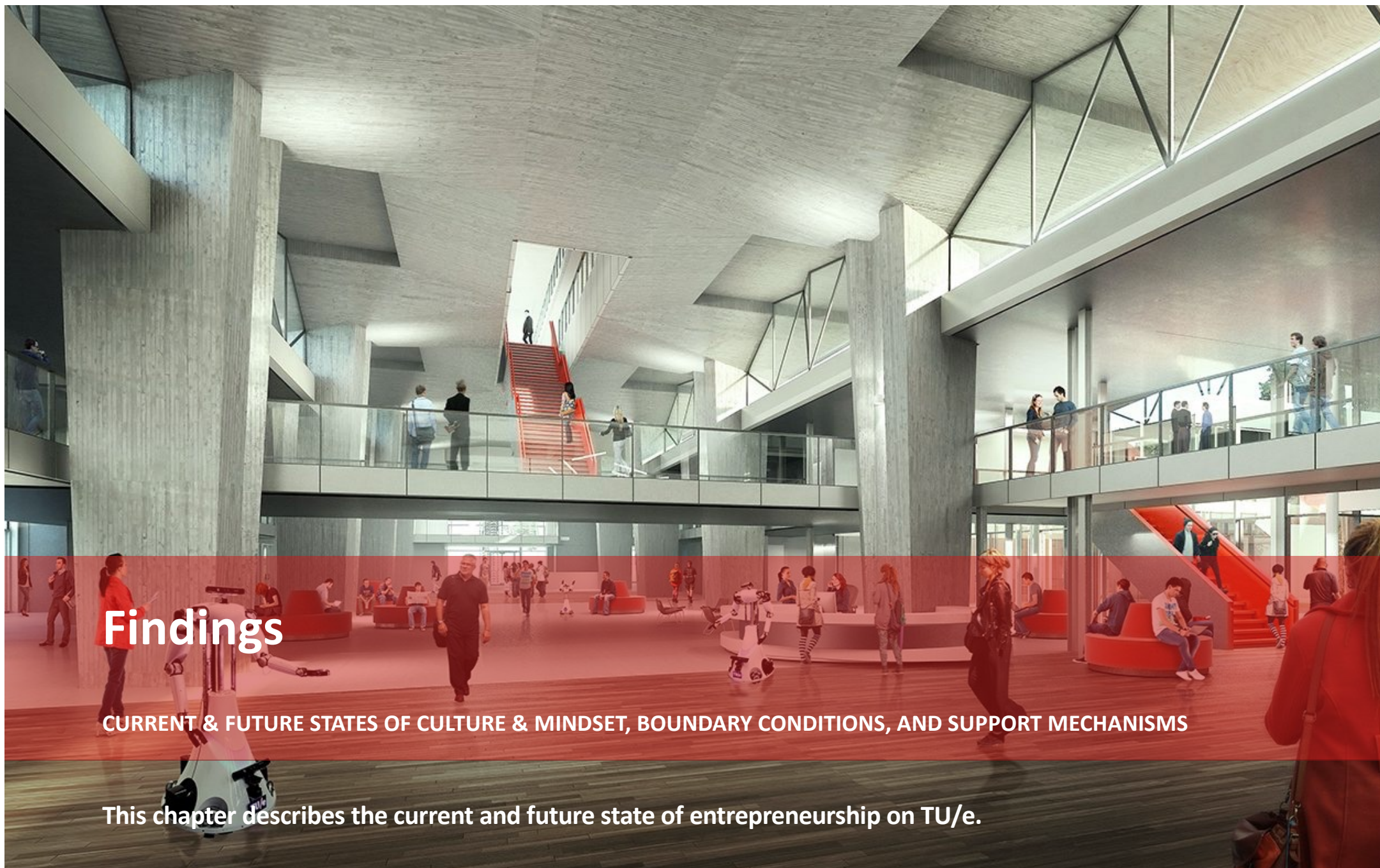
The reports uses the following definitions and abbreviations:

Definitions

- **Entrepreneurship:** The process of creating value by bringing together a unique combination of resources to exploit an opportunity (Stevenson & Jarillo-Mossi, 1986).
- **Academic entrepreneur:** A university scientist, most often a professor, sometimes a Ph.D. student or a post-doc researcher, who sets up a business company in order to commercialize the results of his/her research (Formica, Varblane & Mets, 2008).
- **Academic entrepreneurship:** An “intellectual enterprise,” in which universities cooperate with local communities to create new values or ideas (Beckman and Cherwitz, 2009).
- **Entrepreneurial culture & mindset:** A collective programming of the mind in which the underlying value system is oriented towards entrepreneurial behavior (Beugelsdijk, 2007).
- **Boundary condition:** Systemic conditions that must be created and sustained for a particular (function of the) organization to perform well.
- **Support mechanism:** An activity or resource that people (e.g. novice entrepreneurs) draw on to develop and grow (e.g. their ventures).

Abbreviations

- **TTO:** Technology Transfer Office
- **IP:** Intellectual Property
- **E&I:** Entrepreneurship & Innovation



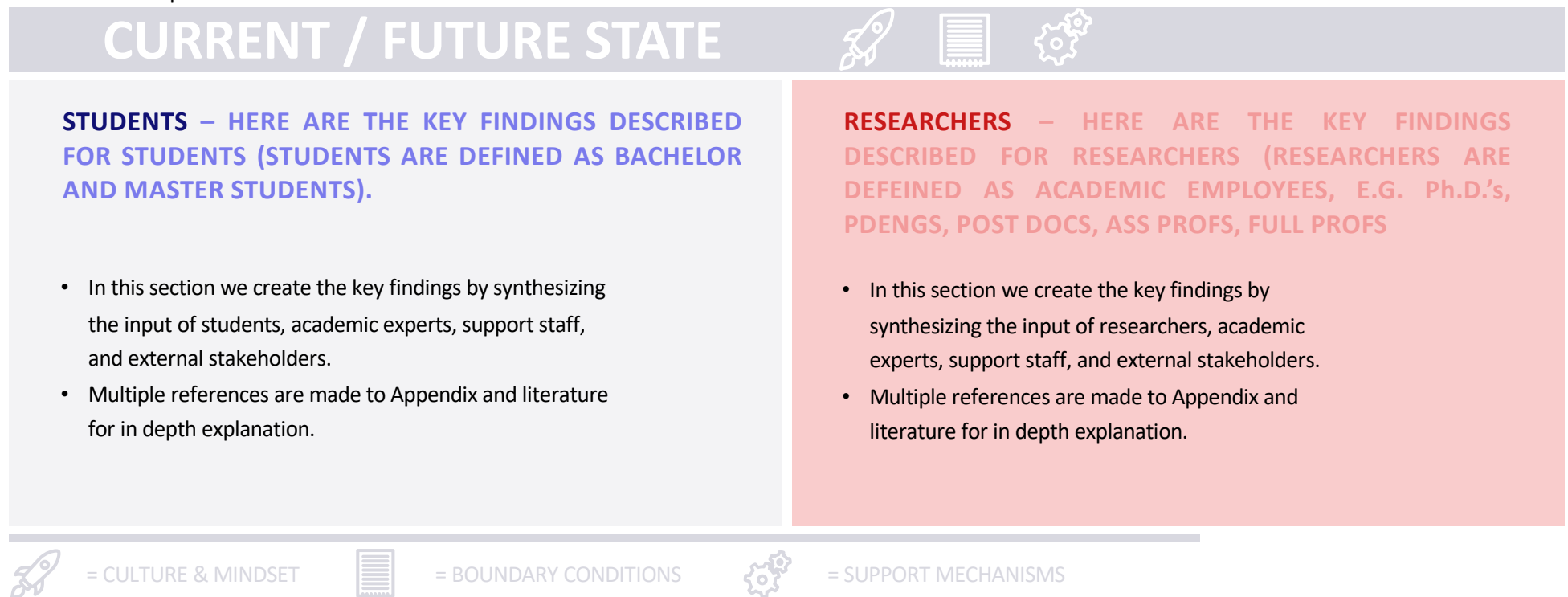
Findings

CURRENT & FUTURE STATES OF CULTURE & MINDSET, BOUNDARY CONDITIONS, AND SUPPORT MECHANISMS

This chapter describes the current and future state of entrepreneurship on TU/e.

3.0 Results are categorized in current states and future states over three topics

This chapter explains the current and future state of entrepreneurship on TU/e. First, it sets the status quo for culture & mindset under students and staff. Second, the current boundary conditions and the conditions of the future are highlighted. Lastly, the support mechanisms are explained in more detail; how TU/e currently organizes them and how they should be orchestrated in the future. It's important to note that the current and future states are consolidated from the input of Appendix III to VII. **This means the study represents the needs, wishes, and best practices as mentioned by interviewees and literature.** The illustration below visualizes the framework that is used in this chapter.



3.1 Entrepreneurial culture & mindset growing among students and lagging at researchers.

CURRENT STATE



CULTURE & MINDSET

STUDENTS – Growing entrepreneurial culture & mindset due to visibility. Entrepreneurship education is where mindset is born, but this is currently underfinanced.

- All internal interviewee groups report a **growing trend in student entrepreneurship** over the past years (Appendix III - VI). “Especially student teams are an exciting mechanism to transform entrepreneurial intent into action and are a systemic way to solve the valley of death” says one support staff employee.
- Students feel that the growing trend is due to the increase in the **visibility of student entrepreneurship**. The visibility comes from student teams and TU/e innovation Space (Appendix III). These kind of environments seem to create an empowered, cohesive, inventive, bold, and well-connected student-led entrepreneurial community (Graham, 2014)*.
- The deans of bachelor college, honors academy, and graduate school further explain that **education is where culture and mindset are born**. So if TU/e wants to increase the entrepreneurial mindset of students, it should change its education accordingly. Academic experts report that entrepreneurial education would benefit from a challenge-based approach. However, the **university’s financial distribution model** does not support the necessary coaching effort and time for this approach. This makes it impossible for teachers to offer the required coaching and customized tracks (Appendix V).

RESEARCHERS – Lagging culture due to mindset and KPIs of researchers. TU/e and researchers are both not good in sharing, which limits entrepreneurial culture.

- All respondents report a **lagging entrepreneurial culture & mindset** under researchers compared to the culture & mindset of students (Appendix IV).
- Researchers themselves claim that this lagging culture is due to the **mindset of most researchers** and **the KPIs they are getting assessed on**.
- Support staff and academic experts agree with this statement but also add that most researchers chose to become a researcher and not an entrepreneur; therefore, having a different skill- and mindset (Appendix IV & V).
- Some support staff adds that researchers also don’t want to share part of their business. However, “for entrepreneurs, it is essential to learn how to share if they want to scale up,” says one of the interviewees. But then also TU/e should become less protective. According to Graham, (2014), a **top-down approach has the danger** that the university’s entrepreneurial & innovation policies become “synonymous” with those of TTO, leading to a culture where **“only university-protected is seen as worthwhile.”** As a result, students, alumni, and regional entrepreneurial communities are often marginalized. Researchers report this lack of confidence is present on TU/e. Therefore, they rather spin-off alone than with TU/e.

* Graham consulted TU/e in redesigning the bachelor college in 2014.

3.1 Next steps are to integrate curricular & extra-curricular and honor role models

FUTURE STATE



CULTURE

STUDENTS – Integrate curricular & extra-curricular better, create a platform, and create more entrepreneurial role models.

- Academic experts and students want to have **curricular and extracurricular activities more interwoven**; student teams are closely linked to education (Appendix V). Students can do their master thesis about their startup. In TU Delft, students can work on commercialization of patents in courses (Hartmann, 2014).
- Students and support staff envision **a platform to go to when students have entrepreneurial aspirations**, but also to form ideas. An organization like TU/e innovation Space has the potential to become this platform because of its open and supportive culture. However, “you should put five floors of startups and support on top of TU/e innovation Space to create a real entrepreneurial hotspot”, as some support staff and external stakeholders highlight (Appendix III & VI).
- Following MIT, **TU/e should stimulate the presence of role models** (Nelsen, 2018) to expose students continuously to people who have successfully started companies and people who fund them. Via this platform with role models, TU/e support staff and startups should **get more engaged in the entrepreneurial ecosystem of Eindhoven** (Appendix VI).

RESEARCHERS – Honor and acknowledge entrepreneurial researchers, design Ph.D. entrepreneurship programs, and cross-fertilize with graduate students.

- All internal interviewee groups want an **academic culture that acknowledges, supports and rewards entrepreneurship** (Appendix IV – VI). Graham (2014) adds that departments should focus on influential disciplinary-based **role models and curricular and extra-curricular activities**. Support staff also sees an excellent opportunity to **honor role model entrepreneurs at TU/e**. Like students, researchers should be continuously exposed to people who have started companies and to people who fund them (Nelsen, 2018). Role models **make researchers excited to become entrepreneurial**, and they can also teach them the ‘code of conduct’ of entrepreneurship (see Appendix VI).
- With regard to curricular and extra-curricular activities, academic experts as well as Muscio & Ramaciotti (2019) and De Haan, Shwartz & Gómez-Baquero (2019) report that the **design of Ph.D. programs has a strong influence on entrepreneurship by Ph.D.’s and PDEng’s** (see Appendix VII). **Cross-fertilization between students and researchers** is also vital since graduate student entrepreneurs play a critical role in many of the pathways for technology led innovation. So, TU/e should focus on influential disciplinary-based **role models and curricular and** transfer through spinoffs (Boh, De Haan & Strom, 2016).

3.2 Vision on entrepreneurship is missing which results in unclear boundary conditions

CURRENT STATE



BOUNDARY CONDITIONS

STUDENTS – There are no rules and regulations for student entrepreneurs, communication & transparency on IP is missing, and negotiation is unclear.

TU/e is not providing a framework for students to operate in:

- **Vision on entrepreneurship-level:** Students want to know what does the **TU/e think of student entrepreneurship?** Is it supported and encouraged or not? And if so, what are the rules & regulations?
- **IP-Policy:** Support staff, academic experts, and students **disagree on the 'checkmark'(*) for students.** Support staff emphasizes this is necessary because the TU/e collaborates a lot with industry but do indicate that the text should be changed (Appendix VI). Students say it leads to frustration and is a demotivator for entrepreneurial efforts (Appendix III). It creates uncertainty, dissatisfaction, and indignation about the current IP policy, which demotivates students in their entrepreneurship (see Appendix III). Students and academic experts also report that **communication & transparency on IP is missing.** Academic experts suggest that it would be more appropriate to enter into an agreement about both IP and NDA when a specific context is known, such as a specific collaboration with a company or setting up a company (Appendix V).
- **Organizational-level:** Students find it **unclear who does what for entrepreneurs** and what are the **interests of the institutions.**

RESEARCHERS – Incentives for researchers are not towards entrepreneurship and a single point of truth is missing for IP and the business development process.

- All internal respondent groups report that **KPIs of researchers are not motivating them to engage in venture development** (see Appendix III - VI). Like Graham (2014) explains: “The incentives built into the university” are the root causes of the problem. The KPIs are “the same as any research university,” and are not adapted to reflect the university’s transition to an entrepreneurial institution.
- Researchers also complain that there is **not a single point of truth regarding IP-policy** for researchers. This makes them insecure about what to do and who to believe. Moreover, TU/e does not explain the 1/3 rule as profitable for researchers, which could be a reason why there is a dominant culture of not willing to share (Appendix VI).
- **Inexperienced entrepreneurial researchers** report that the business development process is **not transparent, and expectations are not well managed.** They feel that the business development process suddenly becomes a negotiation process where a ‘coach’ becomes a ‘negotiator’ for IP and shares in the business (see Appendix III). This creates distrust towards TU/e. **However, experienced entrepreneurial researchers do not report the above mentioned.** Instead, they report a pleasant contact with TU/e innovation Lab.

*On signing the enrollment form students also agree to concede all IP rights to the TU/e concerning your work, models, drawings or inventions created in the context of their studies

3.2 Start with a vision on entrepreneurship which embodies transparent IP policies

FUTURE STATE



BOUNDARY CONDITIONS

STUDENTS – Develop a clear vision on student entrepreneurship, appoint a vice-chancellor for entrepreneurship and design a transparent IP policy.

- Students want that the TU/e communicates a **clear vision on student entrepreneurship**. Graham (2014) adds that universities should have strong university leadership, actively promoting a clear and prominent E&I agenda that is heard and understood by staff, students, and the regional community. On top, **appoint a vice-chancellor for entrepreneurship** to elevate the role of entrepreneurship on campus, further streamline TTO operations, promote the interests of academic entrepreneurs (like an entrepreneurial status), remove barriers to their success, and connect them to entrepreneurship support mechanisms both inside and outside the university (Arias et al., 2018; Hayter, 2016).
- Students and academic experts also emphasize that **TU/e should create a transparent IP-Policy** that is in line with the Dutch Law (Appendix III & V). Like MIT develop a start-up option template that standardizes terms for virtually any start-up (technology transfer tactics, 2018). These rules, regulations, and processes should be **communicated from a single entity** and always be accessible.
- The **negotiation team** should be represented by **multiple independent stakeholders** to oversee all interests (Selten, 2019).

RESEARCHERS – Create a clear vision towards entrepreneurship.

- Researchers and academic experts urge that TU/e needs to **create a clear vision towards entrepreneurship**. They add that TU/e should think about implementing a partial salary or a **leave of absence rule** like Stanford (see Appendix IV & V). Support staff sees opportunities **to let researchers choose profiles** to put (temporarily) focus on research, education or entrepreneurship and feel encouraged to do so (Appendix VI). The prime focus is: prioritize impact, not income (Nelsen, 2018).
- Researchers, academic experts, and some support staff emphasize **that the IP-policy should be communicated from a single entity** so that researchers know what to expect when they start a business development process (Appendix III – VI).

3.3 Students and researchers want a network for support but formal collaboration is lacking

CURRENT STATE



SUPPORT MECHANISMS

STUDENTS – Students want a network to get financial and legal support, but external stakeholders cannot establish formal collaboration with TU/e. Internal trust is lacking on TU/e.

- Students want a **network to get financial and legal support**. Also, they express their feeling that being a student and entrepreneur is tricky and, therefore, would like to **get process support and personal coaching**. Alumni entrepreneurs, as well as students, point out **the limited facilities** on campus for start-ups (see Appendix III).
- Support staff answers that there is **already plenty of support coming** from TU/e Innovation Lab, TU/e innovation Space and Eindhoven Engine, but TU/e should communicate this from a single point (e.g. website), so support is better aligned. Also, TU/e should focus on creating **trust between these three organizations** (see Appendix VI).
- External stakeholders express that they attach great importance to cooperation with TU/e (as a strategic partner and/or shareholder in the belonging organization) in the field of entrepreneurship. However, **institutional collaboration** in the field of entrepreneurship **with TU/e is lacking**. There is no cooperation with TU/e Innovation Lab in supporting and promoting start-ups/spinoffs; at some stakeholders there is even a lot of frustration about **the disinterest and passive attitude** from TU/e innovation Lab (Appendix VIII).

RESEARCHERS – Researcher's needs are similar to student's, but Ph.D.'s. need more support – like entrepreneurial programs – than professors.

- Researcher's needs are similar to students; they have the feeling that they **need the most help with a network for financial and legal support**. This is validated by support staff who mention that researchers mostly miss knowledge in legal and administration topics **when setting up a company**. Therefore, TU/e should reserve resources to help researchers with these topics. On top, researchers should be educated a 'code of conduct' on how to do business (see Appendix VI).
- Researchers have **different views on the support** they would like to get from TU/e innovation Lab. In general, more business experienced researchers appreciate the support while inexperienced entrepreneurial researchers find that TU/e innovation Lab **controls their entrepreneurial efforts too much** (Appendix IV).
- Academic experts and support staff also see a difference in the amount and type of support researchers need. Senior researchers (i.e., full- and associate professors) only want to be supported in legal and administration topics. **Junior researchers (Ph.D.'s and PDEng's)** need entrepreneurial education because it is essential to **strengthening their commercialization power** of scientific knowledge and products (see Appendix V – VI).

3.3 Get support by orchestrating a network of external stakeholders on and around TU/e

FUTURE STATE



SUPPORT MECHANISMS

STUDENTS – Create a system-level collaboration in the Brainport region and change TU/e's role from an executive role to an orchestrating one.

- Academic experts & external stakeholders highlight that there **should be a system-level collaboration in the Brainport region orchestrated by the TU/e** to support student entrepreneurship. TU/e should establish robust & reciprocal relationships with the regional/national E&I community and patent companies, with a platform for these individuals to play a visible and influential role in university life (Graham, 2014).
- The system-level collaboration approach implies that **TU/e's role shifts from an executive role to an orchestrating one**, creating and sustaining partnerships with organizations like HighTechXL, the EIT KIC's, and several other innovation campuses (Appendix VII). This requires the new organization to have more connecting competencies and an open culture (See Appendix V).
- External stakeholders and students would like to see **one clear place where all entrepreneurial activities take place**; entrepreneurial education, start-ups, and support from the ecosystem. As the former CEO of YES Delft recommends: "TU/e innovation Space with five floors on top of it, with start-ups and offices for internal and external support (see Appendix III)."

RESEARCHERS – Move entrepreneurship from TU/e innovation Lab towards a more pivotal position within TU/e.

- Many top universities have taken steps to **move entrepreneurship from the TTO or E&I support functions to a more central position in the university** (Graham, 2014). Stanford University and Aalto University, for example, do this via the *Stanford Technology Ventures Program* (or Aalto Ventures Program). This means that TU/e business developers and entrepreneurship professors work **closely together to encourage and facilitate researchers' engagement in entrepreneurship**, and proactively seek collaboration with external partners (i.e. in Brainport ecosystem) to support and accelerate ventures (Good, Knockaert, & Soppe, 2019). TU/e should, therefore, systemically mobilize and sustain networks of partners and experts to interact with spinoffs (Andries, Van Looy & Debackere, 2014).
- This means that TU/e could keep the **conventional TTO tasks** (including contracting and licensing of university-owned technology) and combine it with **inclusive grassroots community** of E&I engagement across university populations and regional community, both connected via a **university E&I agenda that is reflected in its policies, missions, budget allocations, incentives and curriculum** (Graham, 2014).



Reflection

Key observations framed in terms of the literature on academic entrepreneurship

REFLECTION

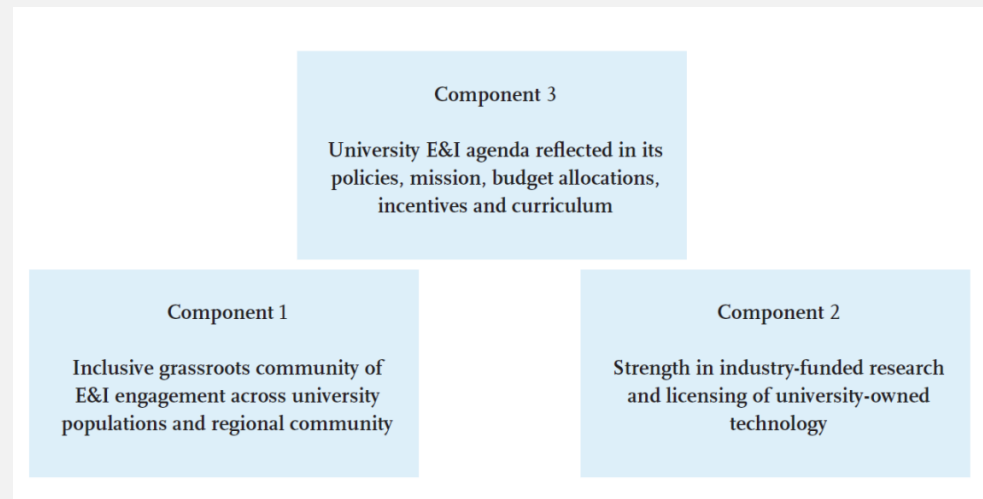
We reflected on our findings using state of the art literature of the past years. Here, we had some interesting observations. The research of Graham (2014) and paper of Siegel, D., & Wright, M. (2015) describe very well in what phase we are in and what elements TU/e is missing as an entrepreneurial university.

GRAHAM, R (2014)

The findings of Graham (2014) suggest that emerging leading entrepreneurial universities share **two common barriers to long-term success**, each of which has the potential to constrain the growth and institutionalization of their E&I capacity.

1. The first challenge relates to **the disconnect between component 1 and component 2** that appear to be driving entrepreneurial growth. As this suggests, the division between university-owned IP and non-university IP casts a long shadow.
2. The second challenge is more deep-rooted and relates to the issue of embedding **E&I into the vision and mission of a university**, indicated as Component 3 in the figure.

While not inherently in conflict, entrepreneurship at many universities **has yet to be aligned with the core university functions of teaching and research**. In the globalized market in which universities operate, research income and research rankings are the metrics that count, **goals that are seen by some to “directly conflict” with an entrepreneurial agenda**. Additional metrics are required to create institutions with an E&I commitment, culture and capacity that will enable sustained regional and national entrepreneurship growth.



Graham, R (2014) Creating university-based entrepreneurial ecosystems evidence from emerging world leaders, MIT Skoltech Initiative

Key observations framed in terms of the literature on academic entrepreneurship

SIEGEL, D. & WRIGHT, M (2015)

TU/e is not alone in exploring (future of) academic entrepreneurship. Other universities also feel the need to **change towards a more entrepreneurial university**. Two leading researchers, Donald Siegel and Mike Wright, have visualized **the traditional versus emerging perspective on academic entrepreneurship**. This is illustrated on the right.

Table 1. Traditional and emerging perspectives on academic entrepreneurship

Theme	Traditional perspective	Emerging perspective
Why	To generate direct financial returns	To provide a wider social and economic benefit to the university ecosystem
What	Academic spin-offs; licensing; patents	Student and alumni start-ups; entrepreneurially equipped students; job creation in the local region or state
Who	Academic faculty and post-docs	Students; alumni; on-campus industry collaborations; surrogate entrepreneurs
How	TTOs; science parks	Accelerators; Entrepreneurship garages; student business plan competitions; collaborative networks with industry and alumni; employee mobility; public-private 'incubators'

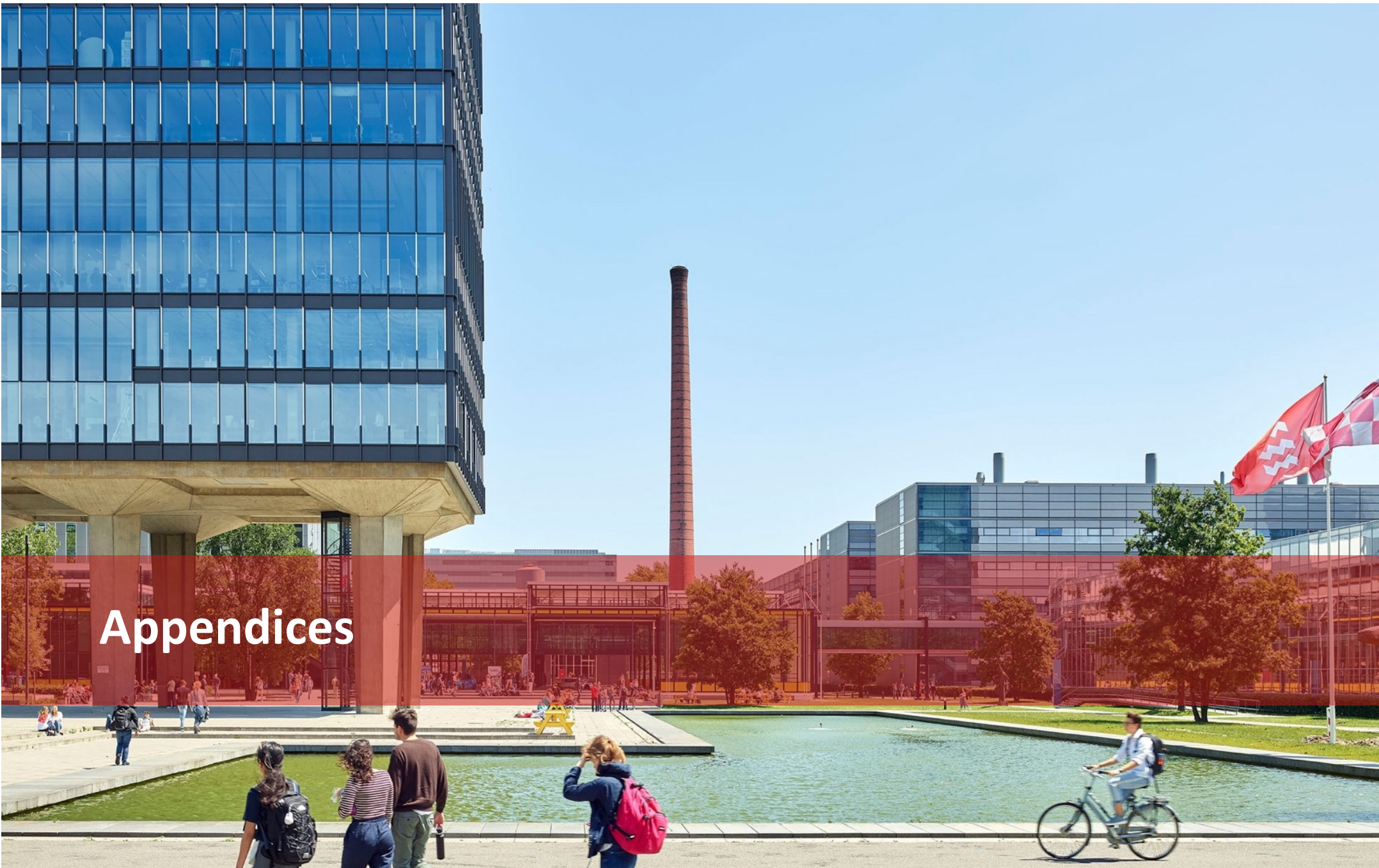
Siegel, D., & Wright, M. (2015). Academic entrepreneurship: Time for a rethink? *British Journal of Management*, 26(4), 582-595.

CONCLUSION

Based on our findings, we can position **TU/e underway from the traditional perspective to the emerging perspective**. For example:

- interviewees observed that the current TU/e mission statement does refer to a *wider and economic impact on the regional ecosystem*, but the *KPIs used* are still primarily based on the traditional perspective.
- TU/e has a *TTO* (i.e. a group of TU/e innovation Lab), but also has entrepreneurial garages like *TU/e innovation Space* and partly also *Eindhoven Engine*.

A large part of the issues raised by interviewees thus appear to arise from **the ambiguity of the university's position towards academic entrepreneurship (see component 3 of Graham (2014))**. Therefore, there is a strong need for a clear TU/e policy framework that guides both internal operations and the interactions with external partners in the area of entrepreneurship.



Appendices

Overview of appendices

- I. Interviewees
- II. Interview questions
- III. Input interviews students
- IV. Input interviews researchers
- V. Input interviews academic experts
- VI. Input interviews support staff
- VII. Input interviews external stakeholders
- VIII. Input best practices literature
- IX. References

Appendix I: Interviewees

Entrepreneurial staff (1st phase)

- Maarten Steinbuch (ME)
- Oded Raz (EE)
- Menno Prins (BME)
- Marion Matters (EE)
- Jack van Wijk (W&I)
- Pieter van Gorp (IE&IS)
- Theo Salet (BE)
- Fausto Gallucci (CEC)

Entrepreneurial students (1st phase)

Four focus groups:

- Project teams of TU/e innovation Space (interviewed on 14-01-2020, five representatives of teams present)
- Startups in the incubation program of STARTUP/Eindhoven (interviewed on 15-01-2020, five startups present)
- Honors Program (interviewed on 23-01-2020, Inez Lopez and Kathinka Rijk Present)
- Alumni student entrepreneurs (*CM Data*: Gilbert Gooijers , *Lighyear*: Tom Selten, *Wolfpack*: Edwin Hermkens and Joey Claessen.)

Academic expert (1st phase)

- Madis Talmar (IE&IS)
- Annelies Bobelyn (IE&IS)
- Myriam Cloodt (IE&IS)
- Rudi Bekkers (IE&IS)
- Paul Koenraad (Dean graduate School)
- Lex Lemmens (Dean Bachelor College)
- Sjoerd Romme (IE&IS)
- Isabelle Reymen (IE&IS)

Support staff (2nd phase)

- Sonja Vos (Director at TU/e Holding)
- Steef Blok (Director at TU/e innovation Lab)
- Steven van Huiden (Director at STARTUP/Eindhoven)
- Robert Al (Business Development at TU/e innovation Lab)
- Frank van de Ven (Business Incubation at TU/e innovation Lab)
- Alfons Bruekers (Managing Director at TU/e innovation Space)
- Bert-Jan Woertman (Liaison Officer at TU/e innovation Space)
- Katja Pahnke (Managing Director at The Engine)
- Pieter van Wesemael (Valorization at Built Environment)
- Carmen van Vilsteren (Director Strategic area Health)

External Stakeholders (2nd phase)

Jacob Ruiter	(CEO at EIT InnoEnergy, Benelux division)
Patrick Essers	(Managing director EIT digital, Benelux division)
Guus Frericks	(CEO at HighTechXL)
Rob van der Werf	(representative of ASML, as partner in HighTechXL)
Sven Bakkes	(CEO at Lumo Labs)
Lex Boon	(CEO at Automotive Campus)
Cees Admiraal	(CEO at High Tech Campus) HTCE
Ger Post	(Lector Business Entrepreneurship at Fontys)
Job Nijs	(CEO Braventure)

Appendix II: Interview questions

Students & Staff

We want to gain more insight in the needs of students & staff regarding entrepreneurship and in how can TU/e service these needs.

- How do you feel about the entrepreneurship culture on TU/e?
 - Which entrepreneurial conditions do already exist?
 - What do you need?
 - Where can we still improve?
- For students: Are the current teaching and learning modules (in Bachelor College, Graduate School, or courses offered to Ph.D.'s) fostering such a culture?
 - If not, what is needed?
- For Staff: Is the current offering of professional and entrepreneurial development by innovation Lab sufficient?
 - If not, what is needed?
- What kind of support do you need?
 - Which parts of this support must come from TU/e?
- What's your view on how the TU/e is handling IP currently?
 - With regards to IP policy itself?
 - With regards to communication IP policy?

External Stakeholders

We want to gain more insight into the positioning of the TU/e in the Brainport ecosystem. We focus on the stakeholder view of entrepreneurship at TU/e, the current relationship between the stakeholder and TU/e, and their dream scenario.

- What is your opinion regarding entrepreneurship (of staff and/or students) at the TU/e?
- What is your experience in collaborating with the TU/e (related to startups or other entrepreneurial output)?
 - Do you have multiple ties with the TU/e, and if so, which?
 - What goes well?
 - What does not go well?
- What do you expect from the TU/e to be better serviced? How can entrepreneurial deliverables (e.g. entrepreneurial talents, prototypes, IP) be better transferred to partner organizations like yours?
- How can the TU/e more effectively collaborate with your organization?
- What would be your dream scenario?

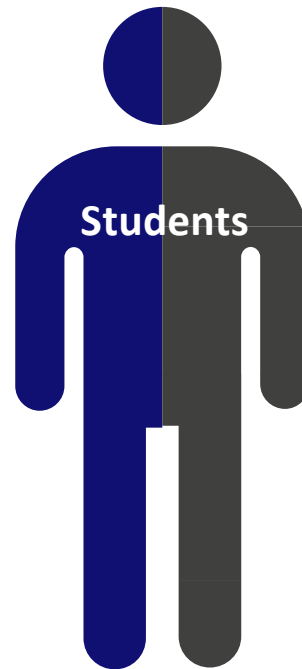
Appendix III: Input interviews students



Entrepreneurship culture & mindset

Students highlight the following points with regard to student entrepreneurship culture at TU/e:

- TU/e alumni entrepreneurs all report that the university has become **more entrepreneurial** over the last decade because the **visibility** of entrepreneurs is increasing. This makes more students interested in becoming entrepreneurial.
- The deans of bachelor college, honors academy and graduate school further explain that **education** is where entrepreneurial **culture and mindset are born**. If TU/e wants to increase the entrepreneurial culture, it should change its education accordingly. Education and entrepreneurship are so much connected that they can strengthen or block one another.
- Students also report that they want a **platform** to go to when they have entrepreneurial aspirations, but when they do not have an own idea. **TU/e innovation Space** has the potential to become this platform because of its open and supporting culture. There is lack of clarity regarding services offered by Innovation Lab, and how the Innovation Lab relates to the TU/e innovation Space.



Boundary conditions

Students want to know about TU/e's position on three levels:

- **Vision on entrepreneurship-level:** What does the TU/e think of student entrepreneurship? What is the ambition of the TU/e? Is it supported and encouraged or not? What rules & regulations are there? Students coin an entrepreneurial status just as the top-athlete status. Here, you can get special treatment because you are setting up a business (i.e. reschedule an exam). Also, combined with a entrepreneurship dean, a high-level person that can defend their interests and mediate with education.
- **IP-level:** Students want a fair Intellectual Property (IP) policy which is transparent and communicated clearly. Currently, it feels that there is not a clear structure in the process and each start-up is treated differently. There is also a lot of discussion on the 'checkmark', which leads to frustration and is a demotivator for entrepreneurial efforts.
- **Organizational-level:** Students want clear communications on who does what for them combined with the interests of the institutions. They want that advice to them and negotiations with the university are separated.

Students report that they find it **difficult to enter a network** of people and institutions that can help them. Therefore, they ask for **network facilitation and organization**. Someone that connects and helps student entrepreneurs in the ecosystem.

With regards to access to funding, students report that the **lack of overview in investment opportunities** is the main problem in the early stages. It's difficult to get **financial support to make a first prototype**.

Students **lack knowledge on legal and fiscal topics**. Typical requests of student entrepreneurs are (additional source: Louwers IP lawyers, 2019) an overview of **company types and structure** that could fit startups, basics on employment and internship agreements, tips on tax regulations for starting entrepreneurs, and an overview of type of shareholder agreements. To get this information, students **want to be connected to lawyers, patent attorneys, and notaries**.



Students

Early phase start-ups need six person meeting rooms, flexible workplaces, and prototyping space where they don't have to clean up. TU/ innovation Space serves their needs well, but students also mention the limited number of current workplaces and that they have to clean up. Mature start-ups need affordable office space and access to high tech facilities. However, they report difficulties to get cheap housing and have bad experiences with expensive and long term contracts.

On the mentoring side, students report they want **processes coaching** by experienced entrepreneurs. They are interested in meetings with investors and suppliers, and in advice on how to scale their start-up, and on what technology to use. Besides, students require **personal coaching** to empower their personal leadership and prevent burnouts. Topics that come up are time management, personal leadership, and development.

Appendix IV: Input interviews researchers



Entrepreneurship culture & mindset

Entrepreneurial researchers report that entrepreneurship culture & mindset under staff are not yet as it should be. Several reasons are given:

- **Mindset:** many researchers stay too much in their room and are not eager to build up a network around. They don't understand the societal value that they could create via their research.
- **KPIs:** researcher's primary KPI is research, then education and then, lastly valorization and entrepreneurship. Therefore, it's difficult to find time to be entrepreneurial.
- **Support:** Researchers report that there is a lack of confidence, and they miss trust and encouragement from the TU/e to their entrepreneurial efforts.

But researchers also see that more colleagues are interested in setting up start-ups. Most of them do this to secure more funding for research, others do external consultancy, and only a small portion to make a product and have a positive impact on society.



Boundary conditions

With regard to boundary conditions, two main points are highlighted:

- **IP policy:** researchers find a lack of transparency and clarity. They argue that the IP policy is not clear because you hear different rules from multiple people, and that makes them insecure what to do. Researchers who have experience in entrepreneurial efforts argue that TU/e does not want to file IP if it's not instantly turned into business. This makes them feel that it's more about reaching a KPI or making profit for the TU/e instead of helping the researcher. Additionally, when IP is filed, TU/e claims a share (or whole) of the start-up. However, it's not transparent what the TU/e is going to do with the shares and revenue from it. Overall, the system is demotivating for researchers who want to undertake entrepreneurial efforts.
- **Process:** Researchers report that the process and the roles of Innovation Lab and TU/e holding are unclear. A 'coach' can suddenly become a negotiator for IPR. Researchers explain that these 'double roles' create fear and distrust towards Innovation Lab.

Researchers report that network facilitation, offered by the TU/e, is important. For example, they want to be connected to venture challenges and the ecosystem. However, this strongly depends per researcher. For example: a Ph.D. student needs more support in network development than a full professor. Access to funding is considered to be a very important aspect in which TU/e can facilitate or support researchers. They say it's essential that TU/e takes an orchestrating role here; connect to external funding and subsidies.



Researchers

Researchers report that they want advice and process support in the early phases. Topics that come up are a manual to set up a company, to employ people and expertise on contracts. Researches emphasize that TU/e should have inhouse knowledge on contracts but connections **to lawyers and notaries** are needed for answers to other questions.



For specific start-ups that originate from research, it's essential that they can use the laboratories & high tech infrastructure of TU/e.

Researchers find that the TU/e is trying to 'control' their entrepreneurial efforts by telling them what to do. However, researchers only want to be supported if they wish so; they desire the freedom to choose what they think is right. Next, researchers ask for transparency around IP. Currently, researches hear different statements on this issue. Lastly, they find that the different interests of the organizations on TU/e dealing with entrepreneurship should become more clear.

Appendix V: Input interviews academic experts



Entrepreneurial culture & mindset

Academic experts report an increase in entrepreneurial culture & mindset of students on TU/e:

- **Bachelor:** Entrepreneurial- and challenge-based learning are the foundation to this mindset. However, it's underfinanced, which makes coaching & customization hardly possible. The open and learning culture of TU/e innovation Space also contributes.
- **Master:** Students should be able to keep their project over multiple courses and do their master thesis about their start-up, to reduce risk.

Entrepreneurial culture & mindset

under **researchers** is lagging. Academic experts give the following reasoning:

- Most chose to become a researcher and not an entrepreneur, it's a different skill- and mindset.
- There are options to make researchers more entrepreneurial, like the 80% rule and unpaid leave schemes of Stanford and Aalto.



Boundary conditions

Optimize boundary conditions for students:

- The lack of communication & transparency on IP leads to uncertainty, dissatisfaction, and indignation among students, which demotivates them in their entrepreneurship. For example, students will not use their best idea in a course because they believe TU/e will 'steal' it.
- Among academic experts, there are doubts about whether this checkmark is indeed necessary for the university in order to collaborate with industry, and whether it is compatible with Dutch law.

Optimize boundary conditions for researchers:

- Develop and communicate a clear vision on entrepreneurship. Also, improve researcher's KPIs because they are not valued on their entrepreneurial efforts.



Support

- **Born student entrepreneurs** should be offered a network for investment opportunities, technical connections, and some coaching. The **majority of students** should be involved in curricular and extra-curricular entrepreneurial activities. **All students** should be reached in one way or another to raise some entrepreneurial awareness.
- **Researchers** should be supported if they wish so; Ph.D.'s need support in business development and finding markets while full professors only need legal support to set up the business.

To optimize and organize this support, TU/e should involve the ecosystem of the region. Create basic facilities to provide advice to students and staff yourself. But play a central orchestrating role, not an executive role in the specific support. The work of a future "entrepreneurship organization" would, therefore, shift from being involved with spinoffs, to building and maintaining relationships.

Appendix VI: Input interviews TU/e support staff



Entrepreneurship culture & mindset

Support staff has seen the entrepreneurial mindset and output of students growing. They give some ideas to enhance the culture & mindset further:

- Support the creation of more student teams. They are an exciting way to transform intent into action and are a systemic way to overcome the valley of death.
- Get TU/e support staff & start-ups more involved in the entrepreneurial ecosystem of Eindhoven.

Under researchers, the entrepreneurial mindset is lacking. Support staff gives two reasons:

- Currently, researchers become entrepreneurial on intrinsic or financial motivation. Therefore, only a minority of researchers want this. TU/e can increase the entrepreneurial culture by honoring researchers more (i.e. by offering them a stage).
- Researchers don't like to share their businesses. However, for entrepreneurs it's essential to learn how to share to create value for society.



Boundary conditions

Support staff report that the following with regards to the boundary conditions for students:

- The 'checkmark' for students is introduced because the TU/e collaborates a lot with industry. The support staff agrees that the text should be changed. There is no agreement on whether the 'checkmark' remains necessary or not.

Concerning researchers, there is no clear framework to operate in, and, communication is not clear:

- The TU/e does not explain the 1/3, 1/3, 1/3 rule as profitable for researchers. That could be a reason why there is a dominant culture of not sharing.
- Also, KPIs for researchers are not motivating to perform entrepreneurial activities. The TU/e would do well to let researchers choose "profiles" on which they can excel and be assessed.



Support

Support staff give emphasize the following specific support for students and researchers:

- Students should get process support by senior support staff and only little financial support.
- Researchers mostly miss knowledge on legal aspects and administration. Also they should be educated a set of moral rules and behavior how to do business with TU/e and others (i.e. a code of conduct).

Overall, there are three organizations on the TU/e that support entrepreneurial students and researchers (TU/e Innovation Lab, TU/e innovation Space, and Engine). There is already plenty of support coming from these organizations, but it should be communicated from one point. Also, TU/e should focus in creating trust between these three organizations.

Appendix VII: Input interviews external stakeholders

Interviews were held with external stakeholders of different kinds of organizations. We are interested in three types of external stakeholders because we believe these are the organizations that could help startups further:

- Other campuses can offer facilities, housing, and a network to startups.
- Innovation intermediaries can offer an accelerator program, sector-specific (European) network, and investment for start-ups.
- Venture builders provide professional accelerator programs, sector-specific networks, and financing.

Below we describe the (regional) organizations we interviewed:

CAMPUSES



- Lex Boon (CEO of Automotive Campus)
- Cees Admiraal (CBO at HTCE)

The **Automotive Campus** has over 1250 people working on the mobility solutions of the future.

High Tech Campus Eindhoven is smartest km² in Europe, with more than 220 companies and institutes, and 12.000 researchers, developers and entrepreneurs working on developing future technologies.

INNOVATION INTERMEDIARIES



- Jacob Ruiter (CEO at EIT InnoEnergy, Benelux division)
- Job Nijs (CEO Braventure)
- Ger Post (Lector Business Entrepreneurship at Fontys)
- Patrick Essers (CEO EIT Digital, Benelux division)

EIT InnoEnergy builds a sustainable, long-lasting operational framework amongst the three actors of the knowledge triangle in the energy sector.

Braventure is committed to making startups the global companies of tomorrow through knowledge, development, community and financing.

EIT Digital is a leading European digital innovation and entrepreneurial education organization of over 200 top organizations, startups, universities.

VENTURE BUILDERS



- Sven Bakkes (CEO at Lumolabs)
- Guus Frericks (CEO at HighTechXL)
- Rob van der Werf (Representative of ASML, as partner in HighTechXL)

HighTechXL's mission is to build high-performance teams so they can become fast-growing, deep-tech ventures. They are deep-tech venture builders.

LUMO Labs is a two-year venture builder program that provides pre-seed and seed funding, and actively supports entrepreneurs.



Current Collaboration

Every stakeholder attaches great importance to cooperation with TU/e (as a strategic partner and/or shareholder in the belonging organization) in the field of entrepreneurship.

However, currently it's not clear to (new) stakeholders where they should go in the TU/e, it is difficult to find a logical entry point. The plus side is that many stakeholders have numerous lines to (individual employees and/or groups, including students of) the TU/e.

Formal cooperation in the field of entrepreneurship with TU/e is lacking. Stakeholders wonder whether the TU/e is going for its own interest or the region's. At least there doesn't seem to be a joint goal.

Moreover, there is no cooperation with TU/e Innovation Lab concerning supporting and promoting start-ups/spinoffs; for some stakeholders, there is even a lot of frustration about the disinterest and passive attitude from TU/e innovation Lab. Besides, the rules regarding IP are not clear. That makes collaborating with researchers difficult as an external stakeholder.



Future Collaboration

The goal from TU/e must change from the turnover on entrepreneurship to making a social impact on the region. In addition to publications, the region can also collaborate on the above mentioned topics. A common goal should be made and also jointly communicated. The Executive Board must actively manage this. Then, the future entrepreneurship organization can act much more as an orchestrator in the entrepreneurial ecosystem. As a pivot in a world-class high-tech innovation ecosystem, they will aim to contribute to making the Brainport Eindhoven innovation hub attractive (TU/e-strategy 2030). This has two advantages:

- The resources and workforce for supporting and accelerating start-ups, student teams and spinoffs (from TU/e) are multiplied, because HighTechXL, EIT Digital, EIT InnoEnergy, EIT Health, and various other stakeholders have much more resources for accelerating these.
- Also, the relevant stakeholders have much context-specific expertise about certain types of startups and/or specific sectors, and also have better access to specific networks of investors/subsidies/etc.

Also, TU/e must even physically step outside its campus with a presence on other campuses to allow students and researchers to get closer to the businesses.

Appendix VII: Best practices from literature



Entrepreneurship culture & mindset

Students

- There should be an empowered, cohesive, inventive, bold, and well-connected student-led entrepreneurial community, benefitting from sustained low-level funding, seasoned entrepreneurial mentors, and direct connections to senior university management (Graham, 2014).
- MIT focuses on role models, a lot of them. Students and faculty should be continuously exposed to people who have started companies and to people who fund them. These people come from within MIT and from the community. This way, students graduate with a sense that “I can do it too” (Nelsen, 2018).
- At TU Delft, they run courses like “Turning Technology into Business.” Between 2003 – 2014, ten companies were founded as a direct spinoff from this course, meaning that the idea developed in the class was turned into a business (Hartmann, 2014).
- Cross-fertilization between students and researchers is also vital since graduate student entrepreneurs play a critical role in many of the pathways for technology transfer through spinoffs (Boh, De-Haan, & Strom, 2016).

Researchers

- A top-down approach has the danger that the university’s E&I policies become “synonymous” with those of the TTO, leading to a culture where “only university-protected IP is seen as worthwhile.” As a result, students, alumni, and regional entrepreneurial communities are often marginalized (Graham, 2014).
- University departments should create an academic culture that acknowledges, supports, and rewards E&I inquiry within a cross-disciplinary context, helping to nurture influential disciplinary-based role models, curricular and extra-curricular activities, and champions for institutional change (Graham, 2014).
- Entrepreneurial education for Ph.D. and postdocs is beneficial for their entrepreneurial mindset.
- The design of Ph.D. programmes has a strong influence on Ph.D. entrepreneurship. Students’ engagement in real-world scenarios, application of their research results to a business context, and participation in entrepreneurship courses can have a dramatic impact on their propensity to become entrepreneurs (Muscio, Ramaciotti, 2019).



Boundary conditions

- For many researchers, “the incentives built into the university” were the root causes of the problem. Which, in almost every case, remained “the same as any research university”, and had not been adapted to reflect the university’s transition to an entrepreneurial institution. In the globalized market in which universities operate, research income and research rankings are the metrics that count, and goals were seen by some to “directly conflict” with an entrepreneurial agenda (Graham, 2014). Career incentives are most valued by academics, followed by personal motives and only a small minority for monetary incentives (Lam, 2011). D’este & Perkmann (2011) report that personal and career incentives are more important than monetary incentives to engage in entrepreneurship. To work towards these incentives, universities should have strong leadership and governance, actively promoting a clear and prominent Entrepreneurship and Innovation agenda that is responsive to the regional and national entrepreneurial environment (Graham, 2014). The prime focus is: prioritize impact, not income (Nelsen, 2018).
- For example, at Stanford, there is a leave of absence for professors. This is a requirement only if the professor engages in a formal management role in the start-up. Otherwise, they are allowed to spend one day a week on start-up related work. They amount to a total of 13 days a quarter and let faculty to do what is called “consulting” work at the start-up. A recommendation by a report of Berkeley is to recruit an Associate Vice Chancellor or Vice Chancellor for Entrepreneurship to elevate the role of entrepreneurship on campus, further streamline TTO operations, and coordinate and amplify educational, accelerator, and funding mechanisms across Berkeley (Arias A.C. et al., 2018). Hayter (2016) describes this by the ‘entrepreneurship ombudsman.’ The purpose of this individual is to act as a neutral coordinator to promote the interests of academic entrepreneurs, remove barriers to their success, and connect these individual to entrepreneurship support mechanisms both inside and outside the university.
- Concerning the IP policy and negotiation process, the TLO of MIT developed a start-up option template that standardizes terms for virtually any start-up. This ready-to-sign short-term option agreement helps start-ups to get going quickly (technology transfer tactics, 2018). With regard to the negotiation process, the negotiation team, which negotiates with student start-ups and spin-offs, should be represented by multiple stakeholders to oversee all interests. Also, a university should make clear to potential student start-ups and spin-offs what they will ask in return, to reduce ambiguity about university-related support (Selten, 2019).



Support

- There has been a change over time. Thirty years ago, TTOs acted as coaches and mentors for start-ups. Over time, there are now non-technology transfer organizations across campus that focus on start-ups as their primary mission and put a lot more emphasis on it. So, that role is not as critical for TTO's as it used to be, and the TTO's can concentrate more on intellectual property and solving the usual messes on getting a new invention off the ground (Medium, 2018). This ecosystem model seems more superior since entrepreneurship network relationships ascribed to the single non-academic intermediary model are more ad hoc and develop despite the presence of a single academic intermediary. The ecosystem model seems to offer an approach for bridging disparate social networks necessary for spin-off success. Within the model, network ties coevolve, beginning long before spin-offs are established—with different co-founders often developing relationships with various academic and non-academic contacts. (Hayter, 2016).
- Three recommendations by Dr. Ruth Graham (2014): **University-led E&I activity:** Distributed responsibility for E&I delivery across multiple university agencies, with a range of support services and participation routes for both students and staff throughout each stage of their personal entrepreneurial growth. **Student-led E&I activity:** An empowered, cohesive, inventive, bold, and well-connected student-led entrepreneurial community, benefitting from sustained low-level funding, seasoned entrepreneurial mentors, and direct connections to senior university management. **External E&I community:** Robust relationships built on trust and mutual benefit between the university and the regional/national E&I community, with a platform for these individuals to play a visible and influential role in university life (Graham, 2014).
- These allied ecosystems achieve a more excellent balance between the academic and commercial logics due to their focus on both science- and market-oriented interactions. Internal components work to encourage and facilitate researchers' participation in technology transfer, while external components work to support the commercialization of that research (Good, Knockaert, & Soppe, 2019). Incubators should therefore mobilize networks of partners and experts to interact with the spin-off (Andries, Van Looy & Debackere, 2014). Indeed, amongst many top universities, there has been a keen appreciation of the challenges of moving E&I from the margins – the TTO or E&I support functions – to the center of the university – the research and teaching functions (Graham, 2014).

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