

A Configurational Model to Analyse Successful Framework Combinations for Sustainability-driven Entrepreneurship Education at Non-Business Universities¹

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1 Introduction

To solve the challenges humanity is facing today, like climate change, a fundamental transformation of practically all dimensions of our society is needed (Wissenschaftlicher Beirat Globale Umweltveränderungen [WBGU], 2011). Innovations in differing types and forms are indispensable for transformations. Schumpeter's (1942) theory of "Creative Destruction" states that constantly arising, radical innovations continuously create social changes and new market conditions (Schumpeter, 1942). These innovations initially position themselves outside the mainstream market in niches, but after their breakthrough, they massively change the respective market, thus de-facto leading to a transformation in their respective field (Geels, 2002).

Universities play a vital role in generating such innovations. Their so-called "third mission," alongside research and teaching, sees them as a central player in the generation of transformative ideas (Bolzani et al., 2021; European Commission, 2014; Tiemann et al., 2018). They can become drivers of innovation in two different ways: Spin-offs, where researchers enter the market with their innovative research findings (Bolzani et al., 2021), or Entrepreneurship Education (EE), enabling students to become entrepreneurs by thinking and acting innovatively (Bécharde & Grégoire, 2005). While research on translating innovative sustainable research results into businesses has already received and continues to receive particular attention, research on how to optimally teach Sustainable Entrepreneurship (SE) (Fayolle et al., 2021; Lans et al., 2014; Lourenço et al., 2013), and, more specifically, Sustainability-driven Entrepreneurship (SDE), is so far unsatisfactory (Biberhofer et al., 2019).

Universities successful in conducting their third mission are referred to in literature as "entrepreneurial universities." Correspondingly, universities that see sustainability as their core focus in research, teaching and operating are referred to as "sustainable universities." A university pushing for sustainability-driven entrepreneurship needs to combine both. Such a combined model of a sustainable as well as entrepreneurial university has rarely been put into practice (Tiemann et al., 2018). The aim of this paper is to create a configurational model to analyse good practice examples of sustainable entrepreneurial universities on what are promising framework combinations to realise the transformation potential of Sustainability-driven Entrepreneurship Education (SDEE) in non-business disciplines (compare Fayolle et al., 2021).

2 State of Knowledge

Humanity and the societies in which it is organized are facing major challenges. Climate crisis, biodiversity crisis, humanitarian crises – these and more central problems require fundamental changes (Brand, 2016; Wissenschaftlicher Beirat Globale

¹ current version of author's master thesis, work in progress

Umweltveränderungen, 2011). Incremental changes are no longer sufficient; a comprehensive transformation of practically all dimensions of our overall social activities is needed (compare Polanyi, 1957). Schumpeter (1942) conceptualized his theory of "Creative Destruction" as early as the mid-20th century. This concept states that constantly arising, radical innovations continuously create social changes and new market conditions (Schumpeter, 1942).

Universities' so-called "third mission", besides research and teaching, makes them a key player in generating disruptive innovations (Bolzani et al., 2021; European Commission, 2014; Tiemann et al., 2018). They must face this demand increasingly, after all, they are additionally supported financially with this intention (Linton & Xu, 2021). The prevailing neoliberal hegemony hopes for a return on investment in the form of increased economic growth through these investments. For an exceedingly long time, the growth paradigm has clung to the inflationary use of the term innovation, since no special growth rates can be generated in "traditional" economies anymore. Only creativity, in the form of new approaches in existing markets or completely newly created markets, can generate sufficient growth rates to keep capitalism, which is inherently growth-dependent, alive. This is referred to as Cognitive Capitalism (Brynjolfsson et al., 2014; Dyer-Witheford, 2005; Vercellone, 2007).

Decoupled from this growth mindset, radical innovations in various types and forms are nonetheless indispensable for transformations; subsequently, even after a transformation phase, in a post-capitalist world (Schumpeter, 1942). Universities will also play a key role in this framework as knowledge hubs to generate new ideas and technologies in two different ways: Creating spin-offs in the context of Technology Transfer Offices (TTOs), addressed to their research departments (Bolzani et al., 2021), or Entrepreneurship Education, addressed to their students (Bécharde & Grégoire, 2005). In both spin-offs and entrepreneurship education, a central role is played by so-called entrepreneurship centres, which are increasingly emerging worldwide (Standish-Kuon & Rice, 2002).

Pacheco et al. (2010) define Sustainable Entrepreneurship (SE) as the discovery, creation, evaluation, and use of opportunities to create future goods and services that are compatible with the Sustainable Development Goals (SDGs). In other words, it is the practice of creating new products, new modes of production, new markets, or new ways of organising processes in a sustainable way (Patzelt & Shepherd, 2011). The sustainability aspect distinguishes it from traditional, so-called commercial entrepreneurship (Howorth et al., 2012; Patzelt & Shepherd, 2011); profit is not a motivational driver. This aspect also makes it more complex: sustainable entrepreneurs strive for the "triple bottom line", i.e. they also want to fulfil social and environmental objectives through their activities (Patzelt & Shepherd, 2011), objectives that are often in direct competition with profitability (Parrish, 2010). This increased complexity creates the need for support systems (Fichter et al., 2016).

Conceptually, Sustainability-driven Entrepreneurship (SDE) (Parrish, 2010) reaches beyond SE, underlining, already within its name, the radical focus on social and environmental values and striving towards radical transformation, potentially towards a post-growth society (Biberhofer et al., 2019). Even though Hart & Milstein (1999) already identified the potential of entrepreneurship for the transition towards a sustainable society in 1999 by using Schumpeter's (1942) concept of creative destruction, research on sustainable and sustainability-driven entrepreneurship education has only really picked up in the last few years. Most articles still focus on the more traditional, commercially-oriented EE (Tiemann et al., 2018).

More and more evidence surface that there appears to be genetic compositions that make a person more likely to become an entrepreneur (i.e. heritability) (Rietveld et al., 2021). And

even though there is disagreement on whether entrepreneurship in total can be taught, it seems that, when done right, entrepreneurship education can be greatly beneficial, increasing intention and aptitude (Haase & Lautenschläger, 2011), at least for those with an entrepreneurial nature. In this context, according to Fayolle (2013), the main goal should not be to turn students into start-up founders, but to teach a creative way of thinking and acting. Contributions come not only from TTOs and didactics departments, but the strategic design and integration of SDEE into curricula is also highly relevant (Biberhofer & Bockwoldt, 2016; Tiemann et al., 2018).

3 Configurational Model

According to Souitaris et al. (2007), EE should provide three different benefits: learning, inspiration, and incubation resources, with inspiration being the most important. Their good practice proposition consists of four components: a “taught” component, a “business-planning” component, an “interaction with practice” component and a “university support” component (Souitaris et al., 2007). The approaches of universities to implement EE differ. Table 1 shows different dimensions according to which Higher Educational Institutions (HEIs) can be assessed in terms of their commitment to EE. The Danish Enterprise and Construction Authority ([EBST/DEACA] 2004) created a framework split into the five dimensions Institutional characteristics, Educational scope, Educational set-up, Outreach, and Evaluation. Based on this, Blok et al. (2014) designed an adapted framework, where they split up the institutional characteristics into strategy, resources, and infrastructure, while combining Educational scope and Educational set-up and renaming Evaluation to Development. The latter framework was heavily inspired by a report by NIRAS Consultants et al. (2008).

Table 1: Configurational framework for entrepreneurship programmes

Dimensions		Description	
EBST/DEACA (2004)	Blok et al. (2014)	This paper	
Institutional characteristics	Strategy	University Entrepreneurship Strategy	Mission, strategy, and policies to achieve prior defined goals
	Resources	Funding	Financial resources available for the programme
	Infrastructure	Organisational Structure	Organisation of EE in the university structure
Educational scope	Education	Curriculum Design & Certification	Educational activities, course content, range, and target group, certification upon completion
Educational set-up		Teaching Concepts	Teaching methods/models, didactics
Outreach	Outreach	Extracurricular Offerings & Outreach	Additional offerings, e.g. competitions, counselling and coworking spaces, incl. involvement of a network with the wider (business) environment
Evaluation	Development	Impact Evaluation	Continuous assessment and development of entrepreneurship education activities

The configurational framework resulting from this paper is a combination of both frameworks mentioned above, combining their nuances to achieve as much differentiation between the different dimensions as possible. The Institutional characteristics, so “University Entrepreneurship Strategy,” “Funding” and “Organisational Structure” can be referred to as Input. Education and Outreach, in this case “Curriculum Design & Certification,” “Teaching Concepts” and “Extracurricular Offerings & Outreach” are what is called the “Throughput”. The “Output” is the performance/quality of the EE (Lubberink et al., 2012).

The configurational framework and model are a suitable basis to conduct a fuzzy-set Qualitative Comparative Analysis (fsQCA) (Ragin, 2008) using findings from a multiple-case study (Yin, 2018). As the assumption is that different emphasis of the dimensions in the analytical framework yield different results, fsQCA is a suitable method because it “explicitly conceptualize[s] cases as combinations of attributes” (Fiss, 2011, p. 401), where the cases can be grouped in overarching types, thereby mastering high levels of complexity (Fiss, 2011). This implies that different pathways of attribute combinations can lead to the same outcome, in this case High University Entrepreneurship Performance; this is called equifinality (Misangyi et al., 2017). Fuzzy-sets allow taking into account not only full-membership (1) and non-membership (0), but also partial membership (Ragin, 2008). Figure 1 **Fehler! Verweisquelle konnte nicht gefunden werden.** depicts the configurational model resulting from the configurational framework.

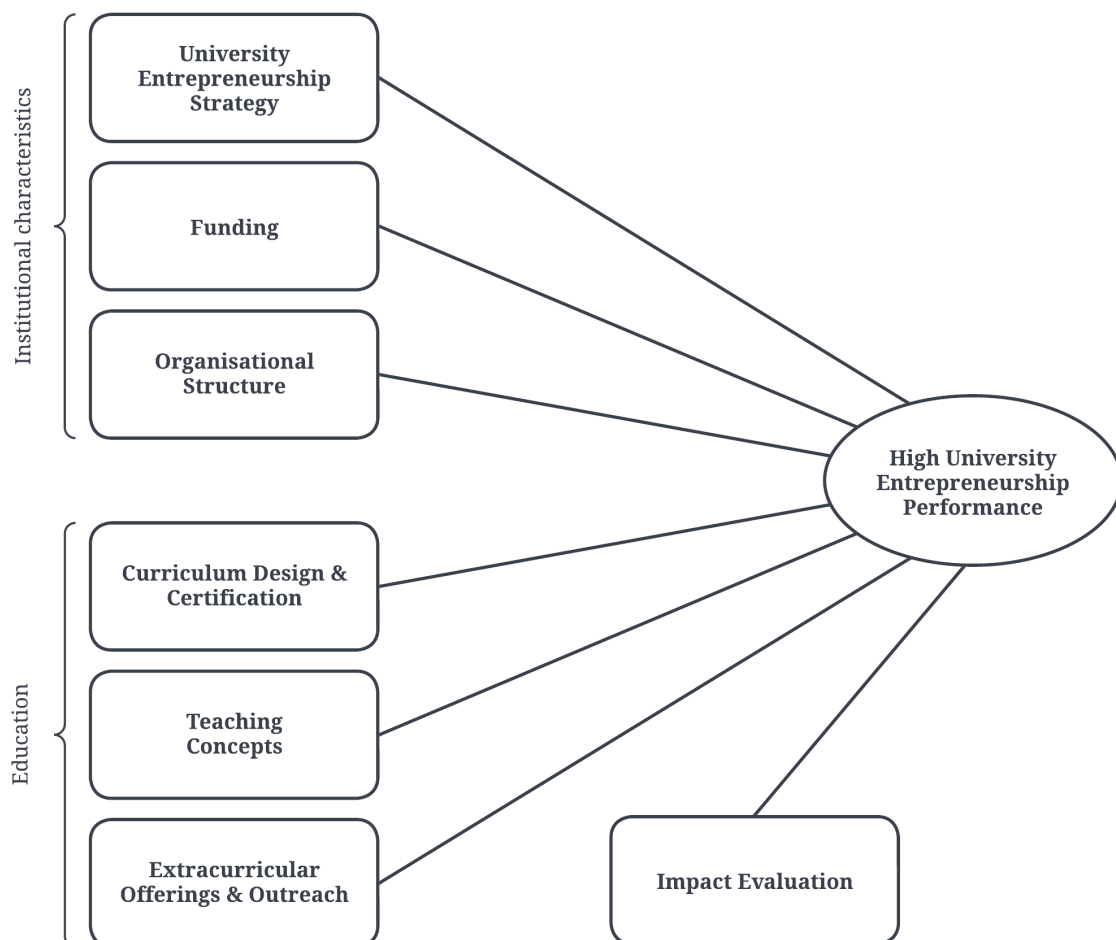


Figure 1: Configurational model: Configurations for high university entrepreneurship performance (own illustration)

In the following, each dimension is briefly described. Each dimension is split into further formative or reflective subdimension, which are, in turn, made up of various relevant variables that each assign a degree of membership as stated above.

3.1 Institutional Characteristics

3.1.1 University Entrepreneurship Strategy

This dimension involves to what degree entrepreneurship is prioritised within the mission and strategy of the HEI, whether there are predefined goals and policies in place to achieve them (EBST/DEACA, 2004) and if the strategy is rooted top-down or bottom-up (Tiemann et al., 2018). This clarifies Fayolle's (2013) didactical level of "Why?".

The subdimension "strong strategic EE goals" contains the variables "high presence of EE in university strategy/mission statement" (Lubberink et al., 2012), the "intention to teach the majority of students to think entrepreneurially" (EBST/DEACA, 2004) and the degree of strategic "top-down support of EE" (Tiemann et al. 2018). The second subdimension of "high embeddedness of EE policy" contains the variables "concrete written institutionalised policies/action plans for EE available" (Lubberink et al., 2012; NIRAS Consultants et al., 2008), "high integration of entrepreneurship in the overall approach to education" (EBST/DEACA, 2004), "high activity in EE-related research" (NIRAS Consultants et al., 2008) and "bottom-up operations" concerning the primary operative responsibility for EE (Standish-Kuon & Rice, 2002).

3.1.2 Funding

This dimension is concerned with the university's allocation of funds to EE (EBST/DEACA, 2004, p. 25) and to what ratio they are accompanied by funding from the private sector (Tiemann et al., 2018).

The subdimension "source of funding" involves the variables "high share of HEI budget is allocated to entrepreneurship activities" (Lubberink et al., 2012), "high share of total entrepreneurship budget stemming from private sources", (EBST/DEACA, 2004; Standish-Kuon & Rice, 2002), "long assurance of external resources" (Lubberink et al., 2012) and a "high share of total entrepreneurship budget from self-generated income" (Lubberink et al., 2012). The subdimension "appropriate budget allocation" is concerned with "budget allows new entrepreneurship initiatives" (EBST/DEACA, 2004) and "high budget for entrepreneurship activities per student" (NIRAS Consultants et al., 2008).

3.1.3 Organisational Structure

This dimension analyses the faculties that engage in EE (EBST/DEACA, 2004). In terms of organisation, two programme models have evolved: the focused programme, with a separate entrepreneurship chair only teaching to students from this discipline, and the university-wide programme, where students from all different disciplines participate in entrepreneurship courses (Streeter et al., 2002). The latter has also been referred to as the unified approach (EBST/DEACA, 2004) and the interdisciplinary approach (Licha & Brem, 2018), and is the model relevant for this model, as it also incorporates non-business students.

The unified programme can be further differentiated into the magnet model and die radiant model (see Figure 2). In the magnet model, all entrepreneurship courses are offered by one single faculty or centre. In the radiant model, on the other hand, the courses are offered by differing institutes according to their discipline; they may still be managed and coordinated by one central body. However, the latter lacks in interdisciplinarity among the students (Streeter et al., 2002). Both have various advantages and disadvantages (Hoffmann et al., 2008; Streeter et al., 2002). As can further be seen in Figure 2, the models can be differentiated along a spectrum of centralisation, from fully centralised (Magnet Model) to fully decentralised (Radiant Model). In their model, Streeter et al. (2002) analyse several elements to define the model type, namely funding, administrative infrastructure, faculty, teaching activities, students, research activity, outreach activity and alumni activity.

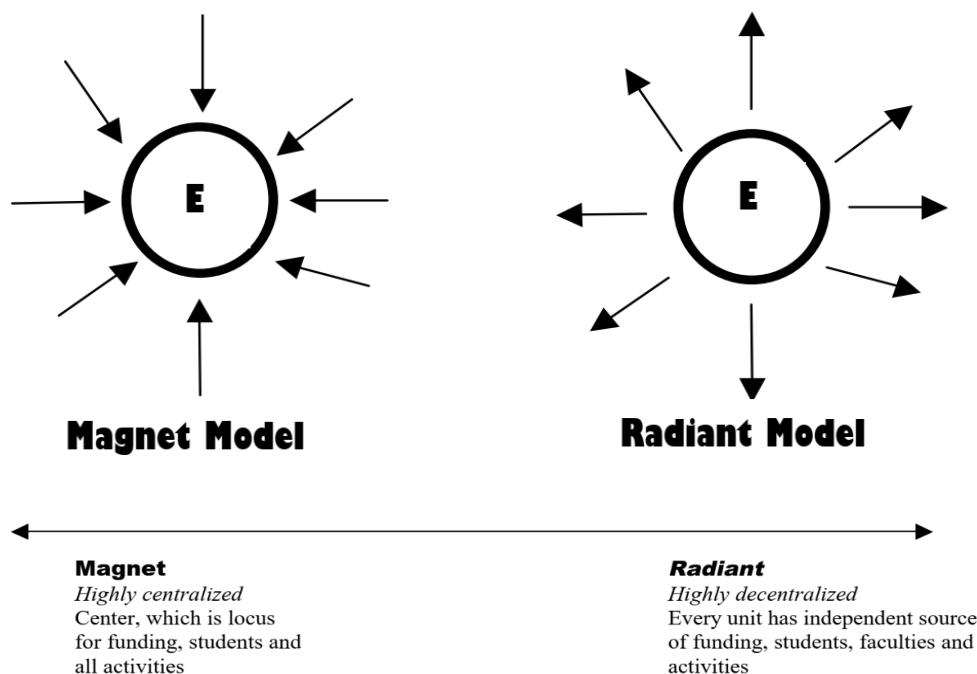


Figure 2: Magnet Model and Radiant Model of entrepreneurship education (Streeter et al., 2002, p. 10f)

The first subdimension tries to identify whether the university’s EE entity is a department or a centre, through the variables “an entrepreneurship department exists” (NIRAS Consultants et al., 2008), “high number of entrepreneurship chairs/professorships” (NIRAS Consultants et al., 2008), “a centralised entrepreneurship centre exists” (compare NIRAS Consultants et al., 2008) and “a decentralised entrepreneurship centre exists” (compare NIRAS Consultants et al., 2008). The second subdimension for the “model type” measures if the university uses a radiant or a magnet model, through the variables “university-wide and/or centralised (at EE entity) entrepreneurship policies/action plan” (Lubberink et al., 2012), “all EE courses are offered by a single entity” (Lubberink et al., 2012), “high average interdisciplinarity per EE course” (Lubberink et al., 2012) and “different institutions/faculties combine to plan and coordinate EE in a centralised way” (EBST/DEACA, 2004; Lubberink et al., 2012).

3.2 Education

3.2.1 Curriculum Design & Certification

In this dimension, the scope of the offered EE courses is analysed, i.e. the content covered and how they are dispersed among curricula. This covers the “What?” didactical level by Fayolle (2013). Furthermore, incentives for participating in EE, i.e. certification, are looked at, as well as internship integration (EBST/DEACA, 2004).

The general subdimension „course offering” includes the variables “high amount of different entrepreneurship courses” (Lubberink et al., 2012), “high share of compulsory entrepreneurship courses as part of the offered curricula” (compare Lubberink et al., 2012; Schuelke-Leech, 2021), “high share of elective entrepreneurship courses as part of the offered curricula” (compare Lubberink et al., 2012; Schuelke-Leech, 2021), “high ratio of compulsory to elective entrepreneurship courses of the offered curricula” (compare Lubberink et al., 2012; Schuelke-Leech, 2021), “high average ECTS per entrepreneurship course” (Lubberink et al., 2012) and “all students take at least one course in EE” (compare NIRAS Consultants et al., 2008).

Schultz (2022) linked the EE pedagogical models proposed by Nabi et al. (2017) to the active/reflective categorisation of Walter & Dohse (2012) as well as giving course type examples for each. An adapted version, adding Thrane et al. (2016) can be found in Table 2.

Table 2: Pedagogical Methods for EE, adapted from Schultz (2022, p. 5)

Pedagogical model (Nabi et al., 2017)	Active/Reflective (Walter & Dohse, 2012)	Learning... (Thrane et al., 2016)	Course type examples
Supply model (Focus on reproduction methods, e.g. lectures, reading, watching/listening)	Reflective	About	Introduction to entrepreneurship Lecture on the theory of entrepreneurship
Demand model (Focus on personalised participative methods, e.g. interactive searches, simulations)	Active	For	Case study seminar Role play (Computer-based) simulation
Competence model (Focus on communication, discussion, and production)	Active	Through	Bootcamp/summer school on specific topics (e.g. entrepreneurial marketing/sales) Learn Start-up Camp Exercise firm (entrepreneurial projects/entrepreneur in residence, i.e. students work in a real start-up) Seminar in joint cooperation with companies or start-ups (e.g. on business planning)
Hybrid models (Supply/demand or demand/competence)	Either, depending on focus	Combination	Research seminar How to write a business plan

To establish the „course types“ foci of the curricula to be analysed, the share of each among the total EE courses is calculated, so the share of “lectures (VO)” (compare Lubberink et al., 2012), “exercise courses (UE) and seminars (SE)” (compare Lubberink et al., 2012), “alternative course models (practical course PR, field trips EX, project courses PJ)” (compare Lubberink et al., 2012), “courses in business planning” (EBST/DEACA, 2004) and “longer lasting internship or practical experience” (EBST/DEACA, 2004; Lubberink et al., 2012).

There is disagreement as to which pedagogical model is preferable. According to Biberhofer & Bockwoldt (2016), teaching and learning models, as well as educational programmes, such as EE, should be competence-oriented. The competences necessary for entrepreneurship differ from those of business administration, which is why business schools should not be the logical home to EE – they focus on more stern values like formality and planning, while entrepreneurs are informal and intuitive (Licha & Brem, 2018). However, in the HEI landscape, there is often a distinct gap between entrepreneurship and sustainability, where entrepreneurship can mostly be found at business schools, and sustainability at environmental institutions (Tiemann et al., 2018).

Moving EE in the form of SDEE to a sustainable university requires to better understand the key competences for entrepreneurship. A competence is made up of attitude, knowledge and skills, and enables the bearer of the competence to successfully perform certain tasks associated with the competence (Wesselink et al., 2015), i.e. real-world challenges (Barth et al., 2007). In order to design the SDEE programme appropriately, HEIs can orient themselves to the key competences necessary for sustainable development as well as entrepreneurial action (Ploum et al., 2018). These competences can be developed during higher education, which is also the time when most future sustainability-driven entrepreneurs develop their entrepreneurial intention. In addition to knowledge of ecological, economic and social sustainability, a set of personal values is necessary that corresponds to sustainability, as well as a set of skills to act on sustainability tasks (Ploum et al., 2018).

Lans et al. (2014) formulated seven key competences for SDE, that Ploum et al. (2018) revised to six. Biberhofer & Bockwoldt (2016) adopted these key competences but combined the interpersonal and interdisciplinary competences. The complete list can be found in Table 3. Underlying these competences are the recognition of the importance of SDE to transition towards a desirable future, and personal values such as environmental and social awareness (Biberhofer et al., 2019).

Table 3: Key competences for SDE

Competence		Description
(Ploum et al., 2018)	(Biberhofer & Bockwoldt, 2016)	
Systems thinking competence	System-thinking competence	Ability to exhibit a holistic view of the world and its subsystems and analyse these complex systems and interactions across various scales and domains through cyclic thinking (Biberhofer et al., 2019; Wiek et al., 2011)
Foresighted thinking competence	Anticipatory/Future-thinking competence	Ability to think in long-term horizons, envisioning scenarios of the impact of present (local) decisions on the future in various dimensions and geographical and temporal scales by integrating uncertainty and risk, while considering the needs of future generations (Biberhofer et al., 2019; Wiek et al., 2011)

Normative competence	Normative competence	Ability to reflect differing sustainability values, to negotiate various stakeholder interests without bias, and to apply these values, based on deeper concepts of justice, equity and ethics and through experience of responsibility and self-reflection (Biberhofer et al., 2019; Biberhofer & Bockwoldt, 2016; Wiek et al., 2011)
Strategic action management	Strategic/ Action competence	Ability to design and implement creative/innovative solutions for a sustainable transition in a structured and proactive way, facilitated by knowledge/insight, commitment/visions, solution orientation, innovative thinking and action experience (Biberhofer et al., 2019; de Haan, 2006; Jensen & Schnack, 2006; Wiek et al., 2011)
Interpersonal competence	Interpersonal/ Inter-disciplinary competence	Ability to establish and sustain participatory and collaborative working conditions through emotional intelligence, allowing to work collaboratively in a diverse and multifaceted team/network, identify trade-offs and synergies across disciplines (Biberhofer et al., 2019; de Haan, 2006; Ellis & Weekes, 2008; Wiek et al., 2011)
Interdisciplinary competence		

To establish the degree to which the curricula being analysed focus on each of the competences mentioned above, the subdimension “competence orientation” classifies the share of each competence among the courses offered (compare Biberhofer & Bockwoldt, 2016; Katz et al., 2016; Schuelke-Leech, 2021). The same goes for the classification of each course according to content for the dimension “content orientation” (compare Katz et al., 2016; Schuelke-Leech, 2021).

Conveying and teaching these competences requires a well-structured course programme (Licha & Brem, 2018). However, there is no clear consensus on the “right” way of teaching entrepreneurship (Fayolle et al., 2021). According to Licha & Brem (2018), the necessary knowledge should not be divided into functional approaches, like marketing or financing, but focus on stages, like incubation, foundation, scaling and exit. Souitaris et al. (2007) suggest the concept of a balanced entrepreneurship programme, in this paper referred to as a “module”, which is broader than a single course, and more coherent than several individual courses that are not coordinated (Souitaris et al., 2007). The module parts would be sequential and could be separated into the four phases “inspiration” (entrepreneurial awareness), “engagement” (entrepreneurial mindset), “exploitation” (entrepreneurial capability) and “sustainment” (entrepreneurial value) (Ndou et al., 2018).

To examine if EE at the various universities has been modularised, the following variables can be used: “large predefined module for entrepreneurship” (compare Souitaris et al., 2007), “module counts toward the curriculum”, “module can be separated in different phases” (compare Ndou et al., 2018), “high share of courses categorised as ‘inspiration’ (entrepreneurial awareness)” (compare Ndou et al., 2018), “high share of courses categorised as ‘engagement’ (entrepreneurial mindset)” (compare Ndou et al., 2018), “high share of courses categorised as ‘exploitation’ (entrepreneurial capability)” (compare Ndou et al., 2018) and “high share of courses categorised as ‘sustainment’ (entrepreneurial value)” (compare Ndou et al., 2018)

Finally, the subdimension “certification” contains the variables “students are awarded a certificate for participation in EE,” “a predefined module has to be completed to receive certification” and “high share of ECTS need to be achieved to be awarded certification”.

3.2.2 Teaching Concepts

This dimension covers didactical techniques used in the courses themselves, including the involvement of external guest lecturers or alumni. It mostly focuses on experimental teaching activities, i.e. going beyond traditional entrepreneurship lectures. The goal here is to not only inform, but also inspire the students. “[It] implies that universities apply a creative and innovative approach to teaching as well as promoting practical entrepreneurship skills” (EBST/DEACA, 2004, p. 24). Thereby, Fayolle’s (2013) didactical level of “How?”, meaning methods, pedagogies and didactics, is covered.

The first subdimension, „courses“, looks very generally at the course performance, with “high number of attendance of entrepreneurship courses” (Lubberink et al., 2012), “demand for EE courses surpassing the supply” (compare NIRAS Consultants et al., 2008) and “lecturers who want to teach entrepreneurship are trained/coached aimed at developing/improving their entrepreneurship teaching skills” (NIRAS Consultants et al., 2008) as the variables.

Table 4 gives an overview over possible teaching methods in EE found in the literature, and the aggregations used in this paper (left column).

Table 4: Teaching methods for EE

Reflective/traditional learning	Reflective learning, learning by reflection, debriefing, reviewing (Biberhofer & Bockwoldt, 2016)
	Learning through parables (Licha & Brem, 2018)
	Traditional teaching (lectures, teaching in the classroom, reading the literature, writing essays, taking exams) (Heinonen & Hytti, 2010)
	Teacher-centered approach (Mueller, 2011)
Active/participatory learning	Active/participatory learning; Learner-centered learning, self-directed learning (Biberhofer & Bockwoldt, 2016)
	Active learning (Manimala & Thomas, 2017)
	Writing a business plan (Licha & Brem, 2018)
	Participative methods (exercises) (Heinonen & Hytti, 2010)
	Student-oriented learning (Mueller, 2011)
Experiential/experimental learning	Experiential learning, experience-based learning, learning-by-doing, action learning, opportunity-centered learning (Biberhofer & Bockwoldt, 2016)
	Work-related learning; Role plays, simulations, games; Action learning (Manimala & Thomas, 2017)
	Experimental learning; Simulations and games, videos/movies, role plays (soft skills) (Licha & Brem, 2018)
	Modelling or imitating entrepreneurship (practice enterprises, business games and simulations); Participative methods (interaction through dialogue) (Heinonen & Hytti, 2010)
	Experiential learning (pitch business plan) (Mueller, 2011)
Problem-based learning (PBL)	Problem-based learning, problem-oriented learning, inquiry-based learning; Project-based learning; Service-learning, community service-learning; Transdisciplinary learning, real-world learning, place-based learning (Biberhofer & Bockwoldt, 2016)
	Problem-based learning (PBL); Project method; Case method; Visits, role models (Manimala & Thomas, 2017)
	Case studies; Role models, hands-on experience with existing enterprises (Licha & Brem, 2018)
	Participative methods (project work); Participative methods (cases) (Heinonen & Hytti, 2010)

Soft skills/creativity	Transformative learning, transgressive learning, transformational learning, affective learning, moral learning, normative learning, critical learning, values-based learning; Collaborative learning, group learning, group work, team work; Interdisciplinary learning, intercultural learning (Biberhofer & Bockwoldt, 2016)
	Cooperative learning (Manimala & Thomas, 2017)
	Creativity techniques, innovation management; Interdisciplinary teaching (Licha & Brem, 2018)
	Participative methods (Group and team work) (Heinonen & Hytti, 2010)
	Changing behaviours and attitudes by addressing emotions (Mueller, 2011)

Usage of the methods described above can be measured using the second subdimension, “teaching methods,” which simply includes the share of courses making use of each of the methods. A further subdimension, called “inspiration,” includes the variables “all lecturers have entrepreneurship background” (EBST/DEACA, 2004), “role models are actively communicated” (EBST/DEACA, 2004) and “all classes use guest lecturers/practitioners” (EBST/DEACA, 2004).

3.2.3 Extracurricular Offerings & Outreach

SDEE activities can be either curricular or extracurricular. Extracurricular activities, also called co-curricular activities (Shirokova et al., 2017), can help to integrate external stakeholders, like companies or established entrepreneurs, which contributes practical experiences. Combined, curricular and extracurricular offerings create a balance between theory and practice (Tiemann et al., 2018). Extracurricular offerings may further include counselling (e.g. on IPR), co-working spaces, incubation programmes, business plan competitions (EBST/DEACA, 2004) and other open innovation activities (Fichter & Tiemann, 2018; Iglesias-Sánchez et al., 2019; Secundo et al., 2020).

The subdimension „high student (inter)action” observes “high participation of students in extracurricular offerings” (NIRAS Consultants et al., 2008), “active student involvement in entrepreneurship activities” (EBST/DEACA, 2004), “frequent informal/formal interaction between entrepreneurship students through seminar series, conferences, speeches” (EBST/DEACA, 2004) and “frequent cross-disciplinary entrepreneurship activities” (EBST/DEACA, 2004). The subdimension “diverse extracurricular offerings” looks at the different types of offerings, specifically “appropriate space for students to meet-up exists” (EBST/DEACA, 2004), “high-quality incubator exists” (EBST/DEACA, 2004), “high-expertise IPR support is offered” (EBST/DEACA, 2004), “business plan competitions take place regularly” (EBST/DEACA, 2004), “vocational guidance/mentor scheme is in place” (EBST/DEACA, 2004), “high attendance at mentor programmes” Lubberink et al. (2012) and “entrepreneurship summer school takes place” (NIRAS Consultants et al., 2008).

Enkel et al. (2009) differentiate three different forms of open innovation: inside-out, outside-in and the coupled process, a combination of the prior two. External key actors of universities can be e.g. companies/start-ups or innovation networks (Fichter & Tiemann, 2018). Fichter & Tiemann (2018), calling the coupled process “cooperation”, define examples for each open innovation form for universities: knowledge transfer to external actors (e.g. hackathons [Iglesias-Sánchez et al., 2019]) or consultation for inside-out, regional clusters or master theses instructed by industrial partners for cooperation and mentorship or guest lecturing for outside-in.

Whether the university is “actively involved in entrepreneurial network/ecosystem” can be determined using the variables “frequent company visits take place” (NIRAS Consultants et al., 2008), “frequent matchmaking events between students and external stakeholders/springboards” (NIRAS Consultants et al., 2008), “ongoing contact of entrepreneurship students with a private company” (EBST/DEACA, 2004), “high share of students participates in external entrepreneurship programmes” (Lubberink et al., 2012), “high number of alumni involved in an organised network involving entrepreneurship activity” (EBST/DEACA, 2004; Lubberink et al., 2012), “frequent entrepreneurial events open to the community hosted by the university” (NIRAS Consultants et al., 2008), “co-working space with existing entrepreneurs at university premises” (NIRAS Consultants et al., 2008), “high involvement of potential investors” (NIRAS Consultants et al., 2008), “regular contact with government agencies” (NIRAS Consultants et al., 2008) and “involvement of institutions supporting entrepreneurship” (NIRAS Consultants et al., 2008).

3.3 Impact Evaluation

Continuous assessment of the EE activities is paramount for its positive development and improvement (EBST/DEACA, 2004). Feedback from students (Worsham, 2012) and other relevant stakeholders should be collected and incorporated, performance indicators should continually be observed and replication of the own activities by other HEIs should be spotted. Most importantly, though, alumni of the EE programme should be monitored and frequently contacted (EBST/DEACA, 2004); this allows to go beyond looking at output indicators, by analysing the actual impact of the EE activities (compare Maier et al., 2015; Then et al., 2017), whereby Fayolle’s (2013) didactical level of “For which results?” can be reflected.

The subdimension „evaluation“ measures general information, like “evaluation of EE takes place” (EBST/DEACA, 2004), “formalised evaluation procedure is followed” (NIRAS Consultants et al., 2008), “goals and policies are followed up on very frequently” (Lubberink et al., 2012) and “educational model (or part of it) is frequently copied by other schools” (EBST/DEACA, 2004). The subdimension “Stakeholder involvement” contains the variables “yearly examination of stakeholder needs” (EBST/DEACA, 2004; Lubberink et al., 2012), “high response rate of student evaluation of EE” (NIRAS Consultants et al., 2008) and “effect of the education on the students’ career pattern is monitored yearly” (NIRAS Consultants et al., 2008). Finally, the subdimension “impact measurement” goes into more detail, with “not only output, but impact is measured” (compare Maier et al., 2015), “not only short-term, but also medium- and long-term impacts of EE are evaluated” (compare NIRAS Consultants et al., 2008; Then et al., 2017), “impacts measured are separated by functional area” (compare Then et al., 2017) and “impacts on the micro, meso and macro level are measured” (compare Then et al., 2017).

4 Conclusion & Outlook

The configurational model proposed in this paper serves as a foundation to discover what kind of framework is necessary for universities to conduct successful, high-quality entrepreneurship education. Finding such favourable attribute combinations can be achieved by examining good practice examples as part of a multiple-case study, using fsQCA in the manner described above to analyse the findings. Good practice examples can be found using existing lists in the literature, or university rankings on the topic of entrepreneurship. These cases can be compared to lower performing universities.

The results from such an analysis are important because entrepreneurial activities in various shapes and forms can bring about innovations with the potential of transforming society as part of a sustainable transition. A promising way is to give students with the potential of becoming entrepreneurial, be it because of prerequisites or because they study in highly promising fields like engineering, digitalisation, sustainability, etc., the tools and instruments to put their innovative ideas into practice. On the one hand, this enables all those willing to become active to implement their ideas; on the other hand, the skills and competences provided through SDEE sensitise the students and are useful beyond entrepreneurial activities

The stated propositions can be embedded in the general discussion on the definition of entrepreneurship. As mentioned above, entrepreneurial activity is far from being limited to just start-up creation. Especially sustainability-driven entrepreneurship takes on forms strongly different to commercial entrepreneurship. Further research, in addition to an fsQCA described above, can investigate in how far entrepreneurship can be a part of or would look like in a post-growth, potentially post-capitalist society.

Ideas have become the new scarce input through a rise of importance of knowledge and cognitive dimensions of labour. Ever since the crisis of Fordism, machines are continuously replacing human labour with the allocation of these profits between labour and capital disputed in an era of post-Fordism (Brynjolfsson et al., 2014; Vercellone, 2007). Brynjolfsson et al. (2014) argue that those reaping the most benefits are “those who can innovate and create new products, services, and business models” (Brynjolfsson et al., 2014, p. 44). Universities as idea generators have long yielded to the dogma of market-driven growth, particularly to the development of high-tech industries. Curricula have been optimised to produce new intellectual properties and techno-cultural subjectivities exploitable in a post-Fordist, knowledge-for-profit accumulation regime (Dyer-Witheyford, 2005). As a society, we need to break out of these capitalist boundaries; “[a]ssuring an acceptable standard of living for the rest and building inclusive economies and societies will become increasingly important challenges in the years to come” (Brynjolfsson et al., 2014, p. 44).

Kickul et al. (2012) drew parallels between commercial entrepreneurship and social entrepreneurship (comparable to SDE) along pedagogical themes to highlight major differences (see Figure 3). Opportunity recognition in commercial entrepreneurship is replaced by social innovation in social entrepreneurship, business models by financial sustainability, growth strategies by scalability and financial performance by social impact. This is one example of how the norms of entrepreneurship depend on values and goals. In this conceptual model, social entrepreneurship is characterised by identifying innovative solutions to social problems, inspiring others to embrace the visions & values, identifying multiple and varied sources of funding, developing a business model for sustainability, identifying means of scaling deep and wide, implementing social solutions in a timely manner and measuring the social impact of the endeavour (Kickul et al., 2012).

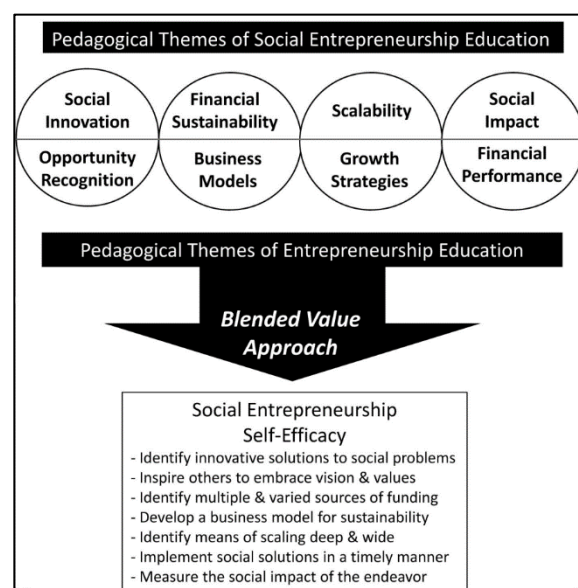


Figure 3: Conceptual Model for Designing and Implementing Social Entrepreneurship, proposed by (proposed by Kickul et al., 2012, p. 480)

In a similar manner, Gianiodis & Meek (2020) compared different organisational performance frameworks of commercially-oriented versus sustainable and social enterprises along profit orientation, strategic intent, resource bundles, operational focus, catalyst for adoption, key stakeholders, relevant performance metrics and governance challenge (see Figure 4), highlighting fundamental ideological and operative differences. With regards to higher education, Lackéus (2017) found that, while entrepreneurship education based on self-orientation creates more neoliberalism in education, entrepreneurship education based on others-orientation striving for meaningful impacts, i.e. sustainability-driven entrepreneurship education, can mitigate parts of the already existing neoliberal trends in education.

	Profit orientation: high-low (left-to-right)				
	Economic view (Friedman 1962)	Balanced scorecard (Kaplan and Norton 1992)	Triple bottom-line (Ho and Taylor 2007)	Sustainable enterprise (Dean and McMullen 2007)	Social enterprise (Frumkin 2005)
Strategic intent	Profit maximizing, short-term orientation for shareholders	Profit maximizing, short versus long-term balanced orientation	Balance maximizing—between profits, people, and planet—orientation	Sustainability maximizing, long-term orientation for sustainable development	Social maximizing, via “double bottom line” for key stakeholders
Resource bundles	Scale-based for cost minimization—exploitative leaning	Resource breadth—focus on exploitation and exploration	Balanced portfolio—internal and external sources	Boot-strapping via <i>resource-lite</i> bundles—internal and external sources	Partner-based portfolio—mostly via external sources
Operational focus	Focused on factors of production	Current competencies and future capabilities	Distributive competencies across stakeholders	Emerging competencies that address “wicked problems”	Justice-based competencies
Catalyst for adoption	Financial performance via efficiency gains	Short-term financial performance incentives distorts future investment	Leverage stakeholder interests for sustainable competitive advantage	Market failures create opportunities for alert and knowledgeable entrepreneurs	Societal need unable to be solved by a private enterprise
Key stakeholders	Shareholders and managers	Shareholders, managers, employees	Stakeholders: capital, product and organizational	Stakeholders: aligned with natural environmental needs	Stakeholders: community with social need
Relevant performance metrics	Two key metrics: (1) Financial (2) Accounting	Four key metrics: (1) Financial (2) Customer (3) Business processes (4) Learning and growing	Three key metrics: (1) Profits (financial) (2) People (stakeholders) (3) Planet (natural environment)	Three key metrics: (1) Profits (externalities) (2) Natural environment (3) Bricolage	Two key metrics: (1) Break-even (2) Mission-based outcomes
Governance challenge	Managing resource flows and attracting/retaining human capital	Managing short-termism; controlling for opportunistic behavior	Managing and aligning stakeholder goals	Solving market failures—externalities, imperfect info, flawed pricing, etc.	Securing and managing resources to fulfill organizational mission

Figure 4: Summary comparison of organisational performance frameworks (Gianiodis & Meek, 2020, p. 1172)

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