

Concept and Impact of an Integrated Approach to Entrepreneurship in Higher Education

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Abstract: Studies show that the intention of students at Swiss universities to become an entrepreneur has been showing a positive trend since 2013 resulting in a 18,8 percent rate in 2021.

The first part of this paper documents the analysis of how the business faculties of the nine Universities of Applied Sciences belonging to the Swiss universities Association take up the topic of entrepreneurship in their Bachelor- and Master-degree programs. This part is based on an analysis of publicly accessible module descriptions of the business administration curricula. The results show that three patterns can be recognized. Firstly, a group of universities that explicitly take up entrepreneurship as a focus subject in their curricula. Secondly, a group that deals with the topic in conjunction with the topic of "innovation". And thirdly, a group of universities that do not address the topic at all in their curricula.

The second part presents the case study of the "Entrepreneurship Pyramid" which is an Integrated Concept implemented at the School of Business of the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) which belongs to the first group of universities mentioned above. The concept divides the entrepreneurship education into four levels. At the lowest level, there are compulsory courses for all students in the bachelor's degree programs. The next two levels are optional specializations in bachelor's and master's courses, the latter of which can already lead to founding a company. On the fourth level, there are other, mostly post-graduate offers. For this purpose, the School of Business of FHNW has built up a network within a regional ecosystem, which supports graduates in their entrepreneurial activities even after completing their studies. Start-up competitions, financing and coaching are offered in cooperation with state institutions, associations, and private companies. This part includes the results of a study which analysed how large the number of startups founded by graduates from the School of Business of FHNW is.

Keywords: Entrepreneurship, Education, Universities of Applied Sciences, Startups, Business Ecosystems

1. Introduction

Recent studies show that 18.8 percent of all students in Switzerland want to work as entrepreneurs 5 years after graduation (Sieger et al 2021b, p. 4). This includes the options of starting their own business or becoming a successor in an existing business. In a global comparison, the entrepreneurial intentions of students in Switzerland are relatively weak, as the global average value of the options mentioned is 34.8 percent (Sieger et al 2021b, p. 4). However, they are typical for highly developed industrial nations because the intention to become entrepreneurial is usually stronger in emerging and developing countries (Wennekers et al, 2005; Sieger et al, 2021b). Nevertheless, there has been a positive trend overall in the last 10 years (Sieger, Baldegger & Fueglistaller, 2019; Sieger et al, 2021a) and there is room for improvement, especially in the area of education and training at universities.

This latter statement is based on the fact, that still over 70 percent of graduates from Swiss universities have not attended a course explicitly dedicated to entrepreneurship (Sieger, Baldegger & Fueglistaller, 2021a, p. 13). In addition, it can be assumed that universities play a central role in imparting knowledge and methods for managerial tasks and that the prerequisites for successful entrepreneurial activity are already created during the course of study. This can be done in particular by raising students' awareness of this topic, teaching them the basics and systematically promoting skills and competences that are important for an entrepreneurial career. Furthermore, universities are important platforms for arranging contacts and building networks. An important basic prerequisite for student entrepreneurship is therefore that students attend appropriate events and courses. And this is where Switzerland has some catching up to do. Whereas in the U.S., for example, entrepreneurship education had already emerged as an independent teaching discipline by the early 1960s (Weihe et al 1991), systematic promotion of entrepreneurship at Swiss universities has only been discernible in Switzerland since the 1990s. A typical example is the Swiss Federal Institute of Technology Zurich, which has been supporting the creation of spin-off companies since the mid-1990s in specially created programs. Between 1995 and 2022, 518 companies were founded out of the university. Based on research from 2018, these companies are estimated to have created around 5500 new jobs to date (Hofer et al, 2018).

In addition to universities such as ETH Zurich, various universities of applied sciences in Switzerland also offer events in the field of entrepreneurship. To date, however, there is a lack of an overview of these programs on the one hand, and in-depth findings on the economic effects in terms of company start-ups and job creation on the other. This is particularly true for programs in the field of business administration/management which is remarkable because students of business administration express the strongest entrepreneurial intentions alongside those of the arts and computer sciences (Sieger, Baldegger & Fueglistaller, 2021a, p. 19).

In the School of Business of the University of Applied Sciences Northwestern Switzerland (FHNW), the topic of entrepreneurship is addressed through events at a wide variety of levels. Two questions therefore arise: First, the question of how these activities differ from those of the business faculties of other Swiss universities of applied sciences. And second, what effect these activities at the School of Business of FHNW have regarding the students' later entrepreneurial activities. Therefore, a first descriptive analysis examines how the business faculties and universities of applied sciences in Switzerland address the topic of entrepreneurship in their Bachelor's and Master's degree programs, as well as in the further education courses offered as part of the Master of Business Administration (MBA) programs and a second descriptive analysis of Startups from graduates of the School of Business of FHNW is being done.

2. Methods

The first part of the paper documents the analysis of how the business faculties of universities of applied sciences take up the topic of entrepreneurship in their Bachelor- and Master-degree programs. The study covers the accredited universities of applied sciences which have a business faculty and at the same time are members of the Association of Swissuniversities. This is the Rectors' Conference of the Swiss universities and represents the interests of Swiss universities at national and international level. It is responsible for the development and implementation of national strategies in the field of higher education and co-operates closely with its affiliated universities and other stakeholders in the education sector to improve the quality of higher education in Switzerland and strengthen the international competitiveness of Swiss universities (Swissuniversities, 2023). The universities, the universities of education and the other institutions in the higher education sector, which are members of Swissuniversities but are not directly comparable with the profile of the universities of applied sciences, were not included in the study. After the above delimitations, the following 9 universities of applied sciences with corresponding faculties or universities of applied sciences in the field of business remain and were examined in detail:

- Bern University of Applied Sciences BFH
- University of Applied Sciences Grisons FHGR
- University of Applied Sciences Northwestern Switzerland FHNW
- University of Applied Sciences Western Switzerland HES-SO
- Lucerne University of Applied Sciences and Arts HSLU
- Kalaidos Universities of Applied Sciences
- OST - University of Applied Sciences of Eastern
- University of Applied Sciences and Arts of Southern Switzerland SUPSI
- Zurich University of Applied Sciences ZHAW

The focus of the study is in the area of education with Bachelor degrees (180 ECTS) and Master degrees (90 ECTS). In the context of further education, the degree of Master of Business Administration (MBA, 90 ECTS) is included. Continuing further education programs with less than 90 ECTS such as EMBA, CAS, DAS, specialised courses, seminars, etc. are not included in the analysis. The courses in the degree programs in business administration and international management within the above-defined initial and continuing education degrees are included. To ensure comparability, study programs on the periphery of business administration or study programs that are designed in an interdisciplinary manner such as "Business Law", "Business Information Systems" or "Business Artificial Intelligence" etc. are excluded from this study. The study focused exclusively on publicly published information on the websites of the relevant degree programs (see references) and on downloadable documentations. A systematic search was carried out for references to courses and other events, such as competitions and advisory services, which can also be used explicitly by students in the area of "entrepreneurship", "entrepreneur", "startup" and "innovation". The websites were examined between January and April 2023. The identified courses are divided into the categories "compulsory modules", "compulsory elective modules (specialisation)" and "other compulsory elective modules". The "compulsory modules" can basically take place in the assessment level and/or in the main study period. These courses are characterised by the fact that all students must attend these courses. In the case of courses in the compulsory elective area

"compulsory elective modules (specialisation)" and "other compulsory elective modules" (e.g. context), students basically have a choice between various alternatives, which means that not the entire cohort of students must attend the module. Compulsory elective modules usually take place in the main study period and vary in terms of the number of ECTS. The allocation into "compulsory elective modules (specialisation)" and into "other compulsory elective modules" follows the information provided by the university without a comparison of the number of ECTS, whereby the wording "specialisation" and "thematic focus" are equated. If it is not possible to clearly assign the courses to a specialisation or thematic focus, they are assigned to the category "other compulsory elective modules". The teaching offers examined can have different formats. They are therefore uniformly referred as "events".

The second part presents the case study of the "Entrepreneurship Pyramid" which is an integrated concept implemented at the School of Business of FHNW. It places the activities of the School of Business of FHNW in the previously developed classification scheme and makes an initial analysis of the effectiveness of these activities by surveying the number and fields of activity of the startups founded by graduates of the School of Business of FHNW. As no respective tracking had been made in the past this information was compiled from lists of graduates from the last 10 years and based on the information on their LinkedIn profiles. This research was done by members of the School of Business' Institute of Entrepreneurship. Based on this, the authors of the present study classified the business activities.

3. Results

3.1 Entrepreneurial education at Swiss Universities

3.1.1 Bachelor's programs

From the entrepreneurship activities of the universities analysed three groups can be identified among the Bachelor's degree programs:

Group 1: There is a group of universities of applied sciences that include the topic of entrepreneurship in the compulsory part of their Bachelor's degree programs. It is noticeable here that in "compulsory modules" the topic of entrepreneurship is always taken up in connection with "innovation" or other related topics. In the category "compulsory elective modules (specialisation)", the topic of entrepreneurship is explicitly found as an independent topic, sometimes in combination with other topics. The category "other compulsory elective modules" is not relevant except for the study programs of the FHNW (see Table 1)

Table 1: Universities including the topic of entrepreneurship in the compulsory part of their Bachelor's degree programs

Group 1		
University of Applied Sciences	School of / Department of	Modules in the Bachelor's degree programmes BSc in Business Administration / International Management
Bern University of Applied Sciences BFH	Business	Compulsory modules: <ul style="list-style-type: none"> • Innovation, Entrepreneurship and Marketing Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Entrepreneurship and Innovation Other compulsory elective modules: <ul style="list-style-type: none"> • No details
University of Applied Sciences Grisons FHGR	Business and Services	Compulsory modules: <ul style="list-style-type: none"> • Innovation Management and Design Thinking Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Entrepreneurship and Corporate Responsibility Other compulsory elective modules: <ul style="list-style-type: none"> • No details
University of Applied Sciences Northwestern Switzerland FHNW	Business	Compulsory modules: <ul style="list-style-type: none"> • Entrepreneurship and Innovation Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Entrepreneurship • International Entrepreneurship Other compulsory elective modules: <ul style="list-style-type: none"> • Innosuisse Modules • Winter- and Summerschool Entrepreneurship

Group 2: A further group of universities takes up the topic of entrepreneurship in the corresponding degree programs exclusively in connection with the topic of "innovation" in the category "elective modules (specialisation)", but there are no clear references to the topic of entrepreneurship in the compulsory part of the degree program (see Table 2).

Table 2: Universities taking up the topic of entrepreneurship in the corresponding Bachelor's degree programs exclusively in connection with the topic of "innovation" in "elective modules "

Group 2		
University of Applied Sciences	School of / Department of	Modules in the Bachelor's degree programmes BSc in Business Administration / International Management
University of Applied Sciences Western Switzerland HES-SO	Business and Services	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • PME & Entrepreneur/Innovation Other compulsory elective modules: <ul style="list-style-type: none"> • No details
Kalaidos Universities of Applied Sciences	Business	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Entrepreneurship and Start-Ups Other compulsory elective modules: <ul style="list-style-type: none"> • No details

Group 3: The third group of universities do not provide any information on the relevance of the topic of entrepreneurship in the relevant degree programs (see Table 3).

Table 3: Universities not providing any information on the relevance of the topic of entrepreneurship in the respective Bachelor's degree programs

Group 3		
University of Applied Sciences	School of / Department of	Modules in the Bachelor's degree programmes BSc in Business Administration / International Management
Lucerne University of Applied Sciences and Arts HSLU	Business	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • No details Other compulsory elective modules: <ul style="list-style-type: none"> • No details
University of Applied Sciences of Eastern Switzerland OST	Business	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • No details Other compulsory elective modules: <ul style="list-style-type: none"> • No details
University of Applied Sciences and Arts of Southern Switzerland SUPSI	Business Economics, Health and Social Care	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • No details Other compulsory elective modules: <ul style="list-style-type: none"> • No details
Zurich University of Applied Sciences ZHAW	Management and Law	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • No details Other compulsory elective modules: <ul style="list-style-type: none"> • No details

At 5 out of 9 universities of applied sciences, the topic of entrepreneurship is explicitly visible as a topic in the respective Bachelor's degree programs in business administration, either independently or in combination with other related topics (group 1 and group 2). This means that entrepreneurship is established as a topic in the universities landscape and is visible as a central educational goal by more than half of the universities. In addition, various combinations of specialisations are offered, which is another indication of the relevance of the topic.

3.1.2 Master's and MBA programs

The results for the Master's and MBA programs can be summarised in three groups too. It should be noted that the FHGR is not part of the evaluation because it offers neither a Master in Business Administration nor an MBA. Therefore, 8 universities are analysed.

Group 1: The first group of universities explicitly offers entrepreneurship as a topic in the analysed categories without combining it with other related topics, such as innovation or growth management. International entrepreneurship was equated with the term entrepreneurship, as it is not a related topic but a specialisation within entrepreneurship (see Table 4).

Table 4: Universities explicitly offering entrepreneurship as a topic without any combination with other topics.

Group 1		
University of Applied Sciences	School of / Department of	Modules in the Master's programmes MSc in Business Administration / International Management and Master of Business Administration MBA
University of Applied Sciences Northwestern Switzerland FHNW	Business	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Innovation and VentureLab • Consulting and Entrepreneurship Other compulsory elective modules: <ul style="list-style-type: none"> • Innovation Academy • Design Innovation for Organisation and Business • International Entrepreneurship • Innovation and Entrepreneurship/Intrapreneurship
University of Applied Sciences Western Switzerland HES-SO	Business and Services	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Entrepreneurship Other compulsory elective modules: <ul style="list-style-type: none"> • No details
Kalaidos Universities of Applied Sciences	Business	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Entrepreneurship Other compulsory elective modules: <ul style="list-style-type: none"> • No details

Group 2: The second group of universities give an explicit reference to the subject area of entrepreneurship but combines it with various related subjects such as innovation, idea creation, growth management etc (see Table 5).

Table 5: Universities with explicit reference to the subject area of entrepreneurship in combination with related subjects.

Group 2		
University of Applied Sciences	School of / Department of	Modules in the Master's programmes MSc in Business Administration / International Management and Master of Business Administration MBA
Lucerne University of Applied Sciences and Arts HSLU	Business	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Business Innovation and Entrepreneurship Other compulsory elective modules: <ul style="list-style-type: none"> • No details
University of Applied Sciences of Eastern Switzerland OST	Business	Compulsory modules: <ul style="list-style-type: none"> • Start-up and Growth Management Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Corporate/Business Development with moduls in Start-up and Growth / Entrepreneur and Business Creation Other compulsory elective modules: <ul style="list-style-type: none"> • No details
Zurich University of Applied Sciences ZHAW	Management and Law	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Innovation and Entrepreneurship Other compulsory elective modules: <ul style="list-style-type: none"> • No details

Group 3: In the third group, there are no explicit references to the term entrepreneurship. However, it is noticeable that these universities also deal with related topics such as innovation in their respective degree programs (see Table 6).

Table 6: Universities with no reference to the subject area of entrepreneurship.

Group 3		
University of Applied Sciences	School of / Department of	Modules in the Master's programmes MSc in Business Administration / International Management and Master of Business Administration MBA
Bern University of Applied Sciences BFH	Business	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Strategy, Innovation and Marketing Other compulsory elective modules: <ul style="list-style-type: none"> • No details
University of Applied Sciences and Arts of Southern Switzerland SUPSI	Business Economics, Health and Social Care	Compulsory modules: <ul style="list-style-type: none"> • No details Compulsory elective modules (specialisation): <ul style="list-style-type: none"> • Innovation Management Other compulsory elective modules: <ul style="list-style-type: none"> • No details

In the case of Master's and MBA programs, 6 out of 8 universities offer courses related to entrepreneurship (group 1 and group 2). This is also evidence that the topic of entrepreneurship is established at a higher educational level.

3.1.3 Other events which are clearly open to students

For the other events, such as competitions or advisory services two groups of universities can basically be formed. A distinction can be made between universities that offer an explicit additional offer for students (see Table 7) and those where nothing was explicitly found. It should be noted, however, that other universities also offer other events. But it was not clear from the available information whether these offers were also accessible to students and thus to be considered an integral part of education or further education, or whether they had to be assigned to the research or services mandate.

Table 7: Entrepreneurship opportunities accessible to students, such as competitions and advisory services.

University of Applied Sciences	School of / Department of	Events in the field of entrepreneurship such as competitions, advisory services, etc., which are clearly open to students.
Bern University of Applied Sciences BFH	Business	Competitions: <ul style="list-style-type: none"> • No details Advisory Services <ul style="list-style-type: none"> • Entrepreneurship Office BFH
University of Applied Sciences Northwestern Switzerland FHNW	Business	Competitions: <ul style="list-style-type: none"> • Swiss Startup Challenge • Swiss Innovation Challenge • Swiss Sustainability Challenge Advisory Services <ul style="list-style-type: none"> • ImpactLab FHNW • 1:1 Support Business Plan • 1:1 Support Entrepreneur Check • 1:1 Cases and Toolbox

At 2 out of 9 universities, other events that are clearly also available to students were found. This low number of events can be explained by the fact that only those offers were taken into account for which there was an explicit indication that students could benefit from them. It cannot be ruled out that events for which there is no explicit indication are not nevertheless open for use by students.

3.2 Case Study "Entrepreneurship Pyramid" at the School of Business of FHNW FHNW

The School of Business of FHNW is one of nine schools of the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) which are active in teaching, research, continuing education and service in various fields such as engineering, business, social work, art and design, music and education. It runs five Bachelor of Science and two Master of Science degree programs and six institutes. In 2022, a total of 2580 students studied at Bachelor level and 388 students at Master level at the School of Business. In the same year, 549 students graduated with a Bachelor's degree and 147 students with a Master's degree (University of Applied Sciences Northwestern Switzerland, 2023b; see Table 8).

Table 8: Number of students and graduations at the School of Business of FHNW.

Program	Study Level	# of students graduated			# of students immatriculated		
		Total 2022	Total 2021	Total 2020	Total 2022	Total 2021	Total 2020
Business Administration	Bachelor degree	417	445	507	1875	1978	1971
International Business Management	Bachelor degree	28	32	26	120	122	127
Business Information Technology	Bachelor degree	104	84	72	585	597	548
Business Information Systems	Master degree	94	87	64	278	278	256
International Management	Master degree	53	55	59	110	119	130

In recent years, the School of Business of FHNW has developed an integrated concept to promote entrepreneurship among students (see Figure 1).

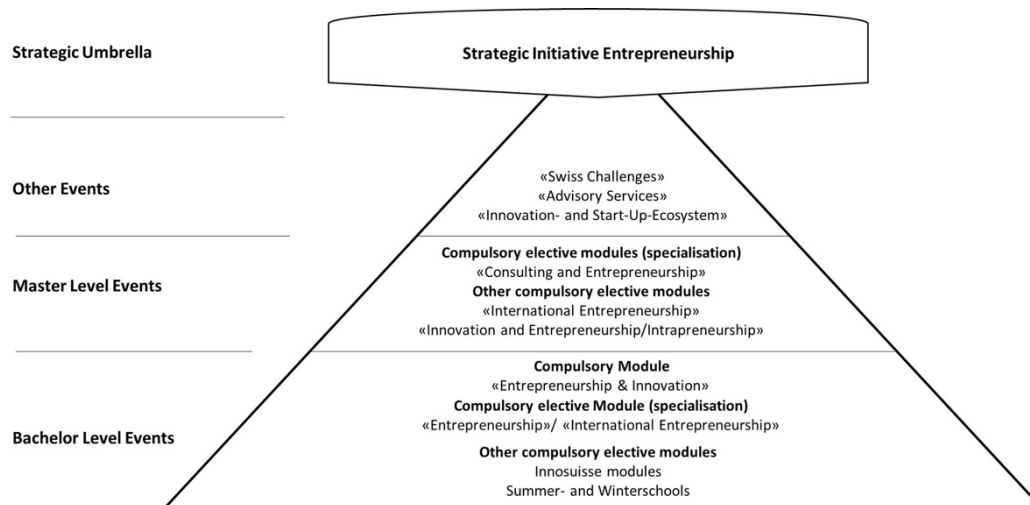


Figure 1: “Entrepreneurship pyramid” of the School of Business at FHNW.

It includes not only elements in the education at Bachelor's and Master's level but also elements that are intended to support the entrepreneurial activities of students even after graduation from the university and thus form an actual regional business ecosystem. In the following sections, key variables of the elements of this *Entrepreneurship Pyramid* are described in more detail.

3.2.1 The Strategic Initiative “Entrepreneurship”

An important design element in terms of a strategic umbrella of all entrepreneurial activities at the School of Business of FHNW is the Strategic Initiative “Entrepreneurship” of the FHNW. The FHNW regularly carries out interdisciplinary strategic initiatives to tackle the most important challenges facing the society. In the period between 2015 and 2017, one of these initiatives was the Strategic Initiative “Entrepreneurship”. Its aim was to promote entrepreneurial thinking and action. The relevant target groups of the project were, on the one hand, the students, and employees of all disciplines at the FHNW, but also, beyond that, the stakeholders in the economy and society of Northwestern Switzerland. The projects of the Strategic Initiative “Entrepreneurship” were designed in such a way that the work done could be integrated into the day-to-day business of the participating faculties after completion of the three-year term. The School of Business of FHNW was closely involved in this initiative and various results were incorporated into the design of events on several levels.

3.2.2 Bachelor Level Events

The results of the strategic initiative Entrepreneurship are reflected in the introduction of the compulsory module “Entrepreneurship and Innovation” in the study programs “Business Administration”. It consists of 6 half-days of entrepreneurship training and 6 half-days of innovation training and includes 6 ECTS points. Every year, between 400 and 450 students are thus familiarised with the basics of entrepreneurship, which corresponds to around three quarters of all Bachelor students at the School of Business.

In the same programs entrepreneurship education is deepened and implemented in the compulsory elective module “Entrepreneurship” or “International Entrepreneurship”. It extends over 2 semesters and comprises 12 ECTS points. In this event, students develop their own business ideas and, if possible, put them into practice. Every year, between 45 and 70 students opt for this module. Furthermore, the School of Business of FHNW offers the Innosuisse semester course “Business Concept - Get the start-up toolbox”. Innosuisse is the Swiss Agency for Innovation Promotion. The course is part of the Innosuisse start-up training series. Participants with an innovative idea who intend to startup a business will expand their entrepreneurial thinking and prepare themselves theoretically as well as practically for founding and managing a company. The event is aimed at students but also at PhD students, postdocs, and people with experience in product development. It is free of charge and takes place over 14 evenings with 4 lessons each. Every year between 30 and 50 people participate this course.

Similar objectives to those of the Innosuisse course are pursued with the summer and winter Schools "Entrepreneurship" and "International Entrepreneurship", which are also offered by the School of Business of FHNW. Here as well, participants with an innovative business idea who intend to startup a knowledge- or technology-oriented company train their entrepreneurial thinking and prepare themselves for founding and managing a company. The events are free of charge, and they last 1 week. They are aimed at students, who are credited with 2 ECTS points for this, as well as at people with experience in product development. The development of the number of participants over the years proves that this offer meets a great need. While 28 people from 7 universities took part in 2019, a total of 105 people from 14 universities took part in 2022.

3.2.3 Master Level Events

At Master's level, the School of Business of the FHNW does not offer compulsory modules related to entrepreneurship but a series of entrepreneurship-related events such as Innovation and VentureLab, Consulting and Entrepreneurship, Innovation Academy, Design Innovation for Organisation and Business, International Entrepreneurship, Innovation and Entrepreneurship/Intrapreneurship in its Master's programs as well as in its MBA electives. These can be both specialisations and other compulsory elective modules.

3.2.4 Other Events

3.2.4.1 Swiss Challenges

One key element of the events launched as part of the Strategic Initiative "Entrepreneurship" are the business competitions held under the umbrella brand "Swiss Challenge". The "Swiss Challenge" comprises 5 competition categories that promote different areas of entrepreneurship. In developing them, the experts at the FHNW in general and at the School of Business of FHNW in particular were concerned with a practice-oriented approach. With a focus on entrepreneurship, the "Swiss Startup Challenge", the "Swiss Innovation Challenge" and the "Swiss Sustainability Challenge" are of relevance.

The *Swiss Startup Challenge* supports startup initiatives by students and employees in developing and implementing their business idea. The challenge promotes them within the framework of special events on the topic of entrepreneurship and awards the 5 best projects with a total prize money of CHF 8,000 every year. In addition, the selected projects are supported by coaches in the further development of their project. The basic prerequisite for participation in the Swiss Startup Challenge is attendance at an event on the topic of entrepreneurship at Bachelor or Master level. Within the framework of these events, a pre-selection for the Swiss Startup Challenge is made. In 2022, a total of 242 students were invited to participate in this challenge. The selected projects can benefit from coaching and have the chance to win the prize money.

The *Swiss Innovation Challenge* supports innovations in their development and implementation with practical knowledge. Business model innovations, product innovations, organisational and management innovations as well as process and service innovations are promoted. The Swiss Innovation Challenge is aimed at start-ups and innovative small and medium-sized enterprises. The total prize money is CHF 40,000, which is covered by sponsors. There are 3 selection rounds, which are carried out within six months. In each case, 100 teams are admitted for the 1st pitch, 50 teams for the 2nd pitch and 20 teams for the final pitch. In addition to the opportunity to win prize money, more added value is created for the participating teams by offering seminars, mentoring, and coaching to expand the necessary skills and by creating media attention. A regional bank, a regional chamber of commerce and a foundation act as partners and sponsors.

The *Swiss Sustainability Challenge* is a competition which aims to make a measurable contribution to sustainable development. The call for participation is aimed at individuals or teams who promote social and environmental sustainability with a project, regardless of whether it is a start-up or a non-profit venture and whether the projects are still at the very beginning or have already taken the first steps towards implementation. While the focus used to be primarily on students as the Swiss Student Sustainability Challenge, it is open to all young people and their ideas. Prize money of CHF 20,000 will be distributed, which is sponsored by a national insurance company. Additionally, the participants benefit from the support of experienced coaches in individual consulting sessions, as well as free seminars and workshops.

3.2.4.2 Advisory Services

Various services are available to students who have a business idea. The ImpactLAB FHNW arranges contacts, the 1:1 support includes tools for the development of business plans, personality tests to clarify the suitability as an entrepreneur, and cases and other tools.

3.2.4.3 Innovation and Startup-Ecosystem

Finally, the School of Business of FHNW has established an extensive network in the innovation and start-up ecosystem in Northwestern Switzerland and beyond. It maintains active cooperation with around 15 organisations that offer office space and coaching in the startup sector, financing, feasibility studies or services around research and development.

3.2.5 Impact analysis: Start-ups by graduates of the School of Business of FHNW

The analysis of the activities of graduates of the respective events of the School of Business of FHNW over the last 10 years shows that they have founded a total of 99 companies (Verkuil 2023, p 43ff.). To get a more precise picture of their economic activities, they were assigned to different sectors within the framework of the present study based on the information available. The Swiss standard for the general classification of economic activities is defined as the NOGA code. This nomenclature consists of five stages differentiating between 794 fields of activity (Swiss Federal Statistical Office, 2008). However, this nomenclature is not suitable for depicting their activities in a suitable manner. For this study, a separate nomenclature was therefore chosen to classify the companies. The sectors shown in the were used for this purpose (see Figure 2):

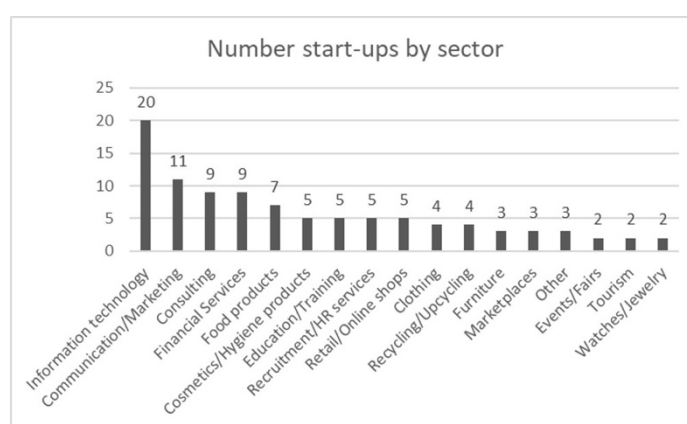


Figure 2: Number of Startups founded by graduates of the School of Business of FHNW.

4. Discussion

4.1 Conclusions

In summary, it can be concluded that the School of Business of FHNW offers an above-average intensity of activities in the field of entrepreneurship at all levels compared to the other universities of applied sciences in Switzerland. This can be an explanation for the results of the study by Sieger et al (2021a), according to which the graduates of the School of Business of FHNW rate the entrepreneurial climate at the school as above average in a cross-comparison with the other analysed universities. The Strategic Initiative “Entrepreneurship” obviously positioned the School of Business of FHNW as a faculty that promotes entrepreneurial-innovative thinking and action among its students and staff in all areas. The study also shows that these activities have an effect regarding the graduates' start-up activities. However, a comparison with the above-mentioned study by Sieger et al (2021a) also shows that studies on the *entrepreneurial intentions* of graduates cannot be used to draw *reliable conclusions regarding the number of start-ups that are founded*. If all the School of Business of FHNW graduates surveyed in the respective study who expressed entrepreneurial intentions in the sense of founding their own business had put them into practice, the number of start-ups would have to be much higher than 99.

4.2 Limitations

The methodology used allows conclusions to be drawn about the visibility of the topic of entrepreneurship on the websites of the respective universities. However, the visibility is only an indication of the anchoring of the examined topic. The present study is a snapshot without any indication of the development of the topic of entrepreneurship. It is also not possible to draw any conclusions about the intensity and scope of the courses offered, since no complete analysis of the number of ECTS for the entrepreneurship part was possible. In this context, no conclusions can be drawn about the weighting of the respective topics in combined offerings such

as "Entrepreneurship and Innovation", as no systematic investigation of the module descriptions could be carried out. It is also not possible to assess the anchoring among students, since the public information does not allow any conclusions to be drawn about the number of students who attend the respective modules. This also means that the present study is not a ranking of the universities in terms of their orientation to the topic of entrepreneurship. Furthermore, the analysis of the companies founded by graduates of the School of Business of the FHNW does not provide any indication of the jobs created and thus the economic benefit of the corresponding events.

4.3 Directions for future research

There is therefore a wide field for further analyses and research. In essence, the aim is to present time series on the development of the topic of entrepreneurship. There is also a need for more in-depth studies on the number of jobs created.

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