

Life Science Start-up Activities at the Universities of Applied Sciences (UAS)

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Abstract: The universities of applied sciences (UAS) provide several values for the society and economy of a country. Besides education of high level professionals, transfer of knowledge from research^[1] to applications in industry or as new start-up companies is an important task. This is done in different ways in the various disciplines. In Life Sciences, a key industry branch in Switzerland, innovation is a competitive success factor and research findings from UAS/Life Sciences contribute to the valorization of new technologies to products, services and to business performance. In order to foster awareness for the innovation need of industry, UAS install processes and support for transfer of research and technology results to marketable applications. Furthermore they may facilitate contacts of researchers and students with entrepreneurs in order to animate start-up founding as a true alternative to being employed. Access to coaching and entrepreneurial training completes the essential basis.

Keywords: Life sciences · Start-up · Universities of Applied Sciences

Introduction

For the welfare of a region an intact value chain with secure jobs and sustainable economic growth is essential. The development of the Swiss economy in recent years has shown that even in critical times of global economy life sciences products, especially pharmaceuticals are among the most successfully exported goods of Switzerland.^[2]

With 40,000 jobs, the largest life sciences industry location in Europe is the region of Northwestern Switzerland.^[3] As for any industry the vicinity to universities – including Universities of Applied Sciences (UAS) – contributes to the economic development of life science companies by providing skilled personnel, by partnering for application-oriented research and by participating in the local cluster of innovation experts. Many high-tech fields constitute the life sciences industry sector with pharmaceuticals, diagnostics, biotech, medtech, agrobusiness, speciality chemicals and with associated technology and engineering providers. Altogether they focus on healthcare, nutrition and care for natural resources and for the environment. In these same fields

the School of Life Sciences FHNW (a part of the University of Applied Sciences and Arts Northwestern Switzerland, FHNW) provides high-level education programs, technical expertise and application-oriented research for the versatile industries.

From Application-oriented Research to Business Ideas

In life sciences innovation may occur at many places for the benefit of healthcare and sustainability. It ranges from novel

products, customized patient solutions to optimized industrial processes and environmental remediation. The novel ideas derive from research in natural sciences and engineering and are often combined with a medical or economic need.

At the School of Life Sciences FHNW topics of research and fields of application thematically fit to the majors of the study programs. They are illustrated in Fig. 1 and cover:

- diagnostics (molecular and physical biomarkers, assay technology, test systems)

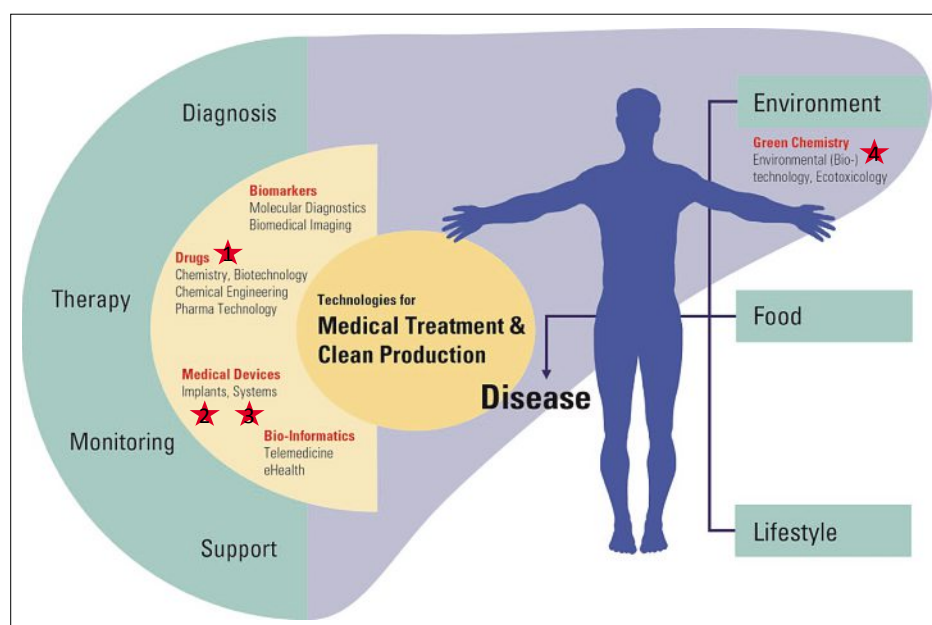


Fig. 1. Research fields and spin-offs at Life Sciences FHNW. The research and teaching fields at the school of life sciences FHNW are centered around technologies for medical treatment and clean production. The red stars correspond to start-up companies established (1, Alloocyte; 2, Mininavident; 3, Mimedis; 4, Inofea).

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- pharmaceuticals (drugs, small molecules / medicinal chemistry, biomolecules)
- medical devices (novel materials, combined products and systems)
- patient-specific products/solutions (based on medical data / informatics)
- product development (profiling, technical development, production)
- environmental remediation (green chemistry, environmental (bio)technology, biorefinery)

The transfer of new knowledge from research to marketable applications in industry cross-fertilizes teaching and creates awareness for innovation among students and teachers. Innovation and entrepreneurship have a high priority at the School of Life Sciences FHNW. It is usual that students work together with their supervisors on industry projects or other application-oriented research. In the case of a direct mandate from industry or in a Commission for Technology and Innovation (CTI)-project the industrial partner has the rights for exploitation or the right of first refusal of promising results for business development. On the other hand, when a project is public or internally funded no obligation to an industry partner exists and the results may be used to create a start-up company. New business ideas may also result from exchange with experts from practice such as from hospitals or by discussing at scientific conferences. In any case, hypotheses need to be explored and experimental verification must be achieved. Such preliminary experiments are often done in small steps because it is difficult to receive funding for this type of exploratory research at UAS. After maturation and after achieving sufficient research data the new product or technology idea is ready for going towards founding a business.

Procedure from Intellectual Property to a Start-up Founding

When a researcher has promising data and strongly intends to found a company he first should reflect on and clarify a number of points as described in Fig. 2 (*Check list*) and then proceed as outlined in Fig. 3 (*Procedure*). Very early on the question of protection of intellectual property (IP) must be addressed. This can be done through secrecy, patent application (Fig. 3a) or by publishing the results (Fig. 3b). In the latter case no patent protection can ever be done any more, which must be considered. For young companies protected intellectual property helps in the procurement of venture capital, in negotiations with customers or business partner and for the assertion in the market. When a start-up intention ex-

ists, the School of Life Sciences, respectively the FHNW, will clarify patentability and if promising, submit a patent application. Over the past years processes for this purpose have been established. Today, the researcher can follow formal steps for spin-offs, the most important ones are listed in Fig. 3. A very important aspect relates to potential conflicts of interests. Planned spin-off activities must be compared with the tasks as a UAS employee since UAS interests cannot be violated. Possible conflicts must be disclosed by the researcher at this time. At FHNW the spin-offs can receive IP rights in form of an IP license. However, it is important for the UAS that no exclusive rights to results are given to a spin-off, except in fields of no or low interest to the research group, the School or the UAS respectively. The UAS may also offer support in form of limited working time for the spin-off founding or in form of restricted use of laboratory infrastructure and in the form of a recommendation for access to the 'Basel Inkubator', a business place for early-stage entrepreneurs.^[4] The financial risk of the new company,

however, is entirely with the founders. All legal or financially relevant benefits to the prospective founder are agreed in written contracts.

Success Factors and Lessons Learned

In order to develop spin-offs from an UAS, the UAS should cultivate a stimulating environment and foster entrepreneurial awareness. There are important elements to be communicated since not every researcher is an entrepreneur by nature! Most importantly the sense for business reality needs to be transmitted. Researchers often underestimate the importance of market knowledge and the high demand of business reality. Yet a company can only succeed when the founder and managers understand the business market and the competition. Equally important is a dedicated personal attitude. The UAS can ensure that researchers (professors, lecturers, assistants, students) become aware of these requirements and the possible perspectives

Question	Clarified	
	Yes	No
Business field / Conflict of interest In which business field and with which business idea will the spin-off be active? What is the demarcation of my responsibilities as an employee of the UAS and my business idea? A comparison of the activities creates clarity.		
Intellectual property Early provisions must be made concerning Intellectual Property: when the UAS holds the patent licensing of rights to the Spin-Off is needed (without affecting the research freedom of the UAS)		
Business plan A clear vision is a prerequisite for a structured and effective approach. The following aspects should be reflected: i) product, ii) business model, iii) market and marketing, iv) management and organization, v) finances and risks		
Time required for spin-off / regulation of working time What role in the spin-off do I want to pursue and how much time do I need (hours / month)? Do I need to reduce my employment workload?		
Infrastructure needs What kind of infrastructure do I need for the spin-off (equipment, utilization-time h/month)? Is there access to an incubator / technopark? What are the conditions? Preparation of a (use) agreement.		
Spin-Off support Are there favorable conditions for office space or laboratory use ("Basel Inkubator" / UAS)?		
Finances How much money do I need - for what and when? Where can I get financial assistance? Friends, family, CTI start-up, venture kick, venture awards, business angels, etc.		
Coaching Who will help me in the early stages? Please seek early advice. Consulting opportunities exists in different places (e.g. Basel Inkubator, i-net, startup training CTI/Venturelab).		
Self assessment <ul style="list-style-type: none"> • Desire for independence? • A clear business idea? • Industry and market knowledge? • Attention for the essential? • Risk-taking tolerance? • Readiness to restrict own needs financially and personal time? 		
Follow formal UAS / organizational guidelines!		

Fig. 2. Spin-off checklist for researchers. These points should be considered and clarified when planning a spin-off.

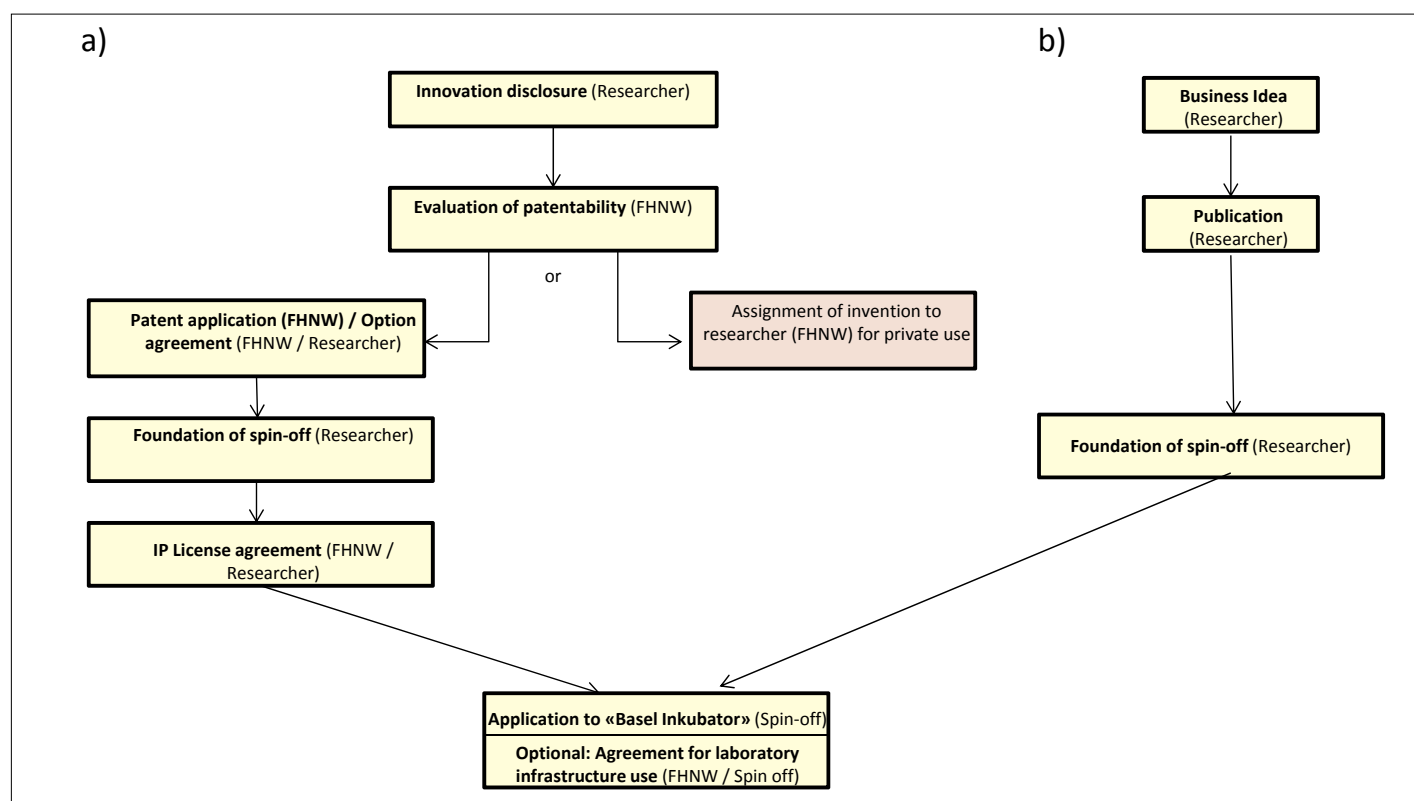


Fig. 3. Procedure for spin-off foundation. A series of formal steps must be followed as listed here. a) patent route, b) publication route.

as entrepreneurs. Therefore it is important to facilitate access to entrepreneurs and start-up founders, *e.g.* at start-up events. Also it should be recommended to researchers to follow and complete an entrepreneurial training such as CTI courses – from venture ideas to the business development. Finally, perspective founders should accept coaching by experienced business experts or partners. They must know the challenges and be aware of chances in order to become successful entrepreneurs.

In the last four years a number of spin-off companies have been founded from the HLS FHNW, some of them in collaboration with external experienced partners. The young companies have different profiles and different target markets (see stars in Fig. 1). One company (Allocty) focuses on pharmaceutical drugs, two companies are in the field of medtech (Mininavident, Mimedix) and one is in the nanotechnology area with environmental remediation (Inofea). They all manage initial activities around financing, product development and preparation for market entry.

In retrospect, the most important aspects for a successful start-up are:

i) the business case, *i.e.* the founders know the market, the competition and have a realistic business model and/or a Unique Selling Proposition;

ii) the development plan: the figures and timelines are reasonable;

iii) the ‘right’ team: there is sound knowledge in development, business, finance and marketing.

If only one of these factors is missing, the start-up companies may fail.

Outlook

In life sciences there are many unmet medical needs, high demands for better or safer products and for environmental sustainable solutions. It is thus relatively easy to have innovative ideas from research for a business development. It may be more difficult to then get the ‘right’ team together with all necessary experience and also sufficient seed money for the often risky product and company development. A convincing business vision, sound technical and market expertise, pragmatism and flexibility secure good perspectives

for young entrepreneurs in Switzerland. Creation of a life science start-up company is a honorable professional goal and the potential for making a positive impact to society and economy of a country is a fulfilling perspective.

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