



HealthEConnect

PRIVATE SECTOR ENABLED ENTREPRENEURIAL COMPETENCE DEVELOPMENT

Exploratory Case Studies

Deliverable 1.2

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Introduction & Motivation

The HealthEConnect Projects aims at strengthening the cooperation between two innovation ecosystems: the Health Tech innovation ecosystem of the Lisbon region (PT) and the one of Hovedstaden (DK), to support the rise and growth of next-generation Health Tech companies through a co-designed and user-centred Health Tech innovation and entrepreneurship program launched in Lisbon, at Nova SBE in partnership with Nova Medical School.

As this educational offer capitalizes on Best Practices, the project team intends to collect a compendium of exemplary educational programs in entrepreneurial competence building (from Europe and North America) with priority given to those that involve innovative and effective ways of linking students with the local and regional businesses and to those that support entrepreneurship within Health Tech by offering a preparation oriented towards creating new ventures within this sector.

In terms of methodology, the collection of Best Practices can be divided into different stages:

1. **Initial Research:** An initial web research was conducted to map best practices in health innovation and entrepreneurship educational programs. The research team gathered information available online on financial resources, program outlines, partner entities, and leveraged skills (among others) and assembled it in a compendium for deliverable D1.1.
2. **Pre-selection of European educational programs on health innovation through a focus Group:** Findings from the compendium were then analysed during a Focus Group, in which members of the Lisbon Healthcare Innovation Ecosystem (entrepreneurs, researchers, corporate partners, professors, alumni, etc.) had to select the 5 most relevant Best Practices to be translated into the Portuguese context. The selected Best Practices were: CBS MSc in Business Administration and Entrepreneurship (#2), Patient Innovation Bootcamp Boosting Patient Entrepreneurship (#3), BII Summer School Innovation & Commercialization of your Life Sciences Project (#8), Novo Nordisk Foundation Paid Fellowship Program for Biomedical Design (#9), and KTH MSc in Innovative Technologies for Healthy Living (#11).
3. **Case Studies Exploration:** The 5 selected Best Practices were further analysed in terms of their “seed to fruit” context, their interaction and interconnectedness with the local ecosystem, and their approach to clinical innovation. Exploratory case studies were conducted via interviews. For each Best Practice, the project team has interviewed various groups, including teachers, directors, alumni and current students,

mentors, as well as employers and recruiters from start-ups and companies specialized in Health tech. For each group, the interviews outputs were anonymized, aggregated, and communicated in descriptive reports (one per group and per Best Practice) for Milestone M1.2. These descriptive reports were then used for the elaboration of exploratory case studies (one per Best Practice) and aggregated into the present document.

The program will be developed following a co-design and user-centred approach, based on Nova SBE and Nova NMS available resources, on the collected Best Practices, and on a co-design retreat with members of Copenhagen and Lisbon Health Innovation Ecosystems.

Best Practice 1 | CBS MSc in Business Administration and Innovation in Healthcare

Introductory Note

Program Information

Name, Institution, Duration, and Location

MSc in Business Administration and Innovation in Healthcare is a 2-year MSc program proposed by Copenhagen Business School (CBS) in Copenhagen, Denmark.

Date of creation and Number of editions

The Program was created in 2016 and happens yearly, counting 7 editions in total.

Students per year in the last 3-5 years

The program hosts relatively small cohorts of 40-50 students per edition.

Goal of the program

The program aims at developing skills to face structural, demographic, technological, and financial challenges of the healthcare industry with innovation, intending to bridge the gap between Business Administration and Innovation within the unique context of Healthcare.

During the program, students learn to analyze health care innovations as business cases and develop actionable skills for their design and implementation.

Member of the Innovation Ecosystem

The program is supported by a wide Innovation Ecosystem (from start-ups, organizations, NGOs, hospitals, etc.) that is constantly evolving. Nonetheless, the retention rate of the Innovation Ecosystem members is relatively high.

Examples are Cook Medical, Bayer, Roche, Novo Nordisk, Rigshospitalet, Cerebriu, the HealthTech Hub Copenhagen, Patient Innovation start-ups, etc.

Case Study Sources

To produce the present exploratory case study, interviews from the program provider category, the student category, and alumna category were conducted (and anonymized), as part of Milestone M1.2.

Their inputs were assembled into one unique document.

From Seed to Fruit Context

Launch Action

Purpose of the creation

This program emerges to bridge a gap between the existing Danish degrees and the industry needs (strong presence of pharma and health Tech industry in Denmark)

Creation, course selection, and ecosystem establishment process¹

The creation was benchmarked with US educational offers.

A partnership was made with *Det Sundhedsvidenskabelige Fakultet* (Faculty of Health and Medical Sciences - UCPH) to complement the program outline and smoothen its creation process.

Main Innovative Aspect

The program was designed in a way that students would learn problem solving skills in real world contexts, through PBLs and internships in collaboration with the healthcare industry and hospitals.

Implementation Action

Program Outline & Entrepreneurial Competencies Development

The program combines health-related courses (Health Systems and Innovation, Foundations of Health Care IT, Innovation in Clinical Processes and Health Care Delivery) with business-related and analytic-heavy courses (Health Care Innovation and Management, Managerial Statistics for Innovation, and The Organization of Healthcare Innovation).

Currently, the program counts 3 main specialization areas, that cover the health care industry landscape:

- Digital Innovation in Healthcare
- Health Technology Assessment
- Healthcare Entrepreneurship

The pharma industry is not included in this program as it is extensively covered in another CBS MSc in BioEntrepreneurship.

Regarding the partnership with KU, only one course is lectured at UCPH (epidemiology).

The program's attractiveness can be explained by its unique value proposition, covering business and entrepreneurship in the specific context of healthcare. Not only CBS educational offer gives a broad approach to Clinical Management in terms of courses, but it also gives

¹ The person that created the program was not interviewed. As a consequence, little information on launch action could be retrieved.

students an overview of roles and stakeholders of the healthcare industry. Applicants are known to have different backgrounds, either medical (dentists, doctors, nurses) or business. While the first group is interested in leveraging their analytical skills (STATA, R, python) and business know-how to be able to advise hospitals and start-ups, the second group is, in general, motivated to learn about the healthcare sector and its specificities.

Overall, participants (students and alumni) are satisfied with the program outline and meet the students' expectations. The only drawbacks are 1) that the program outline is too rigid and does not accommodate the diversity of student backgrounds, 2) the program outline does not cover the entrepreneur journey from A to Z, 3) the program outline is too broad and remains superficial, and 4) the program outline is focused on the Danish Healthcare system and the Danish Health Tech Innovation Ecosystem, while most of its students are international.

Program Implementation, Evaluation, and Revision

Regarding the admission process, three criteria are followed: motivation, grades, and prior working experience. Candidates have either a medical or a business background.

Interviewees highlight that the program could also be opened to engineers to foster even more multidisciplinary groups and innovation that is found extremely valuable in projects.

Nonetheless, accommodate this pluri-disciplinarity can be challenging not only from a program perspective of designing the curricula, but also when moderating group projects.

Regarding curricula implementation, the program fosters pedagogical innovation and uses PBLs as the main learning mechanism. Indeed, CBS educational offers has two mandatory PBLs (The Healthcare Innovation Project and the MSc Thesis). In the Healthcare Innovation Project, students work in groups for a company, a start-up, or a hospital as consultant and have to propose a solution to a real-world health-related problem. In addition, students have the opportunity to participate in several case competitions organized by external stakeholders (e.g., Novo Nordisk).

In addition, extra-curricular activities are put in place to stimulate students outside the classroom. Besides study trips organized in London, Lisbon, Barcelona, etc., students can join the [CBS Health](#) student club that aims at spreading knowledge and providing tools to start a career in the healthcare industry. For entrepreneurs, [CBS School of Entrepreneurship](#) works as an incubator to help students launch their own project.

Students are satisfied with the program implementation that stimulates creativity and problem-solving skills in collaboration with healthcare industry members. This tight collaboration with the Healthcare Innovation ecosystem is highly appreciated by the participants and recruiters as it leverages actionable skills and promotes networking. The only issue is sometimes the low availability of Thesis Supervisors due to the high specificity of the healthcare sector.

Regarding the revision process, the program is being constantly revised and updated through satisfactory surveys, curricular units' evaluations, study board meetings with students' representatives, and in-class open discussions. Indeed, faculty members are engaged in their

teaching activities and create a safe space for students to give feedback in two-ways opened discussions.

Regarding the program's marketing and financial strategy, the offer benefits from a EIT Health quality stamp. Mainly marketed internationally, most of the students are from outside Denmark. The Danish State ensures the program financial long-term sustainability, along with tuitions paid by non-European students.

Post Program Action

Alumni Community & Integration in the Ecosystem

The existing alumni community is not extremely active. Even though some alumni are contacted to "give back" to CBS by being present in career fairs or by giving workshops and punctual lectures, their involvement with the program's innovation ecosystem is reduced.

As a matter of fact, alumni would highly benefit from a higher engagement with the program and with its community through networking events, lifelong learning opportunities at CBS, and guest lecturing. This collaboration is also sought by students that would appreciate alumni counselling activities and mentorship.

Nonetheless, integration into the ecosystem is hard to promote without a career office that ensures graduate students' traceability throughout their professional lives.

Entrepreneurship Longevity

The program itself does not promote entrepreneurship longevity. Nevertheless,

[CBS School of Entrepreneurship](#) works as Incubator and ensure short to middle term sustainability of the entrepreneurial activities.

It is important to highlight that "Healthcare Entrepreneurship" is the only specialization area of the MSc program that actively stimulates entrepreneurship skills and competencies.

Program-Ecosystem Collaboration Impact

Impact of the Innovation Ecosystem in the program

The Innovation Ecosystem leverages the program's problem-solving skills and creativity via its collaboration in PBLs.

Impact in Local and Regional Entrepreneurship & Competitiveness

The aforementioned problem-solving skills are extremely relevant to the ecosystem. Students are creative and show critical thinking when identifying bottlenecks and designing solutions to increase efficiency, optimize processes, or decrease a burden.

Nonetheless, except for the Healthcare Entrepreneurship's area of specialization, the skills leveraging entrepreneurship are limited.

Limitations & Mitigations

Limitations and HealthEConnect Mitigation

Limitation 1 - Accommodating a wide students' background diversity

Multidisciplinarity is beneficial for the program, fostering creativity. Nonetheless, it can also be hard to accommodate from a group's perspective (i.e., tensions in group works) and from a teaching perspective (i.e., absence of common background to fully understand the lectures). Entry criteria have been revised and the number of nurses attending the program has been threshold.

HealthEConnect Mitigation - Nova's pilot starts after the selection of MIEI students. Therefore, this problem should be addressed in the marketing strategy and the establishment of entry criteria for future editions. Opening the program to medical and engineering background should also be discussed.

Limitation 2 - Finding faculty members specialized in the Healthcare Sector

CBS Faculty Experts in Healthcare and Health Tech are reduced. This can be challenging when it comes to finding MSc Thesis Supervisors, lecturers, or professors.

HealthEConnect Mitigation - Regarding Nova's pilot, no courses will be created by Nova SBE while NMS has enough academic resources to accommodate the courses created in the pilot. Regarding the MSc thesis, the Master in Impact Entrepreneurship and Innovation (MIEI)² is a small program from which not all the students are expected to select the new area of specialization. Therefore, enough supervisors are expected for the Final Project.

Limitation 3 - Ensuring the program long-term sustainability and governance through its alumni community

The CBS Alumni community is not actively involved with the program. The alumni community should be more dynamic in nurturing the program's innovation ecosystem while CBS should give them opportunities to continuously assert themselves as experts in their field.

HealthEConnect Mitigation - Implementing a career center could be interesting to 1) continue engaging with alumni and further involve them in the program and 2) register employability metrics and consequently adapt program curricula based on the required market skills. Nonetheless, this limitation should be addressed at a scaling stage.

Limitation 4 - Increasing students' sensibility to clinical needs

The number of medical courses (diseases, anatomy, physiology, etc.) is limited in CBS MSc Program. Moreover, students' immersion in clinical settings and their contact with healthcare professionals is not mandatory, resulting in a lack of understanding of health-related needs and clinical workflows.

² The MSc in Impact Entrepreneurship and Innovation is the program that will accommodate the area of specialization in *Innovation in Healthcare*, created under the scope of the HealthEConnect Project as a co-designed and user-centre educational offer for entrepreneurial competencies development.

HealthEConnect Mitigation - In the pilot, while specific areas of medicine (aging, chronic diseases, mental health) are expected to be covered by NMS in elective courses, no clinical immersion will be implemented in the first edition.

Limitation 5 - Leveraging on students' entrepreneurial skills

CBS should include courses that cover the full entrepreneur journey and should not be limited to entrepreneurial competencies development lectures to one unique area of specialization.

HealthEConnect Mitigation - This will be addressed in the pilot with the existing MIEI framework, that covers the full entrepreneur journey, and through workshops and conferences organized by the Open User Innovation Knowledge Centre / Patient Innovation.

Limitation 6 - Is Portuguese Market ready to accommodate a Healthcare Innovation MSc?

CBS program emerged to bridge a gap between existing educational offers and the industry needs. This gap is narrower in Portugal, R&D departments are usually not based in the country.

HealthEConnect Mitigation - Nonetheless, the international character of Nova SBE mitigates this limitation by itself.

Main Take-aways and Conclusions

Main Take-aways and Potential Implementation in HealthEConnect Program

Take-away 1 - Giving students a complete overview of the healthcare system

CBS gives a broad overview of 1) the health care innovation areas (Digital, Entrepreneurship, Health Technology Assessment) and 2) the Healthcare Industry members and stakeholders' diversity (start-ups, organizations, hospitals).

HealthEConnect Implementation - For Nova's pilot, the current offer is restricted to an area of specialization within an existing MSc. Therefore, there is a limited number of credits to cover, and the implementation timeline is too short to enable courses' creation. This best practice should be included in the scaling phase.

Take-away 2 - Finding a balance between analytical and actionable management skills

CBS manages to find a unique balance between its analytical skills and its actionable management skills. It also includes IT and technical courses, extremely relevant to fully understanding the Health Tech scene.

HealthEConnect Implementation - For Nova's pilot, the current offer is restricted to an area of specialization within an existing MSc. Therefore, there is a limited number of credits to cover, and the implementation timeline is too short to enable courses' creation. That being said, the current pilot currently covers the aforementioned topics in Medicine 4.0 and Data Sciences. Additional electives and courses will be created in future editions and will contemplate this best practice.

Take-away 3 - Putting PBLs as main teaching methodology

PBLs are successful ways of learning problem solving skills in an industry / hospital environment. Not only PBLs fosters networking and promotes a tight collaboration between students and the innovation ecosystem members, but it is also known to motivate students, enhance their creativity, and give them insights that they will keep in their professional lives.

HealthEConnect Implementation - In the pilot, the "Final Project" is the only health-related PBLs done in partnership with members of the Danish and Portuguese Innovation Ecosystems. Future editions could perhaps incorporate the CBS "Healthcare Innovation Project" course and other case competitions in collaboration with members of the Portuguese Innovation Ecosystem.

Take-away 4 - Brining innovation and entrepreneurship outside the classroom

Study trips, excursions, student clubs, student jobs, and incubators are activities/structures that further engage students with the Health Innovation Ecosystem.

HealthEConnect Implementation - The pilot already includes a study trip to NMS. Excursions to Innovation Ecosystem members are under discussion. Regarding study trips and student clubs, those are structures that should be brought up in future editions. Regarding student jobs, the Portuguese educational framework is not designed to accommodate this best practice.

Best Practice 3 | Patient Innovation Bootcamp: Boosting Patient Entrepreneurship

Introductory Note

Program Information

Name, Institution, Duration, and Location

Patient Innovation Bootcamp is a European Project with the following Consortium: Copenhagen Business School (activity leader), Patient Innovation Association, Universidade Nova de Lisboa (Nova School of Business and Economics and Nova Medical School), IESE Business School, Biocat.

The program is composed by 3 working weeks between August and November: 1 week in Lisbon at Nova SBE campus; 1 week online; 1 week in Copenhagen.

Date of creation and Number of editions

It is an annual program with the 1st edition in 2020. In 2023, it will be the 4th edition.

Students per year in the last 3-5 years

The program counts on average 11 participating teams/start-ups per edition (a total of 93 participants in the first 3 editions).

Goal of the program

The goal of the program is to support innovative patients and caregivers, who have developed novel solutions for their own needs, by covering the main road to scale-up and bring a novel solution to the market, covering developing and validation, business model design, and implementation and diffusion tools and relevant information.

Member of the Innovation Ecosystem

Higher education institutions, NGO, bio business catalyst, etc, from the consortium, from the alumni community, and from the Portuguese Health Innovation Ecosystem.

Additional partners (Support the program in specific sessions or other in-kind contributions are Fundação Calouste Gulbenkian, Antas da Cunha ECIJA, Boehringer Ingelheim.

Case Study Sources

To produce the present exploratory case study, interviews from the program provider category, the alumna category, and the mentor category were conducted (and anonymized), as part of Milestone M1.2.

Their inputs were assembled into one unique document.

From Seed to Fruit Context

Launch Action

Purpose of the creation

Patients and caregivers often innovate to create solutions for their unmet needs due to the condition that they face. Some would like to bring these solutions to the market so they can reach more people with similar needs, but they don't know how to do it. Despite lacking entrepreneurial aspirations, their primary focus remains on improving their health. This program is designed to scale-up the solutions patients and caregivers develop to bring them to the market.

Creation, course selection, and ecosystem establishment process

The program design tried to cover the main road to scale-up and bring a novel solution to the market, covering developing and validation, business model design, implementation and diffusion tools and relevant information.

The program consortium got together for an EIT Health proposal, to join prestigious European universities, companies, bio business catalysts, and not-for-profit organizations within the innovation in healthcare European ecosystem.

Since its launch in 2020, the Patient Innovation Bootcamp has been supported by EIT Health, which covers the primary program costs.

Main Innovative Aspect

The Patient Innovation Bootcamp is a program designed to empower patients and caregivers to become agents of change in healthcare innovation. Patients and caregivers often innovate to create solutions for their unmet needs due to the condition that they face, which means that they didn't want to be entrepreneurs in the first place, they would like to be healthy.

Implementation Action

Program Outline & Entrepreneurial Competencies Development

The program plans three working weeks, combining on-site and online sessions, to cover various topics crucial for entrepreneurial competencies development.

Lisbon week (Development and Validation): Design thinking, technology validation, clinical validation, Portuguese healthcare system, visit to private hospital innovation lab, user experience, privacy and data protection, communication during development, leadership, entrepreneurship dos and don'ts, problem-based pitch.

Barcelona week, online (Business Model Design): Macro industry trends, entrepreneurial mindset and ambition, value proposition and market sizing, finance fundamentals, managing cash and financing options, negotiation, competitor position and pricing, valuation and investor relations, how to raise funds, Spanish and Catalunya healthcare systems, customer discovery.

Copenhagen week (Implementation and Diffusion): Danish healthcare system, pricing issues, visit to BioInnovation institute, MedTech marketing, market segmentation, Pharma companies' meetup, DemoDay, Intellectual property, digital health reimbursement, product strategy for large scale.

The program helps acquire knowledge about management and marketing concepts while leveraging on 1) critical thinking and problem-solving abilities and 2) understanding patient needs, developing innovative solutions, and finding room for continuous improvement. Overall, the content was relevant and well-structured, and participants are extremely satisfied with the learnings and leveraged skills.

Program Implementation, Evaluation, and Revision

Regarding the admission process, EIT Health's website opens applications for the Patient Innovation Bootcamp, where participants can submit their proposals. Once the application process is closed, the Patient Innovation team analyzes the submitted applications and selects an average of 11 proposals per year, depending on the current funding availability. After the analysis of the written applications, online interviews are conducted. Based on the interviews, the Patient Innovation team selects the projects that will be part of the Patient Innovation Bootcamp, taking into consideration selective criteria such as identifying the applicant as a patient or informal caregiver, their personal motivation to develop a medical solution, the level of novelty of the proposed solution and the quality of the application.

Regarding the program's implementation, the Patient Innovation Bootcamp is delivered in a hybrid mode, with two on-site working weeks and one online week, allowing participants to benefit from different types of sessions such as talks, workshops, visits, interviews, mentorship sessions, and pitch presentations. This hybrid approach ensures flexibility and accessibility for participants.

The program fosters a dynamic learning environment through expert lectures, tailor-made mentorship, and engaging content, creating an interactive learning environment. Participants particularly value the opportunity to collaborate with mentors and engage in sessions that enhance their understanding of management and marketing concepts.

Evaluation is an integral part of the bootcamp, with participant satisfaction surveys conducted after each working week. Feedback from these surveys is utilized to continuously improve the program in subsequent editions. Alumni testimonials attest to the program's efficacy in fostering a solid foundation in understanding patient needs and developing innovative solutions. The Patient Innovation Bootcamp strives to evolve and adapt to the changing needs of patients and caregivers, remaining at the forefront of empowering them as healthcare innovators.

To reach its target audience of innovative patients and caregivers, the bootcamp utilizes various dissemination channels, including the Patient Innovation platform, social media campaigns, webinars, and direct engagement with European patient associations. The

program's marketing strategy ensures broad dissemination and engagement within the ecosystem.

Since its launch in 2020, the Patient Innovation Bootcamp has been supported by EIT Health, which covers the primary program costs. Consortium partners also contribute co-funding, with different percentages based on the institution's profit status. The consortium has decided not to charge participation fees for teams/start-ups, understanding that the focus of the innovators (patients and caregivers) lies primarily in their pursuit of health rather than entrepreneurship. This cost model demonstrates a commitment to removing financial barriers and prioritizing the well-being of patients and caregivers. By alleviating the financial burden, the program ensures that innovative individuals can fully engage in the bootcamp without compromising their primary goal of improving their health outcomes.

Post Program Action

Alumni Community & Integration in the Ecosystem

The alumni community of the Patient Innovation Bootcamp fosters a strong sense of camaraderie and connection among participants. Alumni participating teams are followed-up after 6 months and on an annual basis after that, to check its development.

Alumni gain access to a strong network of professionals who share a passion for patient-centric innovation, providing opportunities for collaboration, mentorship, and career advancement. The alumni community serves as a platform for ongoing learning, knowledge sharing, and staying connected to the vibrant ecosystem of innovators.

Alumni teams are kept in close contact with the program consortium, receiving support in project development, clinical trial design, funding opportunities, and other relevant tools. They are also invited to participate in future program activities, sharing their experiences as motivational stories and providing guidance to future entrepreneurs.

Mentors maintain close relationships with teams even after the bootcamp, providing ongoing support and addressing specific issues through online communication. This bond allows for continued connections and collaborations within the alumni community.

Entrepreneurship Longevity

The Patient Innovation Bootcamp has supported 32 teams/start-ups founded by patients and caregivers, demonstrating a commitment to entrepreneurship longevity.

As stressed above, alumni teams receive ongoing support and follow-up assessments to monitor their development, even after the end of the program. This comprehensive post-program action ensures the continued growth, success, and sustainability of the entrepreneurs who have participated in the Patient Innovation Bootcamp, while promoting their integration in the program.

Program-Ecosystem Collaboration Impact

Impact of the Innovation Ecosystem in the program

The innovation ecosystem has a significant impact on the Patient Innovation bootcamp, contributing to the program's success and fostering a supportive environment for participants.

The close contact and ongoing mentorship provided by mentors from the ecosystem play a crucial role in guiding participants throughout the program. These mentors offer valuable insights, connections, and opportunities for participants to showcase their work and collaborate with others. Mentors also actively seek out opportunities for participants to connect with influential individuals, opening doors of opportunity for their entrepreneurial endeavours.

Additionally, the involvement of alumni within the program further strengthens the impact of the innovation ecosystem. Alumni contribute by sharing their experiences, serving as mentors, and presenting their own projects to the ecosystem. They also engage in visits to innovation centres and accelerators, enhancing their exposure to diverse resources and networks.

The active integration of the innovation ecosystem in the bootcamp ensures that participants benefit from a rich and supportive ecosystem of mentors, peers, and resources. This collaborative environment nurtures the growth and success of participants as they develop innovative solutions and pursue entrepreneurial paths in healthcare.

Impact in Local and Regional Entrepreneurship & Competitiveness

The Patient Innovation Bootcamp has a significant impact on local and regional entrepreneurship and competitiveness by equipping participants with the necessary tools and knowledge to scale up their innovative solutions and bring them to the market.

The program is designed to address key aspects of the entrepreneurial journey, including solution development, validation, business model design, implementation, and diffusion. By covering these critical roadmaps, the bootcamp provides participants with a comprehensive understanding of the steps required to successfully scale and commercialize their ideas.

Through its support of numerous teams and start-ups founded by patients and caregivers, the bootcamp has already made a substantial impact. Over three editions, it has supported 32 teams/start-ups, and it plans to support an additional 12 in 2023. This demonstrates the program's commitment to nurturing and fostering local and regional entrepreneurship.

Limitations & Mitigations

Limitations and HealthEConnect Mitigation

Limitation 1 – Ensuring the Financial Sustainability of the program

The program heavily relies on external funding, which poses a limitation as these funding sources may not be sustainable in the long run. The program is currently seeking additional funding sources (by defining strategies to secure funding from other institutions or exploring alternative revenue streams to ensure the program's continuation) and developing partnerships with industry partners, organizations, or sponsors.

HealthEConnect Mitigation – NA

Nova SBE MSc financial sustainability falls out of the scope of this project.

Limitation 2 – Is the Duration of the bootcamp enough time for in-depth exploration of the entrepreneurship journey?

The current duration of the bootcamp may not provide sufficient time for in-depth exploration of the covered topics. Lengthening the duration of bootcamp would allow participants more time for hand-on project work, deeper discussions with experts, and comprehensive learning experiences, but would also increase costs and further commit the participants' professional lives.

HealthEConnect Mitigation – NA

Pilot has a fixed duration of 1.5 years.

Limitation 3 – Expanding Post-bootcamp support and resources

Alumni express a need for continued support and resources after completing the bootcamp. Establishing an online platform (via a dedicated online platform where alumni can connect, access resources, share knowledge and collaborate with each other and program stakeholders) or offering networking events that together alumni, industry, professionals, and potential collaborators to foster ongoing networking and collaboration opportunities, are under discussion

HealthEConnect Mitigation – This limitation should be mitigated at later stages on the implementation process and the alumni community should be the owner of that project.

Main Take-aways and Conclusions

Main Take-aways and Potential Implementation in HealthEConnect Program

Take-away 1 – Adopting a Patient-Centric Approach

The program emphasizes the importance of 1) placing patients at the center of healthcare innovation and 2) understanding their needs, perspectives, and experiences.

HealthEConnect Implementation - Developing patient needs-centred work projects in collaboration with current participants and alumni of the Patient Innovation Bootcamp is crucial for developing meaningful solutions that truly address their challenges.

Take-away 2 – Giving a comprehensive overview of the entrepreneur journey

The program design tries to cover the main road to scale-up and to bring a novel solution to the market.

HealthEConnect Implementation - Those courses covering the main steps of the entrepreneurial road are already being addressed by the MIEI curriculum. Nonetheless, additional conferences or workshops in partnership with Nova SBE Open User Innovation Knowledge Centre and with Patient Innovation could be organized during the pilot.

Take-away 3 – Fostering Interdisciplinary Collaboration

The program promotes the value of working together with healthcare professionals, researchers, engineers, and patients to leverage diverse expertise and create comprehensive solutions.

HealthEConnect Implementation - Nova's pilot starts after the selection of MIEI students. Therefore, this best practice should be addressed in the marketing strategy (having into account the Limitation 1 of Best Practice 1). Opening the program to medical and engineering background should also be discussed.

Take-away 4 - Engaging with the alumni community

Alumni community is supported after the program and actively involved in future program editions and with other ecosystem activities.

HealthEConnect Implementation - The exploitation plan should ensure long-term community engagement and foster active relationships between the alumni. The value proposition of that community needs to be clearly defined and marketed to the alumni.

Take-away 5 – Following a Design Thinking Methodology

The use of principles of design thinking as a powerful tool for problem-solving in healthcare innovation. By going through iterative stages of empathy, ideation, prototyping, and testing, participants learned how to develop innovative solutions that truly meet the needs of patients and healthcare stakeholders.

In addition, the program employs a practical approach to enhance the entrepreneurs' experience during mentor sessions. This involves assisting them in drafting pitch decks and

business models, while also teaching them new techniques that enable mentors to gather and analyse the necessary information required to convince other stakeholders.

HealthEConnect Implementation - Nova's pilot should develop a robust mentorship that pairs entrepreneurs with mentors who have expertise and experience in their specific areas of interest within the health and innovation field. This would ensure that entrepreneurs receive personalized guidance and support from mentors who can provide valuable insights.

Best Practice 8 | BII Summer School – Commercialization of your Life Science project

Introductory Note

Program Information

Name, Institution, Duration, and Location

BII Summer School – Innovation & Commercialization of your Life Sciences Project is run by the Bio Innovation Institute (BII) in collaboration with Copenhagen Business School (CBS) Executive Foundation.

The summer school is a 5-day program that takes place every year in Copenhagen at the BII or at the facilities of the CBS Executive Foundation.

Date of creation and Number of editions

It is an annual program with the 1st edition in 2021. In August 2023, it will be the 3rd edition.

Students per year in the last 3-5 years

The program counts on average 30 participants.

Goal of the program

The goal of the program is to equipping researchers in the life science sector with skills for them to commercialize their discoveries and turn them into successful companies. It introduces entrepreneurship concepts and vocabulary aiming at motivating participants to pursue their entrepreneurial endeavours. Networking, collaboration and peer-to-peer exchange are intended side effects of the summer school.

Member of the Innovation Ecosystem

The ecosystem is actively involved in the summer school, as start-ups providing success stories and tips, as investors who share key success factors and discuss current trends, as the BII team who teaches and mentors, or as industry experts who share their relevant expertise.

Previous contributions with faculty & mentorships: NIRAS Life Science Academy, Høiberg, iNotify Therapeutics, Coloplast, The Novo Nordisk Foundation Centre for Bio sustainability.

Case Study Sources

To produce the present exploratory case study, interviews from the program provider category and alumna category were conducted (and anonymized), as part of Milestone M1.2.

Their inputs were assembled into one unique document.

From Seed to Fruit Context

Launch Action

Purpose of the creation

The program emerged to sensitize, educate, and motivate researchers to commercialize their discoveries, making them aware of BII's offering, creating "deal flow" into the BII pipeline and thus scouting for new and groundbreaking innovations. It aims at optimizing learning and preparing scientists for future opportunities of commercialization of research.

Creation, course selection, and ecosystem establishment process

The program was designed to equip researchers with the first tools to bring their inventions to market, while promoting a strong involvement of top-notch academics, industry experts, investors, and start-ups.

Main Innovative Aspect

Its main innovative aspect is the combination of theoretical knowledge relevant for establishing their science-based business and the hands-on practical learning in the form of working on their own business ideas. Further, a big incentive is to be exposed to the BII ecosystem and learn more about continuing acceleration and incubation programs. The summer school can thus be seen as a starting point to everyone's entrepreneurial journey.

Implementation Action

Program Outline & Entrepreneurial Competencies Development

The program serves as an introduction to entrepreneurship with providing theoretical knowledge from industry experts as well as the opportunity to get together in teams and work on their business ideas together. The program is delivered in 5 days, which cover theoretical topics, networking events, start-up stories sessions, investor panels, etc.

Theoretical inputs cover topics such as innovation and push and pull mechanisms, patent strategy, identifying your target customer, market and industry analysis, payer systems, regulatory considerations, Target Product Profile and Minimal Viable Product, Unique Value Proposition, business models and funding, how to attract investors, pitch and public speaking training. At the end of the week, a reflective session is organized for participants to think about their personal motivations.

Regarding the program's curriculum, although some theoretical learnings are not groundbreaking by the participants, the practical and actionable skills are especially relevant, namely on how to prepare a pitch for investors. An additional "impact" angle could be added to the curriculum.

One of the main challenges when creating the program's outline is to guarantee that all sessions to be relevant for all industries.

Program Implementation, Evaluation, and Revision

Regarding the admission process, around 30 participants are selected by the BII program manager each year. Participants must provide a CV, cover letter, abstract of their start-up idea and a recommendation letter by some senior person. The target group for the program is senior PhD students, Postdocs & young research group leaders from universities and research institutions. If all of these are submitted and of high quality, there is a high chance of being selected by the program manager. The most promising projects are selected as case studies (2-3 cases are selected per industry³) and the other participants whose idea did not get selected join these selected case studies. The BII is not assigning participants to the cases but lets the participants choose the case studies themselves and they will do so based on their specific interest and expertise.

The program delivery method with PBLs, interactive group sessions, and mentoring fosters meeting the other participants and teamwork. During the week, BII Summer School provides opportunities for networking, listening to start-up stories as well as an investor panel. Further, BII provides experienced mentors to help the start-ups twice during the week. Nonetheless, the networking activities could be further improved and refined. No extra-curricular activities except the ones already mentioned above.

To gather participants' feedback, participants receive a detailed feedback questionnaire after the completion of the summer school. Each year, the BII is reviewing the feedback and implementing it, while continuously revising the sessions and improving it with the addition of new speakers and start-ups.

To ensure a wide reach of the summer school, the program is advertised via a multi-channel approach. The program is marketed on LinkedIn as well as BII's and CBS's website. There are also a lot of personal reach out to alumni, head of departments, communication departments of universities and personal network contacts at all universities. Further, there was no paid advertisement nor videos. It was also shared within BII's community such as at internal events, the BII newsletter, TV screens in BII facilities. Lastly, start-up employees were directly invited to the course

Regarding the financial sustainability of the program, participants pay 10'000 DKK or 1000 Euros for attending, which is ideally not paid out of pocket but by the sending research group or start-up.

³ Therapeutics, HealthTech and Planetary Health/ Bioindustrials

Post Program Action

Alumni Community & Integration in the Ecosystem

There is no alumni community in place yet, even though people do meet each other by chance since it is a small and well-connected ecosystem. An alumni community is planned to pilot this year. Best practices on how to engage an alumni community still to be collected.

Entrepreneurship Longevity

The school provides skills for aspiring entrepreneurs to make their projects long-term successful, to train new start-up employees who are a part of the BII programs, and to get them connected to the ecosystem.

Besides, BII offers continuing venture support & creation programs (BioStudio, Venturelab, VentureHouse) which outstanding participants will ideally join sooner or later. One of the goals of the summer school is to raise awareness for the continuing programs of the BII. However, summer school participants do not get any special treatment or preference in the applications to the other programs.

Nonetheless, Summer school participants are not actively followed up on or encouraged to create their own companies.

Program-Ecosystem Collaboration Impact

Impact of the Innovation Ecosystem in the program

The ecosystem is actively involved through acting as role models, lecturers, panelists. The ecosystem is giving back to the community, network, experiences, and knowledge exchange and thus laying the groundwork for future entrepreneurial interactions.

Impact in Local and Regional Entrepreneurship & Competitiveness

It is a very early-stage program, so the aim is not to have start-ups created from that one week. However, long-term new, innovative ventures with high success rates will impact the ecosystem positively. This helps job creation in the ecosystem.

Further, the summer school should also increase the pipeline to other BII programs which will then result in finding solutions to unmet clinical needs and value creation in the ecosystem. An additional goal is also that the educated researchers will become more “intrapreneurial” in their research labs and thus foster translational research.

A side effect would also be that there is more intrapreneurship in large corporates because of better educated researchers and a more entrepreneurial mindset.

Limitations & Mitigations

Main Limitations and HealthEConnect Mitigation

Limitation 1: Solving the lack of active alumni community

Long-term community engagement should be endorsed and supported by program directors. Relationships between the alumni should be actively fostered (some resource should be factored in for this).

Continuing relations after the program do not happen organically and need to be facilitated.

HealthEConnect Mitigation - The creation of a vibrant and well-connected alumni community should be taken into consideration at a later stage of the implementation, while networking activities should already be included in the pilot. The exploitation plan should ensure long-term community engagement and foster active relationships between the alumni. The value proposition of that community needs to be clearly defined and marketed to the alumni.

Limitation 2: Marketing the programs through the universities

Foster closer relationships with other universities is needed to ensure a consistent flow of highly skilled talent.

HealthEConnect Mitigation - This should be mitigated in the marketing strategy for future edition, as the pilots' participants have already been selected.

Main Take-aways and Conclusions

Main Take-aways and Potential Implementation in HealthEConnect Program

Take-away 1: Promoting a high involvement of ecosystem

Ecosystem really is highly engaged with the program, be it in the form of a public pitch day, community members acting as mentors, etc. The impact on ecosystem should be clear, and the value of the graduates of the program in the ecosystem should be constantly monitored.

HealthEConnect Implementation - In Nova's pilot, an active involvement of the ecosystem will be crucial to enable knowledge exchange, seeing practical applications, learning from successful cases and to establish new connections and laying the foundations for future collaboration.

Take-away 2: Implementing PBL and working on real cases

This is a very important insight. Learning should go beyond theoretical lectures, but students should work on their own ideas or real start-ups. Students should understand how to translate a scientific idea to an MVP/ product and what are the necessary steps in this process.

HealthEConnect Implementation - In the pilot, the "Final Project" is the only health-related PBL done in partnership with members of the Danish and Portuguese Innovation Ecosystems. Future editions could perhaps incorporate the CBS "Healthcare Innovation Project" course and other case competitions in collaboration with members of the Portuguese Innovation Ecosystem.

Nonetheless, it is important to define what the practical format/PBLs framework is and to select relevant projects topics and problems, aligned with the leveraged skills and the themes approached in class.

Take-away 3: Offering continuing programs & opportunities

At the BII, the continuing offers are an incentive for participants to join the summer school and thus get acquainted with the BII ecosystem without high barriers to entry. They will hear the stories of successful entrepreneurs who have already gone through the BII programs and are thus displaying a possible path to success. Infrastructures are built to ensure long-term support to their entrepreneurs' journey, after the program.

HealthEConnect Implementation - In the HealthEConnect program, it is still an open question how entrepreneurial ventures can be supported long term and how entrepreneurial longevity can be ensured.

Best Practice 9 | Novo Nordisk Fellowships Biomedical Design

Introductory Note

Program Information

Name, Institution, Duration, and Location

Novo Nordisk Foundation Paid Fellowship Program is a 10-month full time program between Aarhus and Copenhagen.

Date of creation and Number of editions

The Program was created in 2019 (between September and June) and happens yearly (4 editions in total).

Students per year in the last 3-5 years

The program hosts relatively small cohorts with 16 students per edition.

Goal of the program

BioMedical Design is a competence development program which fosters healthcare innovation leaders. Even though Biomedical Design is not an incubator or an accelerator, the projects developed during the fellowship program may turn out to be a terrific launch-pads for new MedTech start-ups.

The program intends to provide educational and hands-on training in running needs-driven innovation of medical technologies to build more health innovation capacity in Denmark. As a concrete outcome of this training, Novo Nordisk Foundation Fellowship aims to see start-ups established based on projects that have been developed during the fellowship. Its most unique feature is the needs-driven approach and the opportunity for context understanding.

Biomedical Design is intended to empower and launch healthcare innovators to solve evidence-based clinical needs in a collaborative and multi-disciplinary environment.

Member of the Innovation Ecosystem

The program is supported by a wide Innovation Ecosystem (from start-ups, organizations, NGOs, hospitals, etc.) that is constantly evolving. Examples are BII, Danish Tech challenge, Innofounder, Innoexplore, the Kitchen Aarhus, Danish life science cluster, etc.

Case Study Sources

To produce the present exploratory case study, interviews from the program provider category, the student category, and alumni category were conducted (and anonymized), as part of Milestone M1.2.

Their inputs were assembled into one unique document.

From Seed to Fruit Context

Launch Action

Purpose of the creation

There was (and is) a need in Denmark to educate people with deep domain knowledge, social skills and entrepreneurial interest in health innovation. This education could then fuel the generation of new and de-risked ideas, while funneling deals and creating ventures into the innovation ecosystem.

Creation, course selection, and ecosystem establishment process

This program emerges with a first pilot run in 2013 -2015, inspired by the Stanford Biodesign program, where the clinical immersion feature came from.

Find out more about the Stanford Biodesign Innovation Fellowship [here](#).

Main Innovative Aspect

The Biomedical Design Fellowship Program engages and inspires skilled and talented professionals with a prior background in medicine, engineering, business, IT, design or alike to create value for future healthcare. The clinical immersion is the most outstanding feature of the program and is known to enhance need-driven innovation

Implementation Action

Program Outline & Entrepreneurial Competencies Development

The program is designed in a way that students are learning about the lean start-up approach as well as soft skills & entrepreneurship mindset. The program will also train fellows' ability to gather tacit knowledge, challenge their default thinking, and lead a structured innovation process from exploration and qualification of valuable needs to implementation of a resolution and introduction to the market.

It combines:

Boot Camp Foundational Knowledge (4-5 weeks): Bootcamp students are taught and trained in health ethnography tools in order to be able to conduct observations in a critical and objective manner. Healthcare staff from the clinical departments in which the teams will be immersed will introduce various medical aspects including state-of-the-art technologies, patient care and examination procedures relevant to the clinical field in focus.

Clinical Immersion (11-12 weeks): During an eight-week immersion period on a clinical ward, the teams will carefully observe the different functions and activities of the daily routine in order to identify any problem encountered by the personnel or patients. During the immersion period, the students make individual arrangements with the clinical staff to shadow the work on the ward by either following one of the staff members, a patient or a specific procedure, examination, operation or consultation. During the immersion, the fellows will identify and log hundreds of clinical needs and dive deeper into two to three lead needs with the highest potential-value for the next phase.

Creative Skills: During this phase, the focus is on creating and validating different solution concepts to the lead needs. Through repetitive ideation sessions, the fellows will generate as

many ideas as possible to solve the lead needs. Ideation, prototyping, user involvement and the search for available technologies will force you to find a compatible match between needs and technological feasibility. The seeds for future collaborations between the entrepreneurs and the clinic are sown. During the Concept Development track, the teams will develop and test sequential prototypes and take the first steps toward establishing proof-of-concepts. Those proof-of-concepts can be focused on workflow, organization, communication and results in better work environment, patient safety, and patient care.

Commercial Skills: The fellows will together select one lead concept and then the initial prototyping begins. Each team develops a business-model based on listing, testing and validating preliminary assumptions on key business aspects. The assumptions are supplemented with research on patenting, drafting design of clinical tests, draft of regulatory approval document and, not least, the gathering of data and insights to formulate a clinical implementation strategy.

The end product for each team will be a single validated solution concept to solve a documented clinical need. The students will submit a written report on the final need and product resolution, business model description, patent landscape analysis and patent strategy, a draft research study design and a draft regulatory approval strategy. A physical prototype or product concept artifact should also be produced. The students will graduate at an open access presentation.

Regarding the program's curriculum, the most valuable skills learned are about need-driven innovation and design thinking. Those more actionable skills are complemented with soft skills (project management, teamwork abilities, time management). Common outputs are 1) the increased confidence in themselves in their professional lives after the program and 2) Skills to potentially starting their own business.

Program Implementation, Evaluation, and Revision

The program is delivered through:

- a. A preparation phase prior to the lecture that involves reading a text, listening to a video, and/or performing a practical task together with fellow team members.
- b. The lecture combined with exercise.
- c. Out-of-class teamwork on projects based on specific instructions from the previous in-class lecture. The out-of-class tasks are what we call "get-out-of-the-building" exercises. Fellow teams have to perform field work, research, interviews and networking.
- d. Written assignments are limited and generally short except for the final report.

The program is evaluated throughout the year along its different stages and there is a follow-up survey one year after the completion of the program to stay in dialogue with graduates and assess long-term learning effects. It tries to act on the evaluation points.

The program is mainly marketed via mouth-to-mouth, LinkedIn, and through job advertisements. Since its launch, the program's costs have been covered by the Novo Nordisk Foundation and participants get a full salary.

Post Program Action

Alumni Community & Integration in the Ecosystem

Whilst the program director said that they “have not found the right formula yet” to engage alumni, the fellows themselves really see a value in the alumni community and appreciate to be a part of it. Nonetheless, the location sometimes poses a challenge since there are participants from Aarhus and Copenhagen and they sometimes shy away from traveling.

The program tries to involve alumni in the teaching as much as possible, giving talks, showing their workplace, and more. Furthermore, the program leaders keep track of the participants and regularly check up on them also after the conclusion of the program.

Entrepreneurship Longevity

To further ensure long-term entrepreneurial sustainability, the program gave away a Bridge grant in 2022 and 2023, even if many of them are able to raise external funding. In addition, even after the completion of the program, graduates can still benefit from the support, network, expertise, and advice from the program.

BII and the Danish Tech Challenge have been mentioned as other structures that support entrepreneurship longevity beyond the program.

Success rate: It is expected that a third of the fellows at the BioMedical Design Fellowship will start companies and commercialize the solutions created during the fellowship.

Program-Ecosystem Collaboration Impact

Impact of the Innovation Ecosystem in the program

There are several different ways of how the ecosystem interacts with the program. Firstly, the alumni are actively involved in the teaching and one interviewee mentioned that the alumni had helped with the application to prominent accelerator programs such as the Danish Tech challenge. Whilst the ecosystem had no direct impact on the program design, they are a part of the steering committee, so they are able to represent Biomedical Design's interests to the public and support them. The fellows are also being informed about open calls or networking events in the ecosystem.

Impact in Local and Regional Entrepreneurship & Competitiveness

The newly created projects feed into the ecosystem, get support and funding from a variety of stakeholders, and later also employ people, students, etc.

The fellows who do not continue with an idea get jobs in the Med Tech device industry or at some of the innovation providers above (e.g., Ideekliniken, HealthTech hub in Copenhagen, etc.), and thus also add value to the existing corporations.

Limitations & Mitigations

Limitations and HealthEConnect Mitigation

Limitation 1: Accommodating Team dynamics

The project teams do not always get along and they sometimes do not want to waste their time with a non-functioning team. Team development is crucial and can be very demanding.

HealthEConnect Mitigation - As in every educational program, there should be a specific emphasis on team development through including icebreakers, networking opportunities, but also theoretical inputs about what makes a great team and how to communicate effectively.

Limitation 2: Having a Full Curriculum

The curriculum is quite full, and the students cannot take it all in.

HealthEConnect Mitigation - It is important to design the curriculum in a way that the knowledge can be digested by the students and does not feel overpowering or overwhelming.

Limitation 3: Varying quality of teachers

This limitation needs little explanation. A consistent quality of lecturers should be ensured, and lecturers need to be vetted and briefed thoroughly before starting their assignment.

HealthEConnect Mitigation – To be mitigated in the cyclic revision process of the program curricula and delivery methods.

Main Take-aways and Conclusions

Main Take-aways and Potential Implementation in HealthEConnect Program

Take-away 1: Clinical immersion, needs-driven innovation

The clinical immersion gives the fellows a deep understanding of what is needed “on the ground” and ensures that products are solving a problem for the patient or the clinician. These needs are then compared with market trends and gaps to ensure that the market is large enough for a successful start-up.

HealthEConnect Implementation - This does not seem feasible to include in this year’s pilot. Nonetheless, it is important that PBLs, case studies, and case competitions are based on need-driven innovation. Contact with NMS, hospitals, and patients should further be promoted in the program to understand the health care processes in a comprehensive way. In addition, Patient Innovation could provide opportunities to connect their start-ups with the students via events, workshops, conferences, networking activities for them to learn about user-centric innovation approaches.

Take-away 2: Interdisciplinarity and more mature participants

The teams are set up with fellows from a variety of different backgrounds and mixed up on purpose. This way, there are multiple perspectives and skill sets available per group and it resembles a real start-up more. Further, in contrast to many other educational programs, this is a post-graduate program. Consequently, these fellows are more experienced and actually better equipped to make a real start-up happen.

HealthEConnect Implementation - In the HealthEConnect, there should also be a special focus on allowing diversity and enabling interdisciplinary work. In this edition, Nova’s pilot starts after the selection of MIEI students. Therefore, this best practice should be addressed in the marketing strategy (considering the Limitation 1 of Best Practice 1). Opening the program to medical and engineering background should also be discussed

Take-away 3: Very modern and interactive teaching methods (Reflection on action methodology, peer-to-peer feedback, PBL)

The program employs very modern and interactive teaching methods (Reflection on action methodology, peer-to-peer feedback, PBL). Reflection on action allows students to pause after an action, reflect upon it, adjust their behavior, implement new insights and improve for next time. “Reflection-on-action refers to the retrospective consideration of training to discover, analyze and interpret the recalled information, the knowledge utilized in practical situations.”⁴

Project-based learning on the other hand is a successful method of learning problem-solving skills which take place in the context of a hospital environment at the BioMedical Design Fellowships.

HealthEConnect Implementation – At HealthEConnect, it will be crucial to include a variety of different teaching methods and thus be innovative in the curriculum development. Further, the consortium should think about how students can work on real cases and put their learnings into practice.

⁴ <https://www.peoplehum.com/glossary/action-reflection-learning-arl>

In the pilot, the “Final Project” is the only health related PBL done in partnership with members of the Danish and Portuguese Innovation Ecosystems. Future editions could perhaps incorporate the CBS “Healthcare Innovation Project” course and other case competitions in collaboration with members of the Portuguese Innovation Ecosystem. Nonetheless, it is important to define what the practical format/PBLs framework is and to select relevant projects topics and problems, aligned with the leveraged skills and the themes approached in class.

Take-away 4: Fostering entrepreneurship extremely practically and the quota of ventures created.

In the Novo Nordisk Fellowships, the fellows are building a prototype and developing a final pitch. They are not just immersing in theoretical explorations but focusing on a needs-driven product validated with market assessments.

Giving the students enough time to work on their business ideas helps venture creation, ensuring entrepreneurial longevity through funding, continuous support, incubators networking, etc.

In addition, the Novo Nordisk Foundation Program is a full-time paid employment, that provides financial stability for participants to start and focus on their entrepreneur journey.

HealthEConnect Implementation – This would be the goal of the pilot but remains to be seen how to be implemented. Regarding financial support, this best practice falls outside the scope of the project, and it is Nova SBE’s role to provide aid to minorities and promising students. Nonetheless, for the students that go to Copenhagen for their “Final Projects”, the consortium should think about financial incentives to enable and support this dislocation, while accommodating income disparities across countries.

Take-away 5: The community, shared mindset and post-completion alumni community are some of the most outstanding features.

Continuing relations after the program do not happen organically and need to be facilitated. Therefore, it is important to ensure a great sense of community from the beginning through extracurricular events, team events and excursions. Fostering this community beyond the completion of the program and offering them incentives to join the alumni community. To achieve a well-functioning community, it is important to understand what the alumni need and what their motivations are.

Long-term community engagement should be endorsed and supported by program directors. Relationships between the alumni should be actively fostered (some resource should be factored in for this).

HealthEConnect Mitigation - The creation of a vibrant and well-connected alumni community should be taken into consideration at a later stage of the implementation, while networking activities should already be included in the pilot. The exploitation plan should ensure long-term community engagement and foster active relationships between the alumni. The value proposition of that community needs to be clearly defined and marketed to the alumni.

Practice 11 | KTH MSc in Innovative Technology for Healthy Living

Introductory Note

Program Information

Name, Institution, Duration, and Location

KTH MSc in Innovative Technologies for Healthy Living is a 2-year Master Program at KTH Royal Institute of Technology - School of Engineering Sciences in Chemistry, Biotechnology and Health, Flemingsberg, Stockholm (Sweden).

Date of creation and Number of editions

The Program development phase started in 2009. September 2023 will be the 3rd cohort.

Students per year in the last 3-5 years

The program hosts relatively small cohorts with:
8 students selected among which 3 enrolled in the first edition,
15 selected among which 12 enrolled in the second edition,
20 selected in the third edition.

Goal of the program

The program aims to put impact in the center of sciences applications. Students are given a flavor of entrepreneurship and of commercialization of their own ideas.

Member of the Innovation Ecosystem

The program is focused on guaranteeing students exchange and contact with other ecosystems and universities, to broaden their mindset and expand their network. In that sense, the program works with 3-4 companies with whom it has strong relations and is focused on the local Swedish market in the following areas: rehabilitation technology, monitoring of performance and posture, occupational health therapy, biomechanics, work related injuries. While detailed information regarding the companies that collaborate with KTH on a regular basis was not shared, a mention of a collaboration with Volvo factory was made.

Case Study Sources

To produce the present exploratory case study, interviews from the program provider category, the student category, and alumna category were conducted (and anonymized), as part of Milestone M1.2.

Their inputs were assembled into one unique document.

From Seed to Fruit Context

Launch Action

Purpose of the creation

The idea was to combine health and entrepreneurship in one curriculum, while granting students exposure to real-world settings and problems.

Indeed, it emerged as a solution in a context where 1) companies recruit students with prior working experiences to reduce the in-house training costs and time and 2) innovation is a key driver for business.

Creation, course selection, and ecosystem establishment process

This program was inspired by EITH Health that supported the 1st year of the development. The course selection was made in order to provide flexibility and personalisation while guaranteeing structured learning on tech revolution, AI, social-cultural perspectives and current technological advancements and trends. The program did not establish its own ecosystem, interacting with KTH ecosystem.

Main Innovative Aspect

The most innovative feature is its customer-centered approach to innovation.

Implementation Action

Program Outline & Entrepreneurial Competencies Development

The program is a structured learning on tech revolution, AI, social-cultural perspectives, and current technological advancements & trends. Students learn how to explain, identify bottlenecks in current processes or solutions, create, evaluate, and validate innovative products or solutions, usually adopting a user-centered approach.

While preparing students to be at the upfront of health tech innovation, the program leverages on creativity, critical thinking, and problem-solving skills. Nonetheless, program outlines tend to be broad and superficial in some of the courses and do not bring the required skills to conduct experiments.

Program Implementation, Evaluation, and Revision

Regarding the admission process, the MSc has the following specific requirements: bachelor's degree, corresponding to 180 ECTS credits or equivalent, within Engineering Physics, Electrical Engineering, Computer Science, or Mathematics. The degree must include courses in Mathematics, Physics, Computing and Electronics equivalent to at least 60 ECTS.

The 60 ECTS must include at least 25 ECTS in Mathematics, 15 ECTS in Physics, 10 ECTS in Computing and 5 ECTS in Electronics. Applications are open until mid-January and non-EU; EEA or Swiss citizens must pay a fee of SEK 900. Admission results are published by the end of March.

Regarding its implementation, the program relies on a hands-on learning methodology, group work, and experimentation. Students have one day free per week where they can focus on their own project and extracurricular activities.

During the first year, the lectures are online with 50% mandatory courses and 50% electives. Seminar structure includes a pre-recorded video about the topic, reading material, and questions for students to reflect upon. This provides flexibility and personalization while guaranteeing structured learning. Seminars entail bringing both students and teachers out of their comfort zone. No matter how much preparation, out of the box questions always appear. The live discussions foster interchange between knowledge, backgrounds, fields of interest, and expertise.

During the second year, the program relies on 2 PBLs – one internship abroad and the MSc thesis (online). The master thesis combines 4 parts: medical, R&D, socio-cultural impact, and commercialization. These 4 pillars are approached in the program as mandatory courses.

In addition, even if the program does not foster specific extracurricular activities, participation in [KTH innovation](#) is encouraged as a privileged channel to expose students to the real world. They learn how to adapt an idea to the customer's needs, put an idea in the market, ways to approach investors and venture capitalists and to market it. This one-year program (no credits) covers the business plan and includes different seminars and homework. The students are selected based on the quality and potential of their project. Moreover, students are also encouraged to join the [validation lab](#) where companies ask students to validate, test, and improve their prototypes or products. Finally, students have access to different summer schools, from KTH and other universities.

Continuous evaluation from students and the program responsible and external accreditation every 5 years (standard procedures for every program).

The program is mainly marketed through regular KTH channels and is financed by the Swedish State. It is free of charge for national students while tuition is applied to international students. For periods abroad, KTH provides the necessary information and guidance for students to obtain scholarships.

Post Program Action

Alumni Community & Integration in the Ecosystem

The alumni community has not been structured. Alumni connect with graduates, students, and professors through LinkedIn.

Entrepreneurship Longevity

No specific structure implemented by the program is available to ensure entrepreneurship longevity.

Nonetheless, [KTH pre-incubator program](#) & [KTH holding](#) puts money into successful ideas and help students start their entrepreneurial journey.

Program-Ecosystem Collaboration Impact

Impact of the Innovation Ecosystem in the program

The ecosystem provides projects and real cases for the students to work on. For example, students have to develop a deep learning tool to help physicians identify melanomas or draw trust mechanisms for the DaVinci medical system to be unanimously adopted.

Impact in Local and Regional Entrepreneurship & Competitiveness

The program fulfills the ecosystem's request that future engineers are familiar with the theory, but also with the tools for practical work, so that the training at work period is shortened. As an example, KTH leverages on the standard software tools used in the industry.

The expectation from the program is that students will be hired by these companies.

Limitations & Mitigations

Limitations and HealthEConnect Mitigation

Limitation 1 – Enhancing the difficulty to attract students

In the selection process, a strategic balance between accepting the best students and accepting students that will in fact enroll in the program is applied.

HealthEConnect Mitigation – This limitation is being addressed in the communication strategy to convert MIEI students in selecting the *Innovation in Healthcare* area of specialization.

Limitation 2 – Increasing the frequency of curricula revision

Programs in entrepreneurship and innovation should be revised frequently in terms of curricula and delivery methods to ensure that they stay up-to-date and that they are competitive among others educational offers.

HealthEConnect Mitigation – A strategy for pilot revision in order to identify and act on critical touch points is being implemented by the HealthEConnect consortium.

Main Take-aways and Conclusions

Main Take-aways and Potential Implementation in HealthEConnect Program

Take-away 1: Tailor-made academic path

With 50% electives in the first year and 2 PBLs in the second year that are chosen by the students, the academic path is flexible and accommodates students' interests and backgrounds.

HealthEConnect Implementation - As the current pilot is by itself an area of specialization in an existing MSc, little can be done to retrofit this best practice. However, electives and skill modules will be created to accommodate students' interests in futures editions.

Take-away 2: Practical experimentation in designing user-centered innovative solutions

The KTH MSc leverages on practical experimentation and user-centered design of innovative solutions.

HealthEConnect Implementation - The current offer is an area of specialization within an existing MSc. Currently, only one PBL (the Final Project) specific to Healthcare Innovation is included in the program outline. Nonetheless, in future editions, this number can be increased (with the addition of a Healthcare Innovation Project), along with case competitions.

Take-away 3: Creating a safe space to give feedback and have opened discussions

KTH fosters a close collaboration between students and teachers that promotes a safe space for open discussions and feedback.

HealthEConnect Implementation – This is the success of any educational offer and should be ensured and monitored during the pilot and throughout future editions.