UNIVERSITY OF COPENHAGEN

IDEAS AND SOLUTIONS FOR IMPACT

INNOVATION STRATEGY

The University of Copenhagen creates new knowledge and educates talented students who become key contributors to the development of Danish society – and sometimes the rest of the world. It is an important mission because the world as we know it, and the world that is coming, both need new knowledge, insights and ground-breaking research in order to ensure the transition to a sustainable future.

The University of Copenhagen would like to have a major role in resolving the challenges society is facing by developing new solutions that call for research and knowledge. If we are to contribute more to shaping tomorrow's sustainable society, our knowledge must be brought into play in strong partnerships and business collaborations and through more spinouts and student-run startups. That is the ambition of our innovation strategy.

We are already working with innovation on many levels, but we have the potential to do much more. The many researchers, students, employees and managers who have contributed to the strategy and helped set out a clear vision have expressed a shared ambition that innovation should be a distinctive mark of the University of Copenhagen. We will now deliver on the ambition via concrete initiatives.

We believe that innovation thrives on collaboration, diversity and different areas of expertise. That is why we want to build stronger partnerships with responsible businesses, public authorities, organisations and enthusiasts in civil society. As a University of Copenhagen hub for potential partners, we have opened UCPH Lighthouse, an innovation centre, as the first step of our innovation strategy.

Enjoy the read!

Henrik C. Wegener
Rector, Copenhagen, April 2023

1. PURPOSE

This strategy sets direction for the University of Copenhagen's work on innovation, prioritises efforts and indicates the level of ambition. The strategy is input to the University's coming strategy for the years 2024-2030.

It will play out through the initiatives that departments, faculties and the Central Administration set out in their own goals and action plans.

The University of Copenhagen (UCPH) is a leading knowledge institution with extensive research activities and talented students, who make a substantial contribution to developing Danish society and the world around us.

The world we know, and the direction it is moving in, call for new knowledge and research-based ideas and solutions to create new understandings, address the many different challenges the world is facing and prepare for the future in the best possible way.

In a broad sense, innovation is about developing ideas and realising them. At UCPH, innovation is research-based because it is based on researchers' knowledge and on students innovating via the teaching and inspiration they encounter during their studies.

UCPH already works with innovation on many levels but has the potential to do more. Innovation must be a distinctive feature of the University.

Innovation at UCPH is about researchers, students and graduates who make a difference in the business sector, the public sector and civil society. Innovation can also lead to the establishment of new businesses.

The University's key strengths are high-quality research and education as well as academic breadth. This means that UCPH can develop new ideas founded on deep knowledge within multiple academic disciplines, while also making the most of the potential for innovative thinking across the University.

Interplay with others is vital to research-based innovation. This can be with research colleagues and students, or partners from businesses, public authorities, interest groups and industry organisations or volunteers in the third sector – in Denmark and elsewhere.

THE STRATEGY AIMS TO:

- set out a vision, an ambition and a direction
- highlight the potential of interdisciplinarity
- inspire and activate researchers and students
- increase our interaction with the outside world
- live on in the coming 2024-2030 strategy.

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The following section focuses on UCPH's vision and perception of innovation. Three focus areas and nine action areas are then presented, which form the basis for the initiatives that will support the strategy jointly and locally. Finally, a new measurement system is suggested that aims to show whether our innovation efforts are moving in the right direction.

Overview of the elements of the University's Innovation Strategy:

VISION

UCPH is recognised for the significant contributions made by our researchers and students, in interplay with the outside world, to new ideas and solutions for the benefit of Denmark and the world.

FOCUS AREA 1

CULTURE

ACTION AREAS:

- Management must focus on its own innovation skills, recognition of results and giving credit for innovation.
- Creating good framework conditions that motivate researchers and students to launch new innovation initiatives.
- UCPH must prioritise innovation in both internal and external communication.

FOCUS AREA 2

COLLABORATION

ACTION AREAS:

- UCPH must develop incentives as well as physical facilities and digital platforms that support interdisciplinary collaboration.
- Focusing on collaboration with businesses and other stakeholders based on their needs and opportunities.
- Through dialogue, UCPH must strengthen the external promotion of its interests to ensure better framework conditions.

FOCUS AREA 3

ECOSYSTEM

ACTION AREAS:

- UCPH's innovation ecosystem must be cohesive, user-friendly and linked to innovative environments outside UCPH.
- UCPH must create better opportunities for researchers and students to participate in establishing new companies.
- UCPH must focus on more research and education in the field of innovation at UCPH.

JOINT · MULTIDISCIPLINARY · SUBJECT-SPECIFIC · INTERDISCIPLINARY

EXISTING AND NEW INITIATIVES

2. VISION

UCPH is a leading, comprehensive and research-intensive university. This is a unique and excellent platform for generating innovation.

The vision is to be recognised for:

Researchers and students who – in interaction with the outside world – contribute significantly to new ideas and solutions for the benefit of Denmark and the world.

Innovation can be understood and defined in many ways. At UCPH, the concept is defined broadly with the extensive research activity as the starting point. Excellent research is a key prerequisite for innovation and enables special innovation efforts based on knowledge and ideation by both researchers and students.
A very open perception of innovation can dilute focus and direction. All research at UCPH does not have to lead to innovation. There are other important research objectives. It is also not the goal that all education should lead to entrepreneurship. However, innovation in this strategy should be understood in a broad sense as value creation that can take place within all subject areas.

UCPH defines innovation as:

Research-based knowledge that is transformed into solutions, methods and processes that create value for people, society and the environment.

UCPH should be the driver of research-based innovation by providing researchers and students with innovation skills, just as innovation should be an attractive opportunity in both research and education. The vision will be realised by UCPH, in interaction with the outside world, creating, developing and using research-based knowledge to create value.

3. THREE FOCUS AREAS

As part of our work on this strategy, a lot of input has been gathered from workshops, interviews and meetings with an external innovation panel. This has resulted in three priority focus areas that define and delimit the overall vision.

A stronger **innovation culture** at UCPH is vital to increasing the scope of our activities. Considerable efforts will be needed for innovation to be actively and continuously encouraged, motivated and advanced in words and actions.

Innovation requires **collaboration** between different competencies and partners. UCPH has sought-after but untapped potential for interdisciplinary innovation collaboration across the University. UCPH is an attractive partner for large, medium-sized, small and newly started businesses, public-sector organisations and innovation stakeholders, which UCPH should interact with even more.

UCPH's **ecosystem** should be more cohesive, with a clear division of labour. A cohesive ecosystem with the user in focus means that all levels of the organisation pool their efforts to further innovation. It also means that UCPH involves and collaborates even more with external innovation stakeholders.

4. NINE INNOVATION-GENERATING ACTION AREAS

The three focus areas provide the foundation for nine action areas that will inspire initiatives and priorities at all levels. The goal is for the nine action areas to generate initiatives that will strengthen the general innovation effort at UCPH. The initiatives can be UCPH-wide, interdisciplinary or subject-specific.

4.1 CULTURE

Culture is about UCPH being an open and interactive place that is actively involved in developing new solutions, methods and processes. An innovative culture is boosted when successful business and innovation activities are recognised as merit, and when students and researchers have good opportunities to work with innovation.

To bring about cultural change, it is important for management to lead the way and focus on their own skills, communicate the importance of innovation, acknowledge results and support activities initiated by researchers and students. It is also important that UCPH prioritises innovation in its communication efforts in order to promote cultural change.

Management must focus on developing its own and the organisation's innovation skills, recognising results and giving credit for innovation

Innovation can be encouraged by leadership. With busy and changeable working lives, it is essential for the innovation effort to be persistently highlighted among managers centrally at UCPH and at faculties and departments. For example, it would make sense to make it a permanent item at goals and action plan meetings, and to offer the upper management layer more skills development to support and lead innovative environments and employees.

Researchers, students, administrative staff and graduates should increasingly be given recognition for their innovation efforts. This could be via employment, development reviews, promotions and other ways in which innovative initiatives and results to a higher degree are seen as elements of merit in individual career planning. In particular, there must be scope for hiring researchers based on a strong weighting of their documented innovation skills, experiences and results.

The framework for employment contracts at Danish universities is broad and allows for an emphasis on innovation and external cooperation as well as research. In connection with the recruitment of researchers, it is also important that there is the freedom to choose whether

and to what extent innovation and business collaboration should be prioritised.

Innovation is most likely to thrive when management provides direction, framework, priorities and space. An innovative management culture acknowledges that the best ideas are not generated and further developed in a top-down fashion. UCPH must be willing to take risks and be supportive and inquisitive about the innovation that flows from the knowledge and commitment of researchers and students.

UCPH should provide optimal framework conditions and motivate researchers and students to create and participate in innovation activities

There should be incentives to launch new innovation initiatives. UCPH must become better at attracting funding for innovation activities, and the external funding that departments obtain for innovation activities can be supplemented by the University's own funds. Incentives could also take the form of physical facilities and digital platforms for use in innovative activities at UCPH, and collaboration with stakeholders outside the University.

An example of a new facility at UCPH is the joint innovation centre, UCPH Lighthouse. The core task of the centre is to coordinate and gather innovation resources and ensure that UCPH's knowledge is actively used to address complex societal issues (see Appendix B).

UCPH must prioritise innovation in both internal and external communication

It is important that UCPH's innovation efforts are known at the University, among the University's stakeholders and in the wider outside world. UCPH should bring more news and stories about its innovation activities, business collaboration and societal impact.

There are many untold innovation stories at UCPH. For example, around 200 new start-ups are founded by researchers, students and graduates from UCPH every year, and the University is engaged in collaboration with a wealth of Danish and international businesses. One example of an innovation news story is the collaboration between the University of Copenhagen and the Novo Nordisk Foundation to develop Denmark's first quantum computer, which will be operational in 2034 (see Appendix B).

4.2 COLLABORATION

In innovation partnerships, UCPH's knowledge is used, for example, to address challenges jointly with private businesses, public institutions or other stakeholders. Partnerships are strengthened by being based on a need, a demand or a joint development opportunity for the partners.

External partnerships must not compromise the research-intensive foundation on which UCPH is built. Research and innovation are not opposites, but rather synergistic.

UCPH's participation in partnerships, business clusters and contributions to research and innovation-oriented missions can also lead to setting up more external collaboration projects. It is assumed that the innovative and mission-oriented approach will become more widespread in the coming years, in step with a greater focus on addressing societal challenges among political and financial decision-makers.

UCPH must develop incentives as well as physical facilities and digital platforms that support interdisciplinary collaboration

With its strong and diverse academic environments, UCPH has unique in-house opportunities for different academic fields and scientific disciplines to engage and work together to create new research-based understandings and solutions. One example is the Nordic Humanities Center for Challenge-Based Inquiry, which aims to contribute new understandings and opportunities for action, across humanities disciplines, in relation to some of the major challenges facing society (see Appendix B).

Interdisciplinary collaboration is seen as a special UCPH strength, internally as well as externally, but such collaboration rarely appears out of thin air. Therefore, there is a need for facilitation, advising, events, funding, etc. for students and researchers alike to pave the way, while drawing on the physical facilities and digital platforms, for better exploiting the interdisciplinary potential at UCPH. Another example is the Green Solutions Center, which aims to facilitate the development of research-based green solutions in an interdisciplinary collaboration with the participation of external partners (see Appendix B).

Focus on collaboration with businesses and other stakeholders based on their needs and opportunities

In busy working lives, it is important that collaboration creates value for researchers and students and is easy to establish. An innovation partnership can involve businesses, public-sector institutions, other research institutions, voluntary organisations and entire industries or sectors. Researchers and students may need advice and support to establish, finance and facilitate innovation partnerships. An example from UCPH is Actory, which supports students in developing and realising innovative and sustainable solutions (see Appendix B).

In many cases, UCPH may invite external partners onto our campuses. At other times, researchers and students may benefit more from participating in collaborative projects out of town, closer to the problems or to talented and/or experienced entrepreneurs.

Through dialogue, UCPH must strengthen the external promotion of its interests to ensure better framework conditions

UCPH should influence innovation politics in Denmark and make a footprint on EU research and innovation policies. This will primarily take place through Universities Denmark, and in constructive dialogue with the political level, relevant ministries, various partnerships, interest groups and industry organisations.

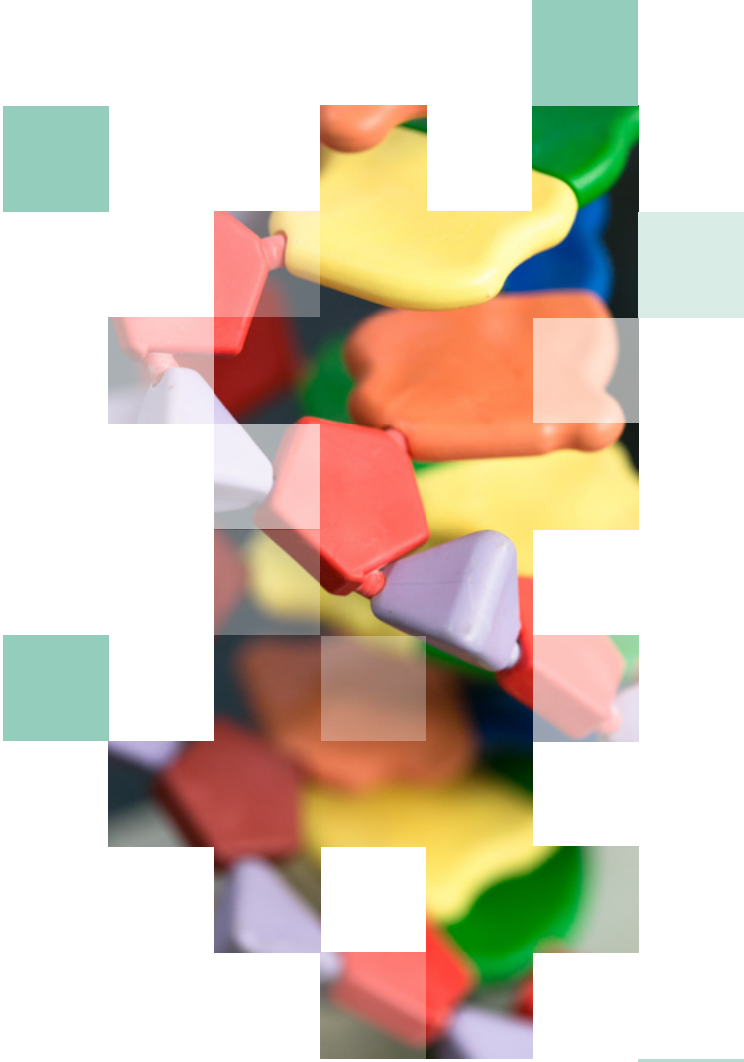
The goal is to establish innovation policy as a more important policy area and to promote individual causes such as research-based innovation, interdisciplinary innovation, good framework conditions for the universities' technology transfer, and the need for more stable financial frameworks for innovation activities and development.

4.3 ECOSYSTEM

UCPH's internal innovation ecosystem must be coordinated and user-friendly. The aim is to ensure good framework conditions for students and researchers to engage in innovation, and UCPH must be actively involved in innovative environments outside UCPH.

The ecosystem must support students and researchers in becoming successful entrepreneurs that generate innovative ideas in established companies, and in governmental as well as non-governmental organisations. The aim is also to boost the skills and motivation of students and researchers who want to create new businesses.

The University's innovation ecosystem must be cohesive, user-friendly and connect with innovative environments outside UCPH



It is important that UCPH allocates resources to a user-friendly innovation ecosystem where researchers and students can meet, be advised and supported in their innovation activities. As the ecosystem at UCPH has grown larger and stronger, a greater need has arisen for ensuring cohesion, division of labour and the best possible use of resources, with a focus on better user experiences.

The Tech Transfer Office is charged with ensuring that the University's patentable research results are protected and exploited, and it plays a key role in the ecosystem. In the area of tech transfer, UCPH wants to be open, flexible and the preferred university partner. It must also be ensured that UCPH, like other Danish universities, can underpin the increased research activities with the necessary tech transfer resources and competences.

The innovation ecosystem at UCPH can also be strengthened through closer ties to relevant external innovation players and environments. For example, through closer collaboration with the BioInnovation Institute (BII) and SYMBION, Denmark's largest start-up environment, which UCPH co-owns. And via the collaboration to establish a world-class innovation district in Copenhagen by further developing the Copenhagen Science City innovation district.

Several universities are experimenting with ways of accelerating the commercialisation of research. This may, for example, be done by creating an open and innovative collaboration environment between researchers and businesses, where the research is made openly accessible. None of the project parties are seeking IP rights and they can therefore share their results.

UCPH must be able to make greater use of different types of innovation and test new forms of innovation, for example, Open Science and Open Innovation. Another example of a new approach is UCPH's new investment fund, UCPH Ventures, which will invest in spinouts based on UCPH researchers' inventions (see Appendix B).

UCPH must create better opportunities for researchers and students to participate in establishing new companies

Innovation at UCPH is borne by researchers and students. Better opportunities must be created for them to start their own businesses. This means boosting UCPH's general commercialisation capabilities, for example by facilitating more and providing better support for researchers and students.

Close relationships with private investors and mentors willing to assist in various ways are important for entrepreneurship. For successful new start-ups to emerge from UCPH, it is important that there is a stronger collaboration with external business developers and investors, who can advise on and perhaps co-finance the development of new ideas.

An example is The Pipeline, which offers training in health innovation, helps to turn research into new businesses and a mentor programme. Another example is the Tech Trans Office's collaboration with other Danish TTOs on the Spin-outs Denmark project (see Appendix B).

UCPH should focus on more research and education in the field of innovation

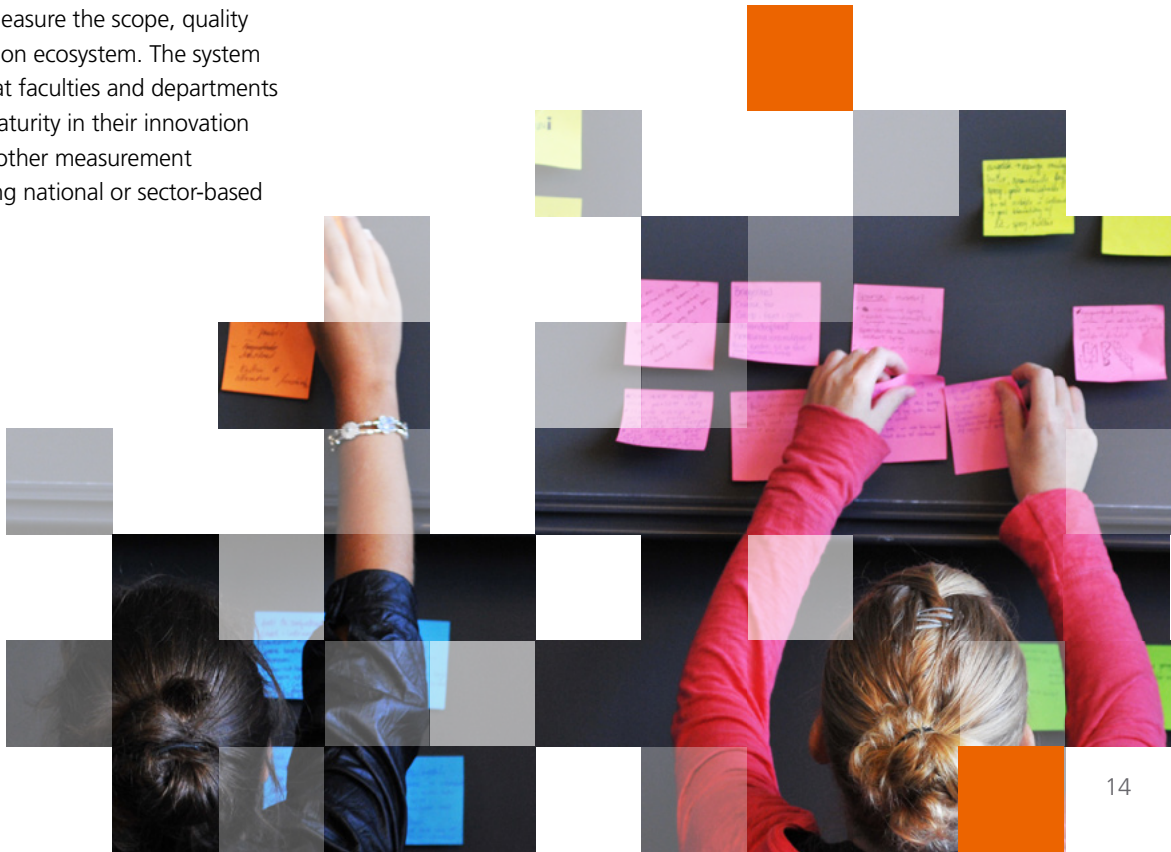
UCPH must increase its research and educational activities in the field of high-level innovation and entrepreneurship. This includes generic offers to Bachelor, Master's degree and PhD students etc. and offers adapted to specific disciplines. Bachelor's and Master's degree programmes at UCPH can contain several elements of either innovation and entrepreneurship classes (with a practical aim) or innovation classes where students use their academic skills in innovation processes about relevant real-life issues. These offers should provide tools, skills and access to networks for researchers, other teaching staff and students.

5. IMPLEMENTATION AND MEASURING

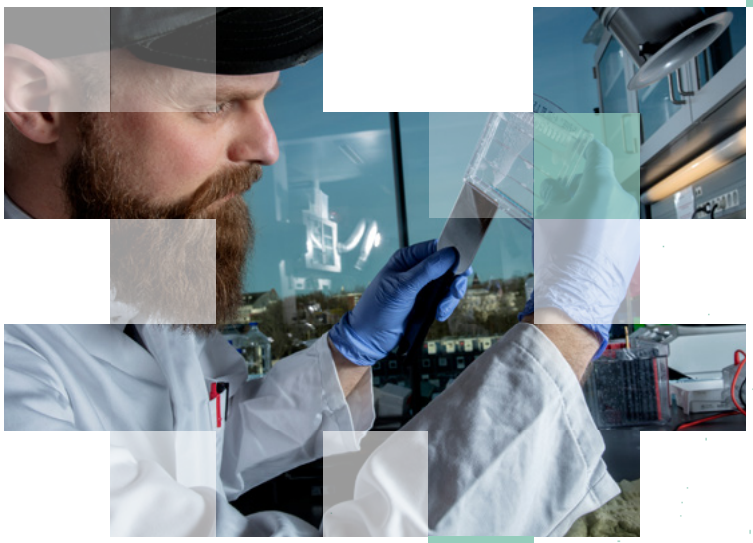
The joint coordination of implementing this stratey will be integrated with the University's overall strategy for 2024-2030. While the individual units are responsible for setting out concrete initiatives in their own goals and action plans, the framework and major UCPH initiatives will be decided jointly with the support of the Central Administration.

In order to measure whether the innovation direction and speed is right, UCPH will establish a measurement system. Measurement areas and indicators will be selected in a separate cross-organisational project.

The system must have both input and output indicators as well as indicators that can measure the scope, quality and progression of the innovation ecosystem. The system must also take into account that faculties and departments are at very different levels of maturity in their innovation work. Finally, it must also take other measurement initiatives into account, including national or sector-based initiatives.



APPENDICES



APPENDIX A:
WHAT WE HAVE DONE – AND THE PROCESS AHEAD

The innovation strategy is based on preparatory work with extensive involvement during the first half of 2022. An innovation panel was appointed with external participants, and three workshops were held with students, researchers and administrative heads and staff from faculties, departments and the Central Administration. A steering committee and a working group with representatives from the faculties provided regular input to the process.

STEERING COMMITTEE	AFFILIATION
David Dreyer Lassen	Chair of the steering committee, Prorector for Research
Dorthe Gert Simonsen	Associate Dean of Research, HUM.
Erik Bisgaard Madsen	Associate Dean for Private and Public Sector Services, SCIENCE
Kim Brinckmann	Director, FA, Research & Innovation
Rie Snekkerup	Director, FA, Education & Students
Sara Hagemann	Associate Dean for Education, SAMF
Trine Winterø	Vice-Dean for Innovation and External Relations, SUND

WORKING GROUP	AFFILIATION
Kim Brinckmann	Project owner, chair of the working group, Director, FA, Research & Innovation
Thomas Ebdrup	Lighthouse, FA, Research & Innovation
Daniel Mosbæk Jensen	Project Manager, FA, Research & Innovation
Annette Fløcke Lorenzen	Business Coordinator, FA, Research & Innovation
Rune Heiberg Hansen	Senior Consultant, SAMF, Faculty Secretariat
Cecilie Ydemann Hansen	Head of Section, SUND, Faculty Services, Research & Innovation
Søren Haslund	Senior Consultant, SCIENCE, Faculty Secretariat, Research & Innovation
Marie Roloff Groth	Specialist Consultant, HUM, Faculty Services, Research & Impact
Laura Wulff Thomassen	Specialist Consultant, FA, Education & Students
Anne Marie Dyrberg	Administrative Officer, FA, Education & Students
Luisemay Seberton	Lighthouse, FA, Research & Innovation

Interviews were conducted with people inside and outside the university with special knowledge of innovation collaboration. The interviews focused, in particular, on the framework for innovative collaboration between universities and the outside world and for establishing new companies. Interviewees were also asked to share examples from other universities that could help increase the innovation capacity of universities. Over 30 interviews were conducted.

TABLE 1: LIST OF INTERVIEWEES

- *Broeng, Jes; Professor and Director, DTU Centre of Technology Entrepreneurship, serial entrepreneur, and board member at PreSeed Ventures.*
- *Feddersen, Ole; CVP Product Supply Technology Transformation, Novo Nordisk.*
- *Lebech, Mads; Director, A.P. Møller Foundation.*
- *Mickelborg, Kalle; Danish student in Skydech, an incubator at Berkeley.*
- *Molzen, Jan Eiersted; Head of Partnerships, DTU.*
- *Motzfeldt, Christian; Chairman of the Board, "Erhvervsfremmebestyrelsen", former Director at the Danish Growth Fond.*
- *Nielsen, Jens; Director, BioInnovation Institute, professor at Chalmers University of Technology, Adjunct Professor at DTU.*
- *Nyholm, Jens; Director, IRIS GROUP.*
- *Olesen, Jeppe Dørup; Head of Innovation, University of Aarhus.*
- *Rasmussen, Mikkel B.; Director, Red Associates, serial entrepreneur and investor.*
- *Rosted, Jørgen; advisor, former Director at FORA.*
- *Singh, Avnit; Director, TechBBQ.*
- *Skovborg, Mikkel; Senior VP for Innovation, Novo Nordisk Foundation.*
- *Torstensen, Peter; Director, Symbion.*
- *Cathey, Cheryl; Licensing Associate, Office of Technology Licensing, Stanford University.*
- *Gaur, Ishan; Studerende på Stanford og direktør for Cardinal Ventures, Stanford University.*
- *Giesecke, Susan; Direktør for Global Engagement, University of California, Berkeley.*
- *Gunaysu, Ekin; Innovation Program Manager, Skydeck, University of California, Berkeley.*
- *Larsen, Morten; Seniorrådgiver, Innovationscenter Denmark, Silicon Valley.*
- *Mo-Yun Li, Direktør for Stanford Technology Ventures Program, University of Stanford.*
- *Mimura, Carol; Asst. Vice Chancellor, Intellectual Property & Industry Research Alliances, University of California, Berkeley.*
- *Singer, Ken; Direktør for Sutardja Center for Entrepreneurship & Technology, University of California, Berkeley.*

APPENDIX B:
EXAMPLES OF UCPH INITIATIVES THAT BOOST INNOVATION

Many innovation activities are already in progress at UCPH. Some are informal, arise spontaneously and are not registrable. Others are more established and visible, with allocated resources, steering committees and formal decisions behind them. Select examples of the many innovation activities at UCPH are listed below.

Human & Legal Innovation Hub at South Campus, SCIENCE Innovation Hub, SUND Hub and SAMF Hub
UCPH has four local innovation hubs with a focus on students and entrepreneurship. At the innovation hubs, business developers teach and advise students involved in innovative projects and planning to establish a start-up. The innovation hubs use local facilities for consultancy and hosting events and innovation programmes. Read more about Human & Legal Innovation Hub **here**, SCIENCE Innovation Hub **here** and SUND Hub **here.**

UCPH Lighthouse
UCPH opened its new innovation centre in November 2022. The primary task of the centre is to help boost innovation capacity and ensure that UCPH's knowledge is actively used to address complex societal issues, via interdisciplinary collaboration with companies, public institutions, foundations, entrepreneurs and players from the innovation environment. In collaboration with other relevant gateways at UCPH, the centre also serves as a gateway for external partners wishing to establish collaboration with UCPH. Read more **here** and **here.**

The Pipeline
SUND's pooling of innovation activities and provision of infrastructure that invites external collaboration and offers support to students, researchers and clinicians. The Pipeline offers training in health innovation for researchers from all Danish educational institutions (from PhD to professor level). SUND also participates in initiatives such as the School of Health Innovation, Open Entrepreneurship and SPARK. Read more **here.**

Spin-outs Denmark
The project aims to create more research and technology-based spin-outs originating from the research environments at all eight Danish universities, thereby creating more jobs for university graduates and a national ecosystem for academic entrepreneurs.
The project has received DKK 75 million from the Villum Foundation for 1) capacity and competence building of university technology transfer, 2) professional and financial support for researchers who have the potential to become entrepreneurs, and 3) building a strong and well-functioning entrepreneurial community. 40-60 postdocs will be financed for up to a year and receive funding to mature their ideas or technologies with commercial potential and help from experienced mentors to develop personal and commercial competencies. Read more **here.**

SCIENCE Innovation 2.0
An innovation proposal from SCIENCE containing 16 recommendations on how to support and strengthen researchers and lecturers at SCIENCE. The focus is on innovation and entrepreneurship in degree programmes and teaching, researcher-driven innovation, external collaboration and innovation culture and branding.

UCPH Ventures
A limited company founded recently by UCPH. The aim is to invest jointly with the EIR Ventures foundation in new spin-outs based on the inventions of UCPH researchers. UCPH Ventures will particularly assist companies during the first few years, where many spin-outs have difficulties finding investors. Read more **here.**

Centre of Applied Ecological Thinking
A new, externally funded knowledge centre at HUM which aims to draw on humanities research to further the green agenda and the cultural transition. The centre will develop knowledge, engage with the outside world and offer specific solutions that take into account the practices and ways of life of humans and societies. Read more **here.**

Toolbox for innovation and entrepreneurship
A website describing methods of relevance to innovation processes, offering courses based on innovation approaches and listing examples of how others have worked with innovation and entrepreneurship as part of their teaching at UCPH. The toolbox aims to make it easier for lecturers to incorporate innovation and entrepreneurship elements in their courses and programmes. Read more **here.**

Actory
An initiative for students established by Studenterhuset in collaboration with UCPH. Actory supports students in developing and implementing innovative and sustainable solutions through events, programmes and challenges. The new innovation centre is collaborating with Actory on an innovation programme for students in partnership with the business community. Read more **here.**

StartUp in practice
A programme that grants ECTS credits and focuses on making it possible for university students to do academic internships in their own or someone else's start-up. The academic internship is a chance for students to combine their studies with business development by doing an internship for one block or semester. Read more **here.**

Copenhagen Science City
UCPH has signed a strategic partnership agreement with external partners to build a world-class innovation district in the area around North Campus. The aim of Copenhagen Science City is to attract and retain talent and companies, bring players in the innovation ecosystem closer together and develop the physical facilities in this area. Read more **here.**

Crown Princess Mary Center
An inter-faculty knowledge centre at the University of Copenhagen, established jointly in 2022 by the faculties of humanities, social sciences and law. The centre aims to connect interdisciplinary research environments with government agencies, companies and civil society organisations. The goal is to create new networks and develop and communicate new knowledge. Read more **here.**

Green Solution Centre

The University of Copenhagen launched the Green Solutions Centre (GSC) in 2021 – an interdisciplinary, solution-oriented platform for developing research-based solutions that can contribute to the green transition in Denmark. GSC works with research at all levels, from basic research to applied initiatives, innovation and implementation, including with external partners.

GSC has launched x Living Labs. These are defined as interdisciplinary, user-centred, open innovation ecosystems, where university researchers, external partners, and eventually students also, can engage in interdisciplinary collaboration on green solutions. Read more **here.**

Nordic Humanities Center for Challenge-Based Inquiry

The University of Copenhagen and the University of Southern Denmark have established a new joint research centre. The purpose is to contribute nuances, perspectives, new understandings and opportunities for action in relation to major challenges facing societies such as the climate crisis and pandemics, across the humanities disciplines. Experienced and young talents from Denmark and abroad will be affiliated with the centre, mostly for one-year intervals to supplement the centre's core staff, who will have a strong focus on the dissemination of knowledge. Read more **here.**

School of Health Innovation

A collaboration between Nordic universities to offer courses in innovation to researchers in the life sciences, from PhD to professor level. The aim of the courses is to boost the entrepreneurship skills of researchers and build a network across national borders, disciplines and sectors. The courses cover entrepreneurship broadly, from drawing up business plans, developing prototypes and pitching ideas, to financing, risk assessment and much more. Read more **here.**

APPENDIX C:
CASES OF INNOVATION FROM UNIVERSITIES IN DENMARK AND ABROAD

As part of the preparation for the innovation strategy, a number of interviews were conducted. Examples have emerged from these of specific initiatives launched by other universities to strengthen innovation. These can inspire UCPH's work on a new strategy for innovation.

1. Entrepreneurship and research quality at Imperial College London

A study from Imperial College London examined the correlation between individual researchers' involvement in starting up new companies and their research activities. The study covers all researchers at Imperial College London, and investigates whether commercial work on starting up a new company has an impact on research. The study concludes that it does not detract from research, measured by publication rates and the number of citations – there are actually indications to the contrary. The thesis is that researchers giving attention to complex new issues that need to be addressed in order for a start-up to succeed increases the quality of their subsequent research. Read more here.

2. Funen robot cluster

In 1997, the A.P. Møller Foundation awarded a grant to set up a robotic centre at the then Odense University (now University of Southern Denmark), in part with the aim of improving the viability of Lindø shipyard in the face of strong international competition. The centre succeeded in building up excellent knowledge of robotic technology and introducing self-programming robots at Lindø shipyard; however, the shipyard did not survive.

The robotic centre at Odense University is still helping to create new companies, and is an important partner for many other businesses. The robot cluster on Funen is one of the world's leading business clusters in the field of advanced, flexible robots for small and medium-sized companies. There are more than 120 companies in the cluster. One of the largest and best-known is Universal Robots, which was started in 2005 by three young researchers from the University of Southern Denmark. Read more **here** and **here.**

3. DTU Entrepreneurship offers a 360-degree entrepreneurship competency course

DTU Entrepreneurship focuses on stimulating the entrepreneurial skills and desire of students and researchers through a range of initiatives.

The initiatives address various aspects of entrepreneurship at DTU. From a dedicated course in interdisciplinary entrepreneurship with a technological basis, and courses in which students and companies collaborate to form new companies, to matchmaking researchers with commercial experts. One thing the initiatives have in common is that they all involve business and commercialisation experts in the development of new spin-outs from the universities.

DTU Entrepreneurship works to stimulate the entrepreneurial skills of students and researchers in three ways:

a) DTU X-Tech facilitates collaboration between students, researchers and companies/entrepreneurs

The DTU X-Tech programme is a 13-week entrepreneurial course that grants ECTS credits. At X-Tech, students are taught entrepreneurship together with researchers and people from the business sector, while also collaborating with companies, researchers or other key players in the entrepreneur ecosystem.

Through the programme, students get access to facilities to make prototypes and to researchers with extensive technological knowledge, and they can receive grants of up to DKK 5,000 for equipment.

At DTU X-Tech, collaboration between students and companies is stimulated through joint innovation processes. Companies pitch ideas, which the students develop in teams with a mentor with relevant experience, together with the companies. The collaboration provides valuable practical experience for the students.

b) In Open Entrepreneurship, researchers and the business sector jointly mature and commercialise early research

The initiative was inspired by an initiative at Berkeley, and UCPH is already involved. The purpose of Open Entrepreneurship at DTU is to help ensure that research is translated into new companies. It has developed into a partnership among all Danish universities.

Under the initiative, teams are established with participants from universities and the business sector, who jointly develop and commercialise early research.

Open Entrepreneurship helps to match researchers with one or more experienced entrepreneurs over a period of 3-6 months. During this period, the researchers can work on the technology while the entrepreneur focuses on identifying the commercial potential. Boot camps are also held, where companies and researchers can work together to develop new ideas. Read more about Open Entrepreneurship **here.**

c) MSc in Technology Entrepreneurship trains students in interdisciplinary entrepreneurship

DTU offers a two-year MSc in Technology Entrepreneurship with a focus on interdisciplinarity[1]. You do not have to be an engineer to do the degree programme.

The programme includes academic teaching and hands-on entrepreneurship, and focuses on putting together interdisciplinary teams of students who work together to address problems in society. To date, 50 students have completed the MSc in Technology Entrepreneurship. Read more about the degree programme **here.**

d) DTU Entrepreneurship has seen great interest in entrepreneurship

The DTU Entrepreneurship initiative has seen more than 2,000 students complete one or more of its courses or degree programmes in recent years, and thus makes a key contribution to spreading the entrepreneurial spirit at the university. DTU Entrepreneurship is located in physical proximity to DTU Skylab, where the students can work on developing their ideas to ensure close ties between research and education in entrepreneurship.

Many universities have established similar, dedicated entrepreneurial centres, which conduct research and educate students and researchers in entrepreneurship, and are responsible for spreading the entrepreneurial spirit at the university. One of the best-known centres is the UC Berkeley Sutardja Center for Entrepreneurship, which runs a wide range of exciting initiatives under the heading 'Empowering Innovators to Positively Change the World'. Read more about the centre **here.**

4. Employment contracts with an emphasis on business collaboration – ETH Zurich

ETH Zurich is one of Europe's leading universities, with 20 Nobel prizes and many business partnerships and spin-outs. In 2020 alone, 34 spin-outs were established, which together raised DKK 3 billion in capital. ETH strives to stimulate collaboration with external partners in their recruitment process.

ETH Zurich seeks a more open culture, in which the university's researchers have opportunities to combine a career as a researcher with involvement in business collaboration. An important tool to this end is broader credit than traditional researcher credit in relation to appointments and promotions.

Like most other universities, ETH uses three job categories for faculty employees (assistant professor, associate professor and professor). Assistant professors are assessed no later than five years after their appointment. At this time they are either offered permanent employment as an associate professor, or asked to seek employment outside the university. Associate professors on the university's tenure-track programme are usually promoted to professor after 4-7 years.[2]

Applicants for professorships are assessed based on classic appointment criteria, such as the scope and quality of their research and the quality of their research-based teaching. However, in addition to the classic appointment criteria, there is an emphasis on the scope and quality of business collaborations and involvement in spin-outs.[3]

Applicants must therefore document the following:

- scope and quality of third party-financed projects
- knowledge transfer and services to industry
- three reports prepared for external partners
- activities for the benefit of the academic community (review activities, holding congresses etc.)
- a description of special achievements

Special achievements may include achievements in teaching, services for the benefit of society or the academic environment, software development, patents, knowledge, practice transfer and spin-outs.

Read more about ETH Zurich **here.**

5. Business partnerships based on corporate needs at Uppsala University

Uppsala University enters into business partnerships with local businesses and public-sector organisations based on the challenges faced by companies and the government. The target group is particularly companies and organisations that have not previously collaborated with the university.

The first step is called 'Academic Industry Meeting' (AIM) day, and involves appointing an interdisciplinary team of researchers to develop research-based solutions to specific challenges:

"AIMday is not an academic conference in the traditional sense. Instead, questions from companies and organisations are the very core of the AIMday format. Your challenges, formulated as one or more questions, set the agenda for face-to-face discussions with academics".[4]

About ten AIM days are held each year, themed on the basis of areas in which the university is conducting relevant research, e.g. mobility, materials, big data, cancer diagnostics and green solutions. Participation is free of charge.

It is therefore very much the university which organises meetings between companies and researchers in order to identify challenges for which new research-based solutions can be created. In the phase of identifying specific challenges in companies and the public sector, researchers with special knowledge in the field are called upon.

Once a challenge has been formulated, the second step is to find interested researchers. A team of 5-10 researchers (not necessarily from Uppsala University) from various disciplines with knowledge of the challenge and its possible solution is then appointed. The company and the research team discuss possible solutions at workshops, with the aim of establishing an innovation partnership. The third step is to establish, finance and facilitate the specific innovation partnership. At Uppsala, the university is tasked with following up on the discussions and establishing a functional innovation partnership.

The new approach of starting with a specific problem has increased the number of collaborative projects and project participants. From 2010 to 2013, the number of participating researchers increased from just over 500 to 1,600, while the number of external participants rose from around 300 to 1,300. The number of participating companies – especially SMEs – increased from 86 to 371.[5] The concept has been exported to several other universities since its inception – including Oxford.

6. At UC Berkeley, students address societal challenges

UC Berkeley involves students in addressing challenges in the local community in its 'UC Berkeley's Hacking for Local' course.[6] Challenges in local communities could be related to homelessness, public transport or health in disadvantaged neighbourhoods – areas where the city council does not have workable solutions or cannot find suitable partners. Most activities take place in the local community, where students conduct interviews, make prototypes and test solutions. There are many examples of such activities giving rise to new companies, formed because other local areas want to address similar societal challenges. Read more **here.**

7. Physical presence promotes innovation at Stanford

Stanford University is regarded as one of the world's most innovative universities. Some of the most successful entrepreneurs in the world studied at Stanford, and the university is undoubtedly a source of inspiration for many other universities.

The pioneering nature of Stanford University is probably due to a combination of factors.

One external factor is that Stanford epitomises Silicon Valley and innovation for many people, with the result that the university attracts a lot of resources. Stanford's fame as a nurturing ground for entrepreneurship also allows the university to attract the best students with entrepreneurial dreams.

When it comes to internal factors, Stanford's interdisciplinary focus is deemed by several observers to create particularly good conditions for innovation. There is a focus on interdisciplinary innovation and entrepreneurship at 18 innovation centres on campus.

After having focused on non-physical innovation centres for a period of time, Stanford came to the realisation that a physical presence is an important part of innovation. The need for physical presence is particularly important in relation to interdisciplinary innovation.

At the start of the new millennium, Stanford had already concluded that special 'collaborative buildings' should be built in which different professional groups developed innovation, and that this required a physical presence – and an alluring open architecture with many communal areas.

The effect of bringing together the various disciplines in the same building, with a focus on entrepreneurship, is deemed to support a shared vision and zest, in addition to synergies between them. Entrepreneurship demands dedication, and physical presence at the innovation centres helps create this. Read more about the centre **here.**

Bio-X at the James H. Clark Center at Stanford University

Bio-X at the James H. Clark Center at Stanford University opened in 2003. The building represented a break with previous traditions. The building was a place for different disciplines to meet and interact, with an open architecture and communal areas, such as cafés, to stimulate collaboration. The building represented a break with the separation of disciplines that had been normal in the past. Since its opening, the Bio-X model has been a source of inspiration for innovation centres at MIT and Georgia Tech.

Sources: ***Here*** *and* ***here***

8. Student-driven accelerators create successful start-ups

At the best US universities – such as UC Berkeley and Stanford – student-driven accelerators with affiliated venture funds are an important element in training entrepreneurial talents and supporting the university's start-ups in the early stages.

Students established the first student-driven venture fund at Berkeley, Arrow Capital,[7] in 2018. Arrow Capital invests USD 15,000 or more in start-ups affiliated with Berkeley. In addition to investing in them, Arrow Capital helps their portfolio of start-ups to attract talent to their teams, provides operational and strategic guidance, and connects them with accelerators at UC Berkeley. The aim is to boost investment in university-based start-ups by building a pipeline and maturing them to the point where they can attract external investment. The fact that the foundation is run by students also helps students develop relevant competencies. The donor required that the foundation be run by students.

Stanford University established Cardinal Venture[8] in 2015 as a student-driven accelerator under Stanford Student Enterprise[9], which manages assets valued at USD 20 million. Cardinal Ventures selects the best start-ups in all disciplines affiliated with Stanford University. Each start-up is allocated a small grant and offered training in the form of a 10-week accelerator programme. This gives start-ups access to a competent network of advisors, consisting of investors, strong entrepreneurs and other industry professionals. There is also a strong focus on supporting start-ups in seeking funding and investment, and the programme ends with a demo day where start-ups present themselves to a strong investor network.

The Cardinal Ventures accelerator has trained 120 start-ups in the past six years, 30 per cent of whom have managed to raise a total of USD 381 million in risk capital from investors.[10] According to student Ishan Gaur,[11] Director of Cardinal Ventures, the success is not so much down to the teaching, but rather to the close relations forged with private investors and mentors who want to help the young entrepreneur talents. Bachelor's and master's degree students, PhDs, researchers and alumni all apply to join the programme. Read more about Cardinal Ventures **here.**

9. Universities are involved in creative environments in Amsterdam, London and Boston

Local universities are involved in many creative environments and innovation districts in Europe and the USA. They provide premises for university spin-outs, student projects, research collaborations and public sector partnerships on the development of infrastructure.

a) Start-up Village in Amsterdam for start-ups involved in quantum computing and artificial intelligence

Amsterdam has struggled with housing shortages and a lack of student housing for many years. Amsterdam University has therefore joined forces with the municipality and government to develop disadvantaged areas in the city by establishing new residence halls and entrepreneurial communities for students who, by their mere presence and outward-looking activities, can help improve security and develop the local area.

Startup Village is one example, where start-up companies in the field of artificial intelligence and quantum computing live in colourful shipping containers, next to a container complex dedicated to venture capital and other investors.[12] There is also an innovative environment with outdoor meeting places, cafés and leisure activities, which add an inspiring vitality to the local area. Read more about Startup Village **here.**

b) Silicon Roundabout in London

London has a thriving environment for creative industries, including media, the arts and technology. Rising rents have pushed creative companies and talents into east London, for example into the area around Silicon Roundabout. This area now has a high concentration of creative talents who inspire each other, advance new creativity and enable new business models.[13]

There are also a number of incubators and communities for creative companies in the area, including TechHub – a hub for start-ups in the fields of art and technology. TechHub is sponsored by organisations like Google and the Pearson British media group. Any ideas the entrepreneurs do not want to pursue themselves must be offered to the sponsors. If they are not interested, the ideas can be sold to others. In many cases, innovative collaboration has arisen between the multinational giant and the entrepreneurial company. Read more about TechHub **here.**

c) Kendall Square in Boston

Kendall Square in Boston is one of the best-known areas for innovation. It has been called "the most innovative square mile on the planet" because of the many innovative start-ups in the area, in fields like biotech, who work closely with researchers at MIT.

In the 1970s, the area – adjacent to the MIT campus, consisted primarily of parking areas and derelict buildings. Because of the cheap rents, several spin-outs from MIT moved into the buildings, as they wanted to remain close to the university.[15] Later the large pharma companies moved into the area, as they also see an advantage in having a presence in the innovative environment close to MIT. MIT owns a number of office buildings in Kendall Square and has undertaken a number of initiatives over the years to develop the area.[16]

10. Princeton University alumni offer advice and finance entrepreneurship

Many universities see a strong alumni network as a key part of their DNA, as it allows close interaction with the private and public-sector companies and institutions where their alumni are employed.

The alumni network at Princeton University helps support entrepreneurship through a range of initiatives.

a) Princeton alumni community drives innovation

At Princeton, it is not just big alumni donations that make a difference. Much of the alumni budget comes from a large number of donations from 'ordinary alumni members', who want to make a difference.[17] The dedication of the alumni to Princeton is supported by a strong community. The 93,000 members of the alumni network are invited to lectures, entrepreneurship programmes, reunions etc. This sense of community helps secure donations and inspires a willingness to mentor young entrepreneurs. Donations are made via the alumni network's website.

The Princeton alumni network is the US university network where the most alumni (55 per cent)[18] donate money. To ensure transparency about member donations, an 'Annual Giving Impact Report' is published each year.

b) Access to mentors is simple through OfficeHours mentoring programme

OfficeHours is Princeton Entrepreneurship Council's mentoring/advising programme. The programme helps researchers, students and other alumni find relevant mentors for their entrepreneurial challenges.[19]

The OfficeHours system makes it easy for entrepreneurs to find a suitable mentor. On the OfficeHours website, those looking for a mentor can choose between different skillsets, ticking the most relevant ones. Based on these choices, the profile descriptions of suitable mentors are shown to the entrepreneur. Mentors are recruited among volunteer businesspeople from Princeton who wish to offer their assistance to the university's future entrepreneurs.

c) Access to venture capital through Princeton University alumni

Princeton alumni are an important part of the university's general innovation and entrepreneurship system, and the alumni network continually encourages students and researchers to consider how the network can contribute to creating new start-ups.

Donations from alumni, via the *Alumni Entrepreneurs Fund* (AEF), ensure that external funding for start-ups is matched up to USD 100,000 through the foundation. AEF's portfolio consists of 30 companies. To date, AEF has invested USD 2.2 million, which has helped secure USD 160 million in external investments.

11. Open innovation accelerates commercialisation of research

Several universities are experimenting with ways of accelerating the commercialisation of research. One example is the Open Discovery Innovation Network (ODIN) at Aarhus University, which seeks to create an open and innovative collaboration environment between researchers and industry. This is done by making the research openly accessible – none of the project parties are seeking IP rights. ODIN was established as a three-year pilot project for the 2020-23 period and received a grant of DKK 55 million from the Novo Nordisk Foundation.[20]

ODIN's research focus is on understanding diseases better at the molecular level in order to accelerate the development of new drugs and support projects in collaboration between academic and industry researchers. The model is based on two key elements: 1) an approach to IP that allows the parties involved to share their results, and 2) facilitation of collaboration between academic researchers and industry stakeholders. Key to making this possible is the fact that the work is done at a non-competitive stage. The programme focuses exclusively on early research, which in this case is Technology Readiness Level (TRL) 1-3, i.e. before a product is developed. All programme participants and anybody else are allowed to use the established research and knowledge in the further process towards product development at the commercial stage.

All participants in ODIN-funded projects sign a document prepared by the Technology Transfer Office at Aarhus University, which enshrines two elements that enable the development of an 'open innovation' environment: 1) all commit to being active in the project, and 2) all foreground knowledge must be shared openly, i.e. the knowledge established must be openly accessible to all, and cannot be patented[22]. This is an attractive model for the universities and industry alike. According to Niclas Nilsson, Innovation Director at Lund University and former Head of R&D Open Innovation at Leo Pharma, open innovation is a good research model as it generates more data and at a faster pace than in traditional pharma research.[23] It is also a good business model, as demonstrated by a number of projects, such as the Structural Genomics Consortium.[24] The open concept has now spread to other research areas, including the development of the foods of the future. The Novo Nordisk Foundation recently financed the Plant2food programme, to be launched in 2023 and based in Aarhus University, with the University of Copenhagen as a partner.

NOTES

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21 Source: ODIN (au.dk)

22 Source: Presentation by Marie L. Conradsen during the 'Many Faces of Open Innovation' event at NNF on 19 September 2022.

23 Source: Presentation by Niclas Nilsson during the 'Many Faces of Open Innovation' event at NNF on 19 September 2022.

24 Source: Presentation by Aled Edwards during the 'Many Faces of Open Innovation' event at NNF on 19 September 2022.