

**Department of Learning, Informatics,
Management and Ethics**
Medical Management Center
Innovative Care Group

Innovative Care Report 2

Meeting health care challenges

Including health care science in innovation systems

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Summary

This report is rooted in the call for the establishment of an endowed Chair in Innovative Care at Karolinska Institutet (KI) through a SEK 10 million donation by Investor AB in 2013. The call for this position was motivated by the need to address challenges arising from an aging population with chronic disease and multiple comorbidities, changes in care strategies due to breakthroughs in biomedical and medtech fields including the rapid development of e-health technologies, with an increasing shift to care outside of hospital environments, and a focus on person-centered care.

According to the call, the position of the Professor in Innovative Care will:

- “...establish and direct a Research, Development and Education Center for Innovative care at Karolinska Institutet.”
- “...contribute to the development of health care services, processes and systems by active collaboration with authorities, providers and patients...”
- “...innovate in research and implementation methods...”

Founded in the mandate for this position, we empirically investigated if and how the existing innovation systems in the Stockholm area, with particular focus on KI, can provide a foundation and the capabilities for developing innovation in health care sciences. In addition, we explore in what ways the health care sciences can play an active and collaborative role in the existing innovation systems, rather than create a new discipline-specific entity. Based on our analysis, we make suggestions for the further development of innovation systems at KI to better encompass the present breadth of disciplines and knowledge within KI.

This report is based on semi-structured interviews with 30 actors chosen from organizations within the innovation systems within KI and in the greater Stockholm area. The findings are presented based on analysis of the transcribed interviews and additional existing documentation.

Overall, the focus for these organizations is on the creation of better and more efficient products, processes, and services which can be commercialized. Collaboration is a key activity for all of the organizations which typically work in niche areas of expertise, and then collaborate with others to bring an idea or concept to fruition. Projects with a clearly defined patentable component are sought after and supported by a number of organizations and with financial investments. At KI, there is a strong drive for partnerships with both small and medium-sized enterprises, with a select number of larger strategic corporate partnerships, as an integral part of the innovation system. Unfortunately, there has generally been a low return on investments, which has led to the restructuring of a number of organizations both at KI and further afield to redefine their focus or value proposition, and to streamline operations in relation to other institutions.

New drugs and medtech products will always be needed, but the time it takes to bring a drug from the research lab to the patient can take decades. In the meantime, additional ideas, products, and processes with a primary focus on creating value by addressing pressing social and health care issues or needs should be more clearly supported and valued.

We conclude that there is a need for an expansion of the innovation system at KI to better reflect the breadth of existing research expertise and innovative potential. This would help the overall innovation system to support and develop research-informed and research-based innovative ideas, products,

processes, and services, both non-profit and for commercial gain. This is crucial if health care sciences and other areas presently not in focus are to benefit from the existing innovation system, and for the present innovation system to benefit from the range of knowledge found at KI, including that derived from health care science research.

We propose that the working definition of innovation at KI should be broadened to include social innovation and social entrepreneurship, and the definition of value expanded to better include patients, healthcare professionals, researchers, communities, and society. Co-creation and partnerships with these different actors should be a priority in all relevant forums. This would offer a potential for innovation to occur at a faster pace and with a greater impact for a wide variety of stakeholders. We are convinced that it is through increased interaction between disciplines and groups that innovation is born.

Recommended support structures needed to expand the innovation system to incorporate health care sciences

A formal system to support health care science perspectives and social innovation in conjunction with the current established system is needed to create solutions which can include:

- Inclusion of researchers with experience and expertise in health care science to inform, assess, and critique ideas submitted to the innovation system.
 - This might be achieved through creation of a network of researchers both within and outside of KI with experience and expertise in health care science.
- Creation of physical and virtual arenas where innovators can cross-pollinate between disciplines.
- Support for development of products, processes or services which may provide a direct benefit for patients, caregivers, health care professionals, and society, although not necessarily patentable, through:
 - expansion of available legal expertise for support in copyright, trademarking, etc.
 - creation of guidelines, protocols, and financial support to develop research-based and informed prototypes.
 - creation of a network of non-profits, foundations, and business focused on societal change and social innovation.
 - creation of infrastructure and networks to connect to distribution and dissemination channels for innovative research results (products, processes or services).
- Incorporation of knowledge and examples of social innovation and the multidisciplinary nature of innovation into the educational programs.
- Development of educational modules to orient students and researchers on all levels to basic issues related to non-profit and commercial dissemination of outputs, such as research-informed and researched-based products, processes, and services.
- Incentivize social innovation to the same extent as other forms of innovation.

Background

Establishment of a Chair in Innovative Care

The call for the establishment of an endowed chair in innovative care was motivated by a need to address a multitude of challenges. Such challenges include an aging population with increasing chronic diseases and multiple comorbidities; continuing biomedical and medtech breakthroughs in which change care strategies including the rapid development of e-health technologies; increasing provision of care outside hospital environments; and a focus on person-centered care. Meeting these challenges calls for investment in health care science research, education, and innovation.

To meet these present and future challenges, Investor AB donated SEK 10 million in 2013 to the establishment of an endowed Chair in Innovative Care at Karolinska Institutet (KI). This competitive position, which integrates health and social care research, was awarded to Professor Carol Tishelman in October 2014 and is based at the Medical Management Center (MMC) at the Department of Learning, Informatics, Management and Ethics (LIME) where she leads the Innovative Care research group (ki.se/en/lime/innovative-care) with Associate Professor Lars E. Eriksson. Tishelman has a joint position with Karolinska University Hospital, Center for Innovation, as University nurse with responsibility for strategic health care innovation.

The Stated Mandate of the Chair in Innovative Care

According to the call for this position, the Professor in Innovative Care will:

- “...have the responsibility to **establish and direct a Research, Development and Education Center for Innovative Care** at Karolinska Institutet. The Center will collaborate with other universities in the region and health care commissioners that will participate in funding the center, i.e. Stockholm County and Stockholm Municipality.”
- “... lead research and participate in teaching in the area of Innovative Care. The professor will also contribute to the **development of health care services, processes and systems by active collaboration with authorities, providers and patients...**”
- “...be expected to **innovate in research and implementation methods** in order to achieve visible improvements in care and outcomes, as well as high quality research methods...”
(see Appendix 1 for the full call)

Despite a mandate to establish a new Center for Innovative Care at KI, resources for this position are only research focused with no devoted resources for such a center. In addition, from the onset CT has questioned the contradictory nature of the mandate, which calls both for establishing a health care science discipline-specific innovation center while at the same time highlighting a need to work across and beyond established disciplines and structures.

Two strategic recruitments have been made through the new position to begin to address its mandates. Administrative resources have been redirected to Dr. Sophia Savage and complemented by the KI Board of Research during 2015, for the scoping exercise presented here. We aimed to better understand the extent to which existing innovation systems in the Stockholm area, particularly at KI, presently address issues related to health care sciences and collaborate with health care scientists and educators today. This can provide an empirical foundation for determining the need for, and form of, a new innovation center, or if innovation may be facilitated through better integration of health care sciences into existing structures.

Sophia Savage has a unique background for conducting this scoping exercise, with preclinical research experience in neuroscience from the US and KI. In addition, she is a Clinical Innovations Fellow from the Center for Technology in Medicine and Health (CTMH), and is the program manager for the Forte-funded DöBra research program (Tishelman, PI).

Associate Professor Lars E. Eriksson has also been recruited to develop the relatively young research field called "biobehavioral nursing research", with help of SEK 800 000/year funding from SFO-V (Strategic Research Area- Health Care Sciences) designated for a senior researcher to work with the new chair. This field has been defined by the National Institutes of Health (NIH) as "a scientific approach to the study of complex interactions among biological, social, behavioural, and environmental factors and their effects on outcomes"¹. For over 15 years, the National Institute of Nursing Research (NINR) has recognized and argued the importance of combining sophisticated knowledge about biological processes with more traditional nursing knowledge about symptom experiences and the resulting behavioural responses². An additional report has been prepared, based on a scoping visit to established centers for biobehavioral nursing research in the US, to highlight possibilities for development of this field at KI. (See Eriksson & Tishelman, 2016. *Meeting the future through bio-behavioral healthcare sciences, innovations for healthcare science*. Unpublished report.)

The Aim of this Report

The point of departure for this report was the mandate to create a new structure for innovation, directed to health care sciences only. We questioned whether this strategy is the most constructive, or if it could risk creating a silo organization rather than facilitating collaborative possibilities within the greater innovation systems at KI and Stockholm County Council (SLL).

The aim of this report is to empirically investigate if the existing innovation systems in the Stockholm area, with a particular focus on the KI Innovation System, have potential to provide a foundation for the development of innovation in the health care sciences, and if so, how. Additionally, we aim to explore how the health care sciences might play an active and collaborative role in innovative endeavors, through discussion with actors presently within the system. Based on this empirical investigation, we make constructive suggestions to support continued development of innovation at KI.

Empirical basis for report

This report is based on an analysis of semi-structured interviews conducted by Sophia Savage with 30 actors chosen from within some of the innovation systems in the Stockholm area.

During 2015, we participated in the development of two workshops held by Idérådet and the Health Innovations research group at MMC/LIME, KI, to engage relevant actors and identify the different healthcare innovation systems in the Stockholm region. These workshops helped inform the choice of interviewees for this report. The 30 interviewed individuals came from innovation systems at KI, Karolinska University Hospital, SLL, and in the Stockholm region (See Table 1). Additional documentation

1. Penn Nursing Science. University of Pennsylvania School of Nursing. What is Biobehavioral Research? 2016; <http://www.nursing.upenn.edu/bbrc/Pages/Mission-Statement.aspx>. Accessed 2 May, 2016.

2. Grady PA. National Institute of Nursing Research commentary on the Idea Festival for Nursing Science Education. *Nurs Outlook*. 2015;63(4):432-435.

and reports by actors, institutions, and networks operating within innovation have also informed this report.

Table 1. Organizations with which interviewees were affiliated

Karolinska Institutet	Innovations Office Unit for Bioentrepreneurship (UBE) Karolinska Institutet Innovations AB (KIAB) Karolinska Institutet Science Park AB (KISP) Karolinska Institutet Holding AB (KIHAB) Innovations Council Development Office Department of Learning, Informatics, Management and Ethics (LIME) Karolinska Institutet University Press (KIUP) Karolinska Institutet Communications and Public Relations Office
Stockholm University	Stockholm University Innovations Office
KI, KTH, SLL	Center for Technology in Medicine and Health (CTMH)
Within Stockholm County Council (SLL)	Innovation Center SLL Innovation Innovation Advisory Board (Idérådet)
Other Organizations within the Stockholm area	Stockholm School of Entrepreneurship (SSES) Venture Cup Stockholm Science City Flemingsberg Science

The Interview Structure

The interview guide was informed by the Business Model Canvas framework by Osterwalder³ to ensure that information collected during the interviews covered important aspects of how an organization works with and within the innovation sphere. The framework consists of nine components describing what an organization offers (value proposition), how it interacts with customers to deliver this value, the infrastructure needed to generate and deliver this value, and the economic aspects of how this is achieved (cost structure and revenue streams). The guide therefore included questions about current or past projects and goals, financial aspects, key partners and collaborators, and customers (when relevant). In addition, questions were raised regarding projects or collaborations with a health care science focus and potential meeting points between different disciplines and interests.

Findings

The findings are presented based on analysis of the transcribed interviews and additional documentation. None of the organizations interviewed worked in isolation. Each organization typically had a strong core collaboration with one or a few other organizations, and further ties with the extended innovation system.

3. Osterwalder A, Pigneur Y, Clark T. *Business model generation: a handbook for visionaries, game changers, and challengers*. Hoboken, NJ: Wiley;2010.

Regardless of how they were interconnected, all the innovation systems were made up of actors working towards increasing the production or amount of innovation within their organization, and to ease the process of developing innovations.

The KI Innovation System

Karolinska Institutet deems innovation and innovation development to be an important part of translating the university's knowledge into benefits for society. This perspective is reflected in the mission statement of the KI Innovation System, to "realize the potential of KI as a medical university to deliver novel products, services and knowledge for the health of citizens and overall benefit to society".

The KI Innovation System, in part, includes the Unit for Bioentrepreneurship (UBE), the Innovation Office, Karolinska Institutet Science Park AB (KISP) and Karolinska Institutet Innovations AB (KIAB)—with KISP and KIAB, among other companies, managed by Karolinska Institutet Holding AB (KIHAB). Support is offered to KI researchers to develop ideas and results through access to expertise in entrepreneurship and business development, professional networking, financing, support to protect intellectual property, office and laboratory space, administrative support, and the incubation of start-ups and companies. In addition, UBE conducts research on innovation and entrepreneurship, and runs education in these areas for undergraduate and graduate students. Together, these entities work to promote innovation and entrepreneurship through direct outreach to researchers, and through events and seminars, including a new introductory course for incoming PhD-students.

A unique aspect related to the context of innovation systems within universities in Sweden is the "Professor's (also known as teacher's) privilege" which allows researchers to retain intellectual property rights over the results of their research. The researcher is therefore free to choose if and how they commercialize their inventions. Common routes are through an established company, via a university tech transfer office, or in collaboration with another research organization. As a consequence, the researcher is tasked to initially project manage and drive the development of research findings into a product, process, or service. This form of ownership, with only a few exceptions, is internationally unique for Sweden, and is in stark contrast to different forms of joint or full ownership by universities, seen for e.g. in the US. In other countries, university involvement in ownership was said to have several positive features: it provides an incentive, including financial incentives, for university investment in entrepreneurship, and allows researchers to focus on their research in partnership with experts in commercialization and innovation processes.

Though scientists and researchers can approach anyone within the KI Innovation System, they have been encouraged to follow a path starting with the Innovations Office. The Innovation Office provides guidance and advice relating to utilization of research, innovation, entrepreneurship, and business interaction. If the concepts or ideas develop further, and there is mutual interest, the researcher may work with KIAB, which is the first commercial instance in the overall innovation system within KI. KISP can assist in acquisition of laboratory and office space with common infrastructures such as seminar rooms and administrative help on a fee-for-service basis. Karolinska Development AB invests in commercially attractive medical innovations which have been screened by KIAB, investing to develop an innovation to a stage where it can be commercialized through the sale of the company, or as out-licensed products. The project trajectory through this system will be dependent upon the project particulars, how it fits into the

KI Innovation System's expertise and interests, including financial considerations and the potential to secure intellectual property rights, and how and when a researcher approaches the KI Innovation System.

Overall, the focus within the current KI Innovation System to date has been on life sciences and the creation of companies, with pharmacological therapeutics and lab tech/research tools comprising the bulk of projects evaluated by KIAB, and the companies currently within KISP. In addition, there is a growing development of a variety of digital e-health applications—this area has clear potential for increasing collaborative possibilities with health care sciences and scientists.

Findings related to the Business Model Canvas

Value proposition: what do the current innovations systems try to do?

In general terms, the value propositions of all the innovation systems were focused on support for increased innovation in society. However, the specifics depended on where the organization was situated in the spectrum from creating and developing, to implementing or disseminating an innovative idea, product, or process. At the creating and developing end of the spectrum, the value proposition was related to providing expert advice, inspiration, financial support or education when developing an idea into a business. Progressing across the spectrum, we found other offerings related to expertise on obtaining funding, intellectual property rights, and exit strategies, i.e. to support the transfer of ownership to another company (merger or acquisition) or to investors (initial public offerings). For organizations working with implementing or dissemination, typically with start-ups or early stage companies, physical office or conference space, and administrative and legal support were accessible as fee-for-service. Interviewees said that they considered the wide range of offerings mentioned here to be of considerable value for entrepreneurs to support the evaluation, growth, and development of innovative ideas into start-ups and more established companies and that they were uniquely positioned to help their target group, or "customers".

Who are the "customers"?

The customers mentioned were primarily individual researchers, students, health care professionals, or established companies. In some cases, the customers were other organizations, including government agencies or universities. Organizations working directly in the health care sector gave examples of companies started by employees to develop solutions to their own needs and were therefore creating a product for their colleagues. No examples were given where patients were the primary customer, though for some innovations, patients were the end-users.

How are customers reached?

Several organizations reported using outreach to create relationships over time with researchers and health care professionals, as the best way to find future projects. For those involved in educational aspects of innovation, course points or competitions were used as an incentive to attract students from the different universities and educational programs. Within the KI Innovation System, individuals interviewed mentioned that questionnaires showed that the most effective way to reach new people and identify potential innovations was through researchers speaking with their colleagues who had had previous experience with the innovation system. In effect, word-of-mouth was said to be the most successful method to reach new customers.

What are the key activities?

The key activities appeared to be dependent on the value proposition offered. For those involved in education and inspiration, conferences, lectures, lunch seminars, and weekend or semester-long courses were main activities. When seeking new ideas, the evaluation and market analysis of a product was a key activity which could be developed, in addition to financial and legal support for obtaining intellectual property protection. In order to increase the volume of ideas generated, different strategies were used. Several organizations either developed web-based platforms, or sent people out to meet directly with potential entrepreneurs.

What are the key resources?

As with value proposition, key resources were defined by where each organization was placed in the spectrum of roles to support innovation from creating and developing, to implementing or disseminating. For those involved in education, key resources were people who taught and created courses, and those who could rely on their networks to bring in guest lecturers and companies to inspire or work with students. When it came to developing a business opportunity, employees and consultants with knowledge and expertise with research, pharma, healthcare training, finance, marketing, patent law, and management were seen as key resources. Several organizations hired consultants with these types of expertise on an as-needed basis. Within the KI Innovation System, the researchers who were developing novel drug targets, new medtech products, and therapeutic or diagnostic tools, were considered to be key resources.

What kind of partnerships are created?

Partnerships between organizations nested within the same larger institution were common. Within the Stockholm area, there was extensive cross-pollination between organizations, in part through positions on executive boards. Key partnerships also existed between the employees of organizations, and the consultants who came in with specific expertise on a project basis. Despite the interaction between organizations, the degree of coordination is not as high as might be expected with these strong partnerships, resulting in the production of similar activities, and confusion among researchers about the focus for each organization. As an example, one response to a question about the difference between the interviewee's organization and another organization, was: "that's a good question, we are in the middle of discussions to work that out".

Economics of innovation support systems

What are the revenue streams?

There are a variety of funding sources which range from either direct government support or support through governmental funding agencies, to private donors, to revenues generated from licensing or sales of companies. A number of the organizations primarily focusing on education rely on funding from universities and private donations.

What are the costs?

Most organizations mentioned personnel costs as a major expense. As a result, they used consultants who were retained for a particular project based on their expertise. This was described as a cost effective way to engage expert competencies, while minimizing permanent personnel costs. Those people who were employed on a fulltime basis were said to have more generalizable expertise. Additional costs were for management of intellectual property, such as patent application processes when required.

Findings related to health care science perspectives on innovation

Where is the health care science perspective? Positive examples

When analyzing the interviews, there was a notable gap between the focus of these innovation systems and the integration of health care sciences into their full spectrum of activities. As expected, there was more interaction with health care science professionals and innovation systems within hospital and health care settings. Less contact was apparent within KI's own innovation system; examples of companies which were developed within the KI Innovation System with a health care science focus were mentioned, but were few in number. It should be noted that these examples focused on commercial development of products or processes.

One research-based example of commercialization, was initiated through Associate Professor Lena Krumlinde-Sundholm's desire to distribute and implement research results to the public. KIAB supports the resulting company, Handfast AB, with its Assisting Hand Assessment (AHA) tool, a hand function evaluation instrument for children with an upper limb disability. During a panel session focused on post-PhD career options at a conference for PhD students and supervisors organized by the Doctoral School of Health Care Sciences (FiV) in April 2016, Krumlinde-Sundholm mentioned that the advice she received from the KI Innovation System was to start a company in order to implement and spread the tool kits she had developed through research. There did not seem to be other options readily available for dissemination and implementation which allowed her to maintain control over the pedagogical aspect of training the trainers to use the toolkits.

From an educational perspective, as part of an outreach to undergraduate students in KI's different educational programs, UBE created pamphlets with three entrepreneurs for each undergraduate educational program, for example, "3 sjuksköterskor som gjorde det! Från idé till genomförande" (3 nurses who did it! From idea to "implementation") for the undergraduate programs for dentists, nurses, opticians, physiotherapists, psychologists, and medical doctors. Examples of innovations for inspiration in health care sciences included Nasaline, developed to irrigate nasal cavities with saline solution to effectively treat symptoms associated with colds, the flu, allergies or sinusitis.

The goal with UBE's project was said to be to introduce undergraduate students to possibilities for different career paths in their profession, and to present innovation as part of that experience. UBE shared pamphlets from all the professions with students in each group. The interviewee expressed concern that the students were not interested in reading the pamphlets with other professions' innovative examples. This is notable, given the push for multidisciplinary teams as drivers of innovation within the innovation systems, and our interpretation is that this may need to be addressed with a curriculum-wide perspective.

In addition, a number of health care professionals outside the KI Innovation System have been supported by SLL Innovation to develop companies based on needs which they observed in clinical settings. Ylva Ryngebo, a nurse/entrepreneur, has developed products to hold and support the body when x-rayed, and Pär Johansson, an ambulance driver, who wanted to securely fasten infants under transport with an ambulance, created a "seat belt" for infants which is attached to the parent's restraints.

What these examples illustrate is that although health care sciences are part of the innovation system, this focus is most successful when it fits into an established system to create companies. However, we did not find a consistent integration of health care science perspectives into the current innovation system. Health care science expert knowledge was absent or not mentioned by interviewees when describing the process to evaluate an innovative idea, or the development of a product or service. The inclusion of a health care science perspective in the assessment of ideas collected by portals or in competitions for business ideas appears, from our perspective, notably lacking.

Some limitations in the Innovation Systems from a health care science perspective

One of the key activities described by the interviewees was to collect ideas, either through portals or direct interaction with innovators, which have potential for commercialization. However, most organizations have worked on a time-limited project basis, which negatively impacts sustainability. There have been several initiatives, including those from Idérådet and Flemingberg Science, to elicit ideas from health care professionals, who would then receive feedback and support from relevant experts. However, as both of these initiatives were project-based, when the funding ended, the structure which was established for health care practitioners and researchers was dismantled without clarifying new avenues for submitting ideas, or a smooth transition into a new portal system. The researchers and health care professionals then would have to relearn how to navigate the innovation support system if using it again. This acts to hinder a potential for long term implementation, dissemination, and sustainability within innovation systems.

This limitation is further highlighted in the KI Innovation System as the trajectory for navigating among existing instances remains unclear, with differences between organizations not readily apparent to outsiders in need of assistance. A general understanding of if, when, and how to file for patent protection is lacking, and is often considered in conflict with the critical need for researchers to publish. As mentioned previously, word-of-mouth is said to be a major factor in the entry process and navigation within the system; while this has benefits for some, it may also hinder potential candidates, especially those in fields in which contact with the innovation system is traditionally more limited. This risks a circle effect, with most benefit for those in research areas already most involved with innovation.

The expected innovation portal currently under development at KI may address some of these issues, however what types of innovation will be considered within this portal has not been publicized. Portals typically begin by asking the potential innovator to fill in forms to describe their idea. These forms start a process to assess if the innovator has considered numerous aspects related to the specific idea and its market potential, and are used to better link the idea with needed expertise for support. These portals and the forms used for the submission process would benefit from input from a health care science perspective, and to have health care science expertise incorporated into assessment panels providing feedback on ideas. While not universally the case, much health care science research focuses on user experience, which should be a vital aspect to consider in innovation. One would hope and expect the new portal for the KI Innovation System to address these needs.

Bridging gaps to better integrate health care sciences in existing innovation systems

As has been mentioned throughout this report, there is an established structure of support for the types of innovations in which companies have been created; however there is a need to broaden that structure for other types of innovations beyond those directly related to commercialization. There are innovations

which work towards addressing other types of wicked problems⁴ which are not readily “solved” or benefited by commercialization, such as language barriers within health care contexts, or managing multiple co-morbidities or frailty in a wide range of contexts. Health care science research often studies and innovates with a focus on experiences of illness, health, and care, and support is presently lacking for innovations from a health care science perspective. Moreover, current innovation systems would be enriched by and benefit from inclusion of perspectives based on experiences from end-users, whether patients, families, or staff.

An established structure is therefore needed to support the dissemination, implementation, or sustainability of research-based and research-informed innovations which do not necessarily lend themselves to commercialization, but which can have direct benefits for patients, families, and health care professionals. This support should include legal and financial support, and logistic capabilities. Legal support could include aid with the copyrighting and trademarking of an innovation which can provide a degree of intellectual property protection. There are also aspects of the design of the innovation which can be protected, but at present systematic expertise is not being developed and utilized around these issues; rather they are negotiated individually and on an ad hoc basis. Expertise in such areas is sorely needed within the present KI Innovation System. Financial models should include collaborations with existing companies, non-profits, or foundations; how to sell an innovation at cost; and how to team up with other organizations or companies to disseminate an innovation through their existing structures.

For the development of prototypes of products, care structures or processes, agreements between consultants or established companies and innovators should be supported to drive the prototyping and implementation of innovations. A number of innovations, fall into the category of *social innovation*. Social innovation can be defined broadly as:

“...new approaches and solutions to social needs or common problems that are implemented in, and impact, society. Social innovations are inclusive, and create new social relations or collaborations. This impact can be reached through the introduction of new, or alterations of existing products, services, organizations, practices, frameworks and norms.”⁵

Social innovations are also said to be “often motivated by other factors than economic gain⁶” and the “innovation processes for social purposes are often of a social nature themselves and may be anything from local to international⁶”. Currently, there is limited formal support, within the KI Innovation System or the other organizations interviewed for this report, for driving social innovation, despite several interviewees mentioning an interest in expanding their organization’s in-house expertise. Support was limited to discussions of other groups within the greater Stockholm region and abroad which work solely with social innovation, but not research-based or research-informed social innovation.

4. The term “wicked” problems refers not to a sense of evil, but to an issue which is highly resistant to resolution. The term was originally proposed by H. W. J. Rittel and M. M. Webber, both urban planners at the University of California, Berkeley, USA in 1973. Rittel, Horst WJ, and Melvin M. Webber. "Dilemmas in a general theory of planning." *Policy sciences* 4.2 (1973): 155-169

Wicked problem can be defined as social or cultural problems that are difficult or impossible to solve because of incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with other issues. Kolko, J. *Wicked Problems: Problems Worth Solving*. Austin Center for Design, 2012.

5. Björk F, Olofsson L-E, Hansson J, Lundborg D. “An Ecosystem for Social Innovation in Sweden: A strategic research and innovation agenda.” 2014.

6. Tillväxtanalys. “Sociala innovationer- ett internationellt perspektiv.” PM 2014:12.

Conclusions

Organizations working with innovation in the Stockholm region in general, and the KI Innovation System in particular, are focused on the creation of better and more effective products, processes, and services which can be commercialized. As a result, the projects with clearly defined patentable components are sought after and fully supported by a number of organizations with large-scale financial investments; however, as stated in the Karolinska Strategic Innovation Agenda (KSIA), the financial return on these investments has not been as expected. This poor return on investments has led to the restructuring of a number of organizations to redefine their focus or value proposition, and to streamline operations in relation to other institutions. There is a strong drive for partnerships with both small and medium-sized enterprises (SMEs), and with a select number of larger strategic corporate partnerships, as part of the innovation system within KI. New drugs and medtech products will always be needed, but the time it takes to bring a drug from the research lab to the patient can take decades. In the meantime, additional ideas, products, and processes with a primary focus on creating value by addressing pressing social issues or needs should be more clearly supported and valued.

Recommendations for better integration of health care sciences into the KI Innovation System

We conclude that there is a need for an expansion of the innovation system at KI to better reflect the breadth of existing research expertise and innovative potential. This is crucial for health care sciences to benefit from the existing innovation system, and for the present innovation system to benefit from the range of knowledge found at KI, including that derived from health care science research.

This would help to expand the overall innovation system to support and develop research-informed and research-based innovative ideas, products, processes, and services, both non-profit and for commercial gain. We argue that systematically making efforts to find meeting points, and manners to integrate health care science research directly within the current established and evolving innovation systems in and around KI is more effective and efficient than creating another siloed mono-disciplinary structure. We are convinced that it is through interaction and friction between disciplines that innovation is born.

This expanding of the Innovation System would need to begin by re-visiting the definition of innovation, and shifting the value creation for direct customers and shareholders to also include the end-users, i.e. here, patients, their families, and staff. By broadening definitions to include social innovation and social entrepreneurship, and expanding the definition of value to better include value towards patients, healthcare professionals, researchers, communities, and society, innovation can be achieved at a faster pace and with a greater impact for all stakeholders.

Support structures needed to expand the innovation system to incorporate health care sciences

A formal system to support health care science perspectives and social innovation in conjunction with the current established system is needed to create solutions which can include:

- Inclusion of researchers with experience and expertise in health care science to inform, assess, and critique ideas submitted to the innovation system.
 - This might be achieved through creation of a network of researchers both within and outside of KI with experience and expertise in health care science.
- Creation of physical and virtual arenas where innovators can cross-pollinate between disciplines.

- Support for development of products, processes or services which may provide a direct benefit for patients, caregivers, health care professionals, and society, although not necessarily patentable, through:
 - expansion of the legal expertise for support in copyright, trademarking, etc.
 - creation of guidelines, protocols, and financial support to develop research-based and informed prototypes.
 - creation of a network of non-profits, foundations, and business focused on societal change and social innovation.
 - creation of infrastructure and networks to connect to distribution and dissemination channels for innovative research results (products, processes or services).
- Incorporation of knowledge and examples of social innovation and the multidisciplinary nature of innovation into the educational programs.
- Development of educational modules to orient students and researchers on all levels to basic issues related to non-profit and commercial dissemination of outputs, such as research-informed and researched-based products, processes, and services.
- Incentivize social innovation to the same extent as other forms of innovation.

Acknowledgements

We would like to thank the interviewees for the time they took to share their insights.



Investor's Professorship in Innovative Care, with possibility to combine with a clinical position within Stockholm County Council

Karolinska Institutet, En av KIs institutioner

The ageing population, and the increasing prevalence of chronic diseases constitute formidable challenges for health and social care. Continuing breakthroughs in biomedical research will provide opportunities for individualized treatment, at the same time as patients and relatives increasingly wish to participate in decision-making and the management of their care. Meeting these challenges calls for considerable investments in health care research and innovation as well as in the redesign of health professions education will therefore require more investment in health care science and innovation and in the training of caregivers.

Investor AB donates SEK 10 million over a period of five years to fund a Chair in Innovative Care at Karolinska Institutet in order to support the development of world-class welfare services in Sweden.

Duties

The Professor in Innovative Care will have the responsibility to establish and direct a Research, Development and Education Centre for Innovative Care at Karolinska Institutet. The Centre will collaborate with other universities in the region and health care commissioners that will participate in funding the centre, i.e. Stockholm County and Stockholm Municipality.

The Professor will be able to draw on Karolinska Institutet's Strategic Research Programme in Care Science, a centre of excellence built around five thematic areas of health care research: i) Women's and child health, ii) People with long-term illness, iii) Elderly with reduced mobility and participation, iv) Cancer and palliative care, and v) Health care systems, policy, management, economics and informatics. Through the programme, the Professor will have access to health care delivery organisations and communities of patients and families. If the Professor has a health professions education a dual appointment at Karolinska Institutet and The Stockholm County Council will be possible.

The Professor will lead research and participate in teaching in the area of Innovative Care. The professor will also contribute to the development of health care services, processes and systems by active collaboration with authorities, providers and patients. The position includes:

- secure research funding from grant funders and health service providers to develop the programme,
- publish in high quality peer reviewed journals as well as professional and popular publications,
- establish and lead successful research projects of internationally leading quality,
- collaborate with other departments, disciplines, patient groups and care providers to produce applied research which contributes to knowledge and improved patientcare

Entry requirements

All professors at Karolinska Institutet must demonstrate scientific as well as pedagogical competence. The applicant must have proven ability to secure external research funding as well as establish and lead successful research projects of highest international quality. A track record of publishing in high quality peer-reviewed journals as well as in professional and popular fora is required. Good interpersonal skills demonstrated in collaboration with other

disciplines, departments, patient groups and care providers are also required.

The Professor will be expected to innovate in research and implementation methods in order to achieve visible improvements in care and outcomes as well as high quality research methods. Demonstrated ability to cross boundaries of many types - academic, disciplinary, service and sector - will be important, as well as demonstrated experience in innovative experiment and development of projects.

Bases of assessment

The assessment will weight qualifications as follows: research expertise (3), educational expertise (1), leadership, development and collaboration expertise (2).

Application process

An application must contain the following documents in English curriculum vitae, qualifications and description of planned research, presented in accordance with Karolinska Institutet's qualifications portfolio (<http://ki.se/qualificationsportfolio>).

The application is to be submitted on the Net Recruiter system.

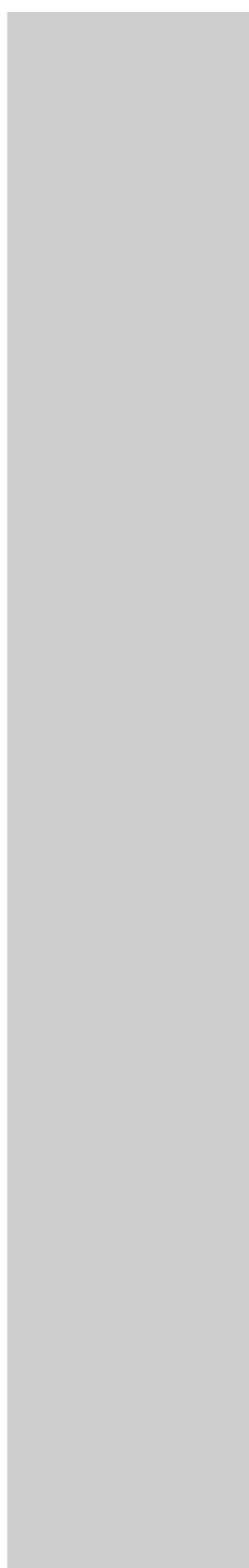
Karolinska Institutet är ett av världens ledande medicinska universitet med visionen att på ett avgörande sätt bidra till att förbättra människors hälsa. I Sverige står Karolinska Institutet för den enskilt största andelen medicinsk akademisk forskning och har det största utbudet av medicinska utbildningar. Varje år utser Nobelförsamlingen vid Karolinska Institutet mottagare av Nobelpriset i fysiologi eller medicin.

Enligt Riksarkivets föreskrifter arkiveras ansökningshandlingar i två år efter att tillsättningsbeslutet vunnit laga kraft. Detta gäller dock ej bilagor som är tryckta eller på annat sätt publicerade.

Karolinska Institutet strävar efter att vara en arbetsplats med jämn könsfördelning som är fri från diskriminering och ger lika möjligheter för alla.

Till bemannings- och rekryteringsföretag och till dig som är försäljare: Vi undanber oss vänligen men bestämt direktkontakt med bemannings- och rekryteringsföretag samt försäljare av ytterligare jobbannonser.

Anställningsform	Tillsvidareanställning
Anställningens omfattning	Heltid
Antal lediga befattningar	1
Sysselsättningsgrad	100%
Ort	Stockholm
Län	Stockholms län
Land	Sverige
Referensnummer	2-2590-2013
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**Karolinska
Institutet**