

HELIX COMPETENCE CENTRE – SUSTAINABLE DEVELOPMENT IN ORGANIZATIONS

Application for Continuation and Development of
the HELIX VINN Excellence Centre
at Linköping University

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at Linköping University with Academic Nodes KTH Royal Institute of Technology in the Stockholm/Södertälje area and Swerea IVF in the Gothenburg/West Sweden area.

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0. Executive Summary

This proposal concerns the continuation and development of the HELIX VINN Excellence Centre at Linköping University. HELIX is an established centre within working life research, focusing specifically on sustainable development in organizations. This entails research and innovation activities that promote good working conditions, learning, health and gender equality in combination with an effective and innovative production system. This fruitful approach of studying social and economic sustainability in integration is unusual.

Working life challenges. A number of transformative challenges caused by globalization, digitalization and a changing demographic situation affect working life. Organizations live under the pressure of increasing productivity and in parallel they must ensure employee health, support diversity and facilitate learning. Terms of employment are changing with the development of new employment relations and work arrangements. An aging population, combined with decreasing resources in the public sector, also calls for effective organizing of welfare. In addition, outsourcing will also include civil society organizations. As a consequence, the sustainability of working life in all sectors of society need to be further studied.

Research strategy. In the HELIX Competence Centre, the interactive collaboration between researchers from different disciplines and the partner organizations enable us to face the challenges and the complexity of contemporary working life. The research strategy contains three key elements. *Firstly*, research and innovation activities are carried out with the well-established interactive research approach. *Secondly*, a multidisciplinary, integrative research approach is used. Researchers from different disciplines within behavioral sciences, management, business and public administration, entrepreneurship and innovation, as well the health and work sciences, collaborate within the Centre. *Thirdly*, a partnership approach is used, engaging universities and private firms as well as actors within the public sector, labour market, and civil society organizations. The problems and issues defined in dialogue between partner organizations and researchers drive the research activities. The constellation in HELIX Competence Centre consists of Linköping University as a coordinator together with two academic partners: KTH Royal Institute of Technology in the Stockholm/Södertälje area and Swerea IVF in the Gothenburg/West Sweden region. The existing partnership is expanded with new organizations.

Research programme. HELIX vision can be captured by the phrase Knowledge for Sustainable Development in Organizations. Our research programme focuses on organizational development across a broad front in working life, including attractive working environments, high welfare standards, and effective organizations, offering sustainable job opportunities. The focus is on knowledge production for integration and utilization across four multidisciplinary research themes: 1) Sustainable development processes in industrial production systems; 2) Growth and development in small enterprises; 3) Sustainable, innovative, and coordinated health and welfare processes; and 4) Inclusive workplaces.

Excellence with impact. Linköping University strongly supports HELIX as part of its long-term strategy to strengthen working life research. The research at HELIX advances scientific knowledge about development of new types of work arrangements and development of sustainable working life in Sweden. The Centre strengthens the potential for Swedish organizations to be more sustainable in the long-term and to stimulate endeavors between public, private and civil society. As expressed by the partner organizations, they join HELIX to get support in developing their organization towards better economical and social sustainability. Our overarching goal is to contribute significantly to scientific knowledge and, at the same time, add value to practice – that is, to put working-life research to use.

1. Existing Activities in the Field

This application and the HELIX Competence Centre builds on and extends the 10 years of experiences in the HELIX VINN Excellence Centre. As stated in the evaluation report from the evaluation of stage 3: “HELIX meets all requirements for a VINN Excellence Centre.” In this section, we elaborate on the operations of HELIX during the past 10 years, as well as its relation to other activities in the field.

HELIX Operations and Progress of the Centre

The successful operations of HELIX have so far built on the interests and expectations of the different stakeholders that comprise the HELIX partnership. The partner organizations have had a high degree of joint ownership of the HELIX programme and projects through e.g. the HELIX Board. As manifested by the engagement and sustainability of the partnership, now for over a decade, we have developed strong linkages between research and practice, and a portfolio of research projects of direct relevance to our partners. This is, to a large extent, an effect of the interactive research approach. In line with this approach, the vision, research strategy, and project portfolio have been developed in dialogue with partner organizations. Key functions for conducting this strategic dialogue have been the Centre director, the HELIX management team, and an engaged and experienced board in which all partner organizations have been represented.

As pointed out in the evaluation of HELIX stage 3, the productivity in terms of publication has been good. HELIX research has led to a large number of publications, presented in international journals, conference papers, books and reports. It is especially worth mentioning the two publications resulting from our international conference, held in Linköping in June 2013. The book *Sustainable Development in Organizations: Studies on Innovative Practices* edited by Elg, Ellström, Klofsten, and Tillmar, and published by Edward Elgar in 2015, summarizes important themes and issues from the HELIX research programme and from some of our international affiliates. The HELIX conference also resulted in the special issue, *Innovative practices in work, organization and regional development: problems and prospects*, in the Scandinavian Journal of Public Administration (2014), edited by Högberg and Sundin. A summary of the volumes and patterns of our scientific publication is presented in Table 1. In addition, HELIX produced 26 PhD theses and hundreds of conference articles and reports.

Table 1: Volumes and Patterns of Publication

Type of Publication	Year					Total
	2011	2012	2013	2014	2015	
Articles	25	40	40	33	42	180
Books	2	4	3	6	8	26
Chapters in books	14	17	19	28	25	103
Total	41	61	62	67	78	309

Impact among the Stakeholders

Equally important is the considerable impact that our interactive research has had on the partner organizations and beyond. If we once more cite the evaluation of HELIX stage 3, it is stated that “the Centre has been very successful in getting its innovative ideas accepted and used by the partners.” Indeed, most partners report clear benefits from the research collaboration. Examples of impact include:

Improvements and development of new models, processes and innovations in public organizations

- Integration of processes for innovation support as part of the regular operations in several municipalities, for example, as part of the existing management system.
- New approaches and models for co-creation and learning with patients in healthcare service development that has been utilized in various healthcare environments.
- New strategies in order to improve work ability among long-term sick listed and young people on disability benefits in collaboration projects between the Social Insurance Agency, health care organizations, the Public Employment Service, and municipalities.
- Development of a new R&D Centre in the field of human resource development and management (HRD/HRM) at Region Östergötland.
- Improvements of “Customer-choice model” for public procurement within elderly care.

Development of work organisation and production processes in industry companies

- Several of our partners in the industry are working with continuous improvement, employee involvement and production development and we have actively contributed to this work.
- Research findings guided one of the industry partners when it was reorganized in response to the economic crisis during 2008–2009.
- Development and implementation of new HR strategies, and ongoing efforts to integrate the HR strategies with the overall business strategy of the company.
- Stimulation of innovation and entrepreneurship within the life science industry, for example, development of a new coaching module and improved guidelines for different project activities.

Development of leadership and Lean production across private and public sector organisations

- Contributing to the development of a Swedish model for Lean Production, both in industry and in the public sector.
- Collaboration in a management development programme for managers within elderly care in private and public organizations.
- Principles for leadership and managerial work have been included in job descriptions for managers at various levels of our partnership organisations, both in industry and in the public sector.

Intermediaries' and unions' utilization and dissemination of research

- Input to policy actions as well as changes in existing practices within the EU Structural Funds, for example, concerning the formulation of programme criteria, project calls, and recommendations to include learning evaluations in all larger projects that are funded.
- The union IF Metall has, both at a regional and a national level, systematically used our research to advance their knowledge in relation to employers and other actors (e.g. funders).

The HELIX partnership has for many partners also meant increased interaction with research and the university, significantly increasing access to research-based knowledge. In the most successful cases we have anchored the projects at the top management level in the partner organizations, assuring a high degree of management attention and support for the research and innovation efforts. The level of engagement in HELIX and perceived benefits and impact for their organizations is shown by the fact that a majority of the partner organizations are interested in continued participation in HELIX.

Interactions with Educational Programmes

The researchers at HELIX are involved on a regular basis as teachers, examiners, course directors and are responsible for course development in educational programmes at the undergraduate, graduate, and post-graduate levels within LiU and KTH Royal Institute of Technology. More specifically, the HELIX researchers are involved in several educational programs within the subject areas Business Administration, Education, Human Resource Management and Development, Ergonomics, Entrepreneurship, Public Health, Sociology, and

Quality Technology and Management. In this way, the HELIX researchers in total reach over 4000 undergraduate students, over 500 graduate students and over 130 post-graduate students each year. This integration of HELIX researchers within university teaching provides one of the most powerful dissemination channels and also has an important impact on the university system. In addition, HELIX has a central role in developing partnership interaction in education at the university. In addition, the researchers participate as teachers in adult education for professionals and regularly give talks at meetings and other public events. Furthermore, HELIX teaching enriches different forms of collaboration with the partnership and other organizations.

HELIX Research Collaborations

HELIX has become a leading actor for working life research in Europe. In this section we describe the Centre's important national and international research collaborations. HELIX research leaders' individual collaborations are also presented here (see Table 2 below). We would like to pinpoint the important national network Workplace-related R&D for sustainable working life (Arbetsplatsnära FoU för hållbart arbetsliv, AFoU), which is a very important vehicle for scaling up the HELIX research programme at the national level.

Workplace-related R&D

The national network Workplace-related R&D constitutes a national arena bringing together researchers, practitioners, labour market parties, and financiers who have the same interest of creating a sustainable working life. HELIX initiated this network during 2015, and along with Swerea IVF led this dynamic effort in placing working life research and innovation at the forefront of public and policy practice. This network collaboration gives important input to the design of HELIX research projects with a high relevance for practice. The network is also a vital distribution channel for our research results. Workplace-related R&D consists of more than 150 working life researchers at eight universities and research institutes in Sweden.

Swerea IVF and FALF (the Forum for Work Life Research in Sweden) are among our active collaborators in this network. The network's focus is on research that creates a sustainable working life. The overarching objectives are to generate knowledge which then implemented would lead to competitiveness and innovation through good working conditions, to create a stronger interaction between workplaces and researchers, and to combine high-quality research with practical use.

Table 2: National and International Collaboration in the Centre among Research Leaders

Researcher	Competence	Examples of national collaborations	Examples of international collaborations
Jörgen Eklund Professor Royal Institute of Technology (KTH)	Work science, Ergonomics, Quality development, Industrial production, Organizational change	Chalmers University of Technology Luleå Technical University Lund University University of Gothenburg Karolinska Institutet Jönköping University of Technology	University of Bordeaux, France Ryerson University, Canada University of Wisconsin Madison, USA Monash University, Australia Massey University, New Zealand Hiroshima Int'l University, Japan University of Nottingham, UK Indiana University, USA DTU, Denmark CNAM, France
Mattias Elg Professor IEI, LiU	Quality Management, Service Development, Change management	Jönköping University Chalmers Karolinska Institute	Hanken Business School, Finland Queensland University, Australia Intermountain Healthcare, US
Maria Gustavsson Professor, IBL, LiU	Workplace learning Vocational education and training Organizational change and development Health and workplace health promotion	Medical Education Research Group at Linköping University Jönköping University, School of Engineering Stockholm University University of Gothenburg	The Centre for research In Learning and Change at University of Technology (UTS), Australia RUC Roskilde University, Denmark
Magnus Klofsten Professor IEI, LiU	Entrepreneurship and innovation: Early development processes of new businesses, Training and supporting entrepreneurship, Knowledge-based regional development	Chalmers University of Technology, Gothenburg University, Lund University, Luleå Technical University	Aalto University, Helsingfors, Finland University of Antwerp, Belgien Bristol Business School (University of the West of England), UK Macquarie University Sydney, Oslo University, Norway Stanford University, USA University of Oldenburg, Germany University of Toulouse, Franch University of Turku, Finland
Henrik Kock Associate Professor IBL, LiU	Workplace learning, Leadership and leadership development, Organizational change and development, Labour market intermediaries	APeL Inc. Jönköping University Region Jönköpings län Region Östergötland	National Chengshi University, Taiwan, Edith Cowan University, Perth, New Zealand Centre for Small Business Research, Massey University, New Zealand Work and Labour Market Institute, Auckland, New Zealand The Danish School of Education, European Association for Research in Adult Education
Christian Ståhl Associate Professor, IMH, LiU	Social insurance, Return to work, Implementation, Policy	PRESA (Swedish network for research on the prevention of sickness absence with common mental disorders) Uppsala University	Tranzo, Tilburg University, Netherlands University Medical Centre, Groningen, Netherlands Centre for Research on Work Disability Policy, Canada Institute of Work & Health, Toronto, Canada Finnish Institute for Occupational Health, Finland International Work and Life Academy (IWALA)
Malin Tillmar Professor IEI, LiU	Organization, Entrepreneurship, Gender, Public sector, Social entrepreneurship, Interorganizational relationships, Trust Emerging markets	EMBLA research group including Jönköping University, Stockholm University, Swedish Agricultural University, Stockholm Centre of Civil Society Studies, Institute for Research on Migration, Ethnicity and Society REMESO, Linköping University	First International Network on Trust (FINT), EM Lyon Business School, Centre for the Understanding of Sustainable Prosperity, University of Surrey, UK, Dar es Salaam University, Tanzania Makerere University, Uganda Nairobi University, Kenya Moi University, Kenya Turku Business School, Finland

International Collaborations

HELIX has broad and extensive international collaboration with 38 universities all over the world. The collaboration is mostly based on individual research contacts, but we also have collaborations with international research centres like HELIX conduct research in collaboration with partners in the field of working life. Centres with which we have established strategic collaboration are presented below:

- Centre for Research in Learning and Change at University of Technology Sydney (UTS). As HELIX, the centre is committed to working life research in collaboration with a wide variety of partners, including small and medium-sized enterprises; large multinational companies; local, state, federal, and international government agencies; NGOs; and charities.
- EM Lyon Business School. This entrepreneurship research centre is headed by Professor Alain Fayolle. They have over the last 25 years developed an interactive entrepreneurship ecosystem composed of stakeholders from different sectors in a context where there previously was no tradition of such interaction.
- Tranzo centre at Tilburg University in the Netherlands. This centre has a long tradition of interactive research with partners in the field of work and health. Our collaboration is focused on exchange of knowledge and data that enable European comparative studies.
- The Center for Quality and Productivity Improvement (CQPI) at University of Wisconsin-Madison's College of Engineering, in the US. This is an interdisciplinary research centre for human factors and systems engineering focused on the quality and safety of work processes, working life, and health care.

National Collaborations

HELIX participate in several networks and collaborate with other research organisations in Sweden. Important collaborations are:

- A network of researchers and employers based in Uppsala, focusing on prevention of sick leave. The network's goal is to organize meetings between research and practice, and by research-based support facilitate development activities. Among the research groups in Uppsala, a notable participant is Professor Sandblad, focusing on interactions between humans and computers, and psychosocial work environment.
- EMBLA, an excellence programme within gender studies and entrepreneurship funded by the Swedish Research foundation. Professor Tillmar is one of the four researchers in the program, which is headed by Professor Ahl of Encell, a centre for lifelong learning.
- FALF, Forum for work life research in Sweden (Forum för Arbetslivsforskning), which organizes yearly conferences in the working life research field. In this arena, research leaders within HELIX participate and discuss relevant contemporary issues.
- Jönköping Academy for Improvement of Health and Welfare at Jönköping University, headed by Professor Boel Andersson Gäre, with a research focus on clinical quality improvement, learning, and process innovations within the health care and welfare sectors.
- Stockholm Center for Civil Society Studies (SCCSS), headed by Associate Professor Wijkström at the Stockholm School of Economics is a centre the organizational field of civil society organizations.
- The National platform for sustainable working life in Horizon 2020, a cooperative initiative from Swedish universities promoting working life research in the EU research funding system.

Collaborations with Other Organizations at Linköping University

HELIX also has collaborations with other organizations and research teams at Linköping University. Important collaborators are:

- Division of Political Science. This close collaboration with Professor Elin Wihlborg and Dr. Bo Persson strengthens our expertise especially regarding policy development.
- REMESO (Institute for Research on Migration, Ethnicity and Society), a 'Forte Centre of Excellence', with which HELIX has collaboration in research on entrepreneurship among different ethnic groups, as well as women's entrepreneurship. A number of HELIX researchers

are also related to REMESO, and the head of REMESO collaborates on HELIX projects. REMESO pursues interdisciplinary research and education on transnational migration, ethnic diversity, and citizenship in relation to changes in the labour market.

- The Centre for Municipality Studies (CKS). The centre focuses on questions and challenges of major importance for municipalities. The main purpose is to generate knowledge through research, support, evaluation and seminars.
- The Medical Education Research Group at the Department of Medical and Health Sciences headed by Professor Abrandt Dahlgren. This collaboration strengthens our expertise especially regarding professional learning, interprofessional learning and simulation-based learning and education in health care.
- The National Institute for the Study of Ageing and Later Life (NISAL). Our close contacts and collaboration with NISAL is of course a strength in our work for a sustainable working life.

How the Centre Supplements Ongoing Activities in the Research Field

As noted in the evaluation of HELIX stage 3, it was argued that: “From a wider European perspective HELIX is a potential role model for other universities where interactive research is a rarity.” We received ample evidence for the validity of this observation during the international conference we held in 2013, but also through our participation in other international conferences and network initiatives. Considering the national arena, HELIX is an important partner in the initiative Workplace-related R&D for sustainable working life mentioned above. Our interactive research approach already serves as a role model for this and other initiatives around Sweden. A continuation of HELIX is therefore vital for the progress of this network initiative.

The establishment of HELIX as a VINN Excellence Centre with prospects for long-term funding has meant a significant incentive for multidisciplinary collaboration across faculty and departmental borders within the university. An important consequence of the long-term funding is that this type of externally funded, interactive research also acquires a relatively high status within the university – a status comparable to that of traditional research funded by the faculties.

The HELIX partnership supported by interactive research is quite unique as a regional innovation system. Compared to research collaboration in individual separate projects, the partnership approach functions as a bridge between different workplaces, organizations and regions. Project initiation and planning, the conduct of research, and the implementation and dissemination of research results, thus becomes more integrated than is usually the case in traditional research. This approach makes it possible to disseminate research results and make use of research more effectively than is usually the case.

2. Vision, Goals and Strategy

The HELIX Competence Centre is committed to sustainable development in organizations. Our strategy has three key elements: 1) a multidisciplinary, integrative research approach; 2) an interactive research approach and 3) a Penta-HELIX partnership approach, i.e. engaging universities, private firms as well as actors within public sector, labour unions, and civil society organizations.

Current Working life Challenges

In contemporary society and working life, there are many new challenges generated by globalization, digitalization, and a changing demographic situation. As a consequence, organizations need to adapt to new circumstances. However, many organizations experience difficulties in creating conditions that can be sustainable both with respect to economic use of resources (human, social, material) and competitiveness or alignment to markets.

Concurrent with increasing production demands, organizations need to obtain good working conditions in terms of employee health, learning, and facilitate diversity in the workforce. Thus, in order to become sustainable, organizations have to create synergies between result-orientation and good working conditions as well as involve all groups of co-workers constructively in innovation and improvement efforts. Employment arrangements are changing with the development of more precarious employment relations, which challenges both traditional ways of organizing work and supply of purposeful welfare services. Another challenge is to integrate and re-integrate unemployed individuals and individuals on long-term sick leave.

Decreasing resources in the public sector combined with an aging population calls for effective organization of welfare services. Previous waves of New Public Management have begun to change into value-based strategies, often influenced by Lean production. While improvements have been made in some areas, many of these attempts have had other unintended and negative consequences, such as an increased administrative burden, increased transaction costs, and deteriorating working conditions. A structural change is underway, where outsourcing of welfare is no longer limited to private companies, but will also include civil society organizations. The effects of such changes need to be studied.

Vision

The vision for the HELIX Competence Centre can be captured by the phrase *Knowledge for Sustainable Development in Organizations*. Our research programme focuses on organizational development across across many areas of working life. In a broader societal perspective, the relevance of our vision can be witnessed in current policy debates, including in the EU Commission, such as with EU 2020, and the OECD. Our research targets working life development in collaboration with our partners, with authorities, and with actors at national and international levels.

Goals

Our overarching goal is to contribute significantly to scientific knowledge and, at the same time, add value to practice – that is, to put working life research to use. We strive for *excellence with impact!* We aim for knowledge production for integration, synthesis, and utilization across four multidisciplinary research themes: 1) Sustainable development processes in industrial production systems; 2) Growth and development in small enterprises; 3) Sustainable, innovative, and coordinated health and welfare processes; and 4) Inclusive workplaces.

With a starting point in our four research themes the following goals are formulated:

- Produce research-based knowledge of high scientific quality, published in relevant, well-recognized, peer-reviewed journals and books;
- Produce research-based knowledge with high practical relevance communicated to and used by relevant actors in policy and practice;
- Contribute to university teaching programs and relevant education as well as training, oriented to the needs of our Penta-HELIX partners;
- Establish and enhance mobility of people with strategic competences between HELIX Centre and its stakeholders.

Our previous Quadruple-HELIX partnership model is expanded to a Penta-HELIX model, allowing us to reach a broader spectrum of organizations.

Strategy

The strategy is based on a multidisciplinary, integrative, and interactive research approach, and a well-developed partnership – in accordance with a Penta-HELIX model. These elements of the strategy are further described below.

A Multidisciplinary, Integrative Approach

As mentioned in the strategy section, the research group represents different theoretical perspectives that provide deep understanding of contemporary working life challenges in society. The multidisciplinary orientation creates a strong potential for innovative research, and it is crucial to continue to work towards integration of the different disciplines that are represented within the Centre.

During the first 10 years, we have learned to organize our work so that different research perspectives represented in the research groups are viewed as complementary rather than mutually exclusive. We have also learned the advantage of sharing data in our research projects to achieve greater effect of the multidisciplinary research strategy. The different perspectives and methods support innovative thinking and creativity in understanding and analysing sustainable development in organizations. We have learned that multidisciplinary collaboration can take place at different stages in the research process: in the planning, data collection, data analysis, interpretation of results, and writing process. It must take place within each project in most of these stages in order to be effective.

We have also learned that the multidisciplinary approach involves fostering a creative environment for research where there is a potential for discovering the strengths and weaknesses of one's own disciplinary matrix for studying certain problems. This is facilitated through our most important integrating mechanism, namely to work closely together, systematically. Consequently, in the Competence Centre we have extended the integrative aspect through a stronger focus on multidisciplinary collaboration in four joint themes.

An Interactive Research Approach

The research and innovation activities are carried out within an interactive framework of research. This does not entail a belief in the existence of one research methodology that represents the single best approach. On the contrary, we argue for a mix of methodologies, ranging from descriptive-analytical studies such as surveys and qualitative case studies, to different types of evaluation or follow-up studies, and to intervention studies. A wide range of recognized methods are employed, including interviews, observations, focus groups, questionnaires, and document studies. Independent of the type of study, a strong focus on reflective, theoretical work is a common core. Interactive research stresses the independence of the researcher, the necessity of having a critical distance, and the focus of long-term theory development. We have presented our version of interactive research in different publications, both in books and articles (Svensson, Brulin, & Ellström, 2015).

In order to succeed with our vision, it is necessary to avoid the risk of maximizing the interests of practice at the expense of the interests of research, and vice versa. Below is a description of how this dual task is realized (see Figure 1).

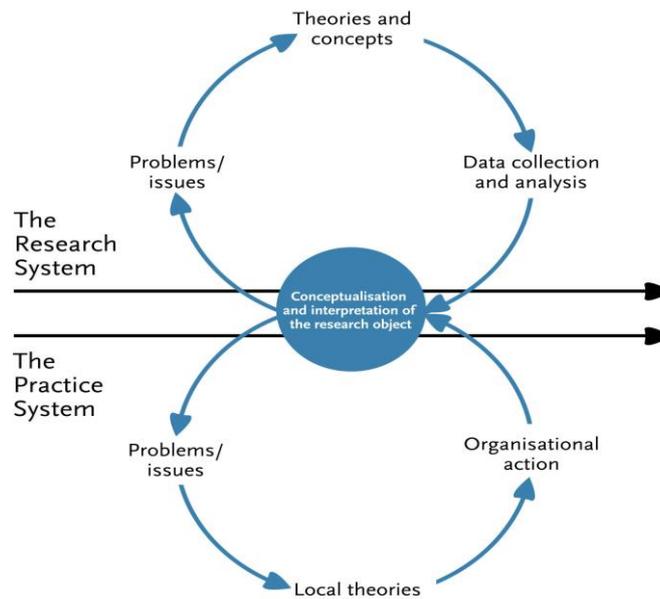


Figure 1: Interactive Research as a Two-Way Flow of Problems and Knowledge (Svensson, Brulin, & Ellström, 2015)

The model includes two interacting activity systems, called *the research system* and *the practice system*. These two activity systems refer to ideal typical representations of the research process and the activities in a practical process of problem solving. In this model, both activity systems are depicted as cyclical in character and driven by problems/issues originating in research or practice. The basic activities in both systems, that is, research activities such as data collection and analyses, and different kinds of organizational actions, are assumed to be informed by explicit or implicit theories based on previous research and/or practical experiences.

A crucial point in the model, as indicated by the shaded circle in the intersection between the two systems, is that the process of interactive research produces common conceptualizations and interpretations of the research object that are fed back as “cognitive input” into the next cycle of problem-solving activities, but also into the next cycle of the research process. Thus, the model is interactive in the sense of attempting to build a two-way flow of problems and knowledge between research and practice. We have learned that rapid analysis and feedback to organizations after data collection is essential for keeping up practitioner involvement, and that interactive research also provides excellent opportunities to validate research results.

A Partnership Approach

A basic characteristic of the organization of the HELIX Centre is the partnership approach, established already at the start of the HELIX VINN Excellence Centre in 2006. Inspired by the Triple-HELIX concept (Etzkowitz & Leydesdorff, 2000), the first 10 years of HELIX was organized as an expanded model Quadruple-HELIX, including university, private companies, public sector organizations, and labourunions. Due to contemporary challenges in working life, we now move to an even more inclusive Penta-HELIX model, as outlined in the section about stakeholders.

Thus, HELIX projects are initiated in dialogue with one or more of the partner organizations, and are based on work-related problems emerging as development and improvement needs

within the organizations. Thus, projects are initiated, planned and carried out in an interplay between the partners and researchers in the Centre.

The partnership is viewed as a developmental coalition (Gustavsen, Finne, & Oscarsson, 2001). In line with this concept, the planned research and innovation activities are based on a multi-level approach – that is, studies and other activities are carried out in order to link phenomena and development efforts at the individual or group level with the organizational level and the inter-organizational level. An important task for the HELIX Competence Centre is also to create arenas and process supports that facilitate interaction within and between partner organizations. With such a supportive structure, it is possible to create the potential for both individual and collective learning within the partnership.

Interpreting Vision, Goals and Strategy in Practice

To achieve impact, the Centre continues to develop our extensive dissemination program, comprising a broad set of activities that contribute to the development of industry, the public sector, and other actors within the Penta-HELIX partnership. The involved stakeholders receive continuous access to research, get input on strategic and operative issues from researchers and other involved stakeholders in the Centre, and acquire insightful and rapid feedback on actual and ongoing research on site. Also, stakeholders provide input to the Centre's strategy and choice of research issues. To remain an internationally attractive research environment, it is necessary to develop an excellent and competitive research program, which is theoretically and practically relevant, highly visible through publications and presentations, and contains international exchange and mobility.

The Centre undertakes an extensive number of cooperation and dissemination activities with the partners of the Centre (described in our Penta-HELIX model) as well as with the surrounding ecosystem. It is of great importance that the Centre activities match and strengthen previous and ongoing initiatives. Through the mobility of people and ideas the Centre is able to handle international stakeholder collaboration. The Centre, along with the dissemination activities, use methods and concrete measures to facilitate the transfer of knowledge through enhanced mobility and communication with the surrounding ecosystem of the Centre.

Research Programme

The overall research question concerns how to understand and manage sustainable development in organizations. Sustainable development is about reaching long-term effects of development work and interventions in organizations without consuming more resources (human, social, material) than are generated or regenerated. As we have argued elsewhere on the basis of previous research (Elg, Ellström, Klofsten & Tillmar, 2015), this entails a balance between result-orientation, in terms of effectiveness, economic growth, and innovation, and good working conditions, in terms of health, gender equality, learning, and development.

Creating knowledge for sustainable development involves a quest to understand how organizations establish long-term effects of different types of development initiatives. This contrasts with much of the research on change focusing on the early development phases, but lacking interest in understanding what happens during phases of stabilization and institutionalization.

Below, we describe the HELIX Competence Centre research programme. The programme comprises four research themes identified in collaboration with our partner organizations. The themes target central working life challenges: global competition, digitalization, health at work, demographic changes, and changing employment relations. (Figure 2).

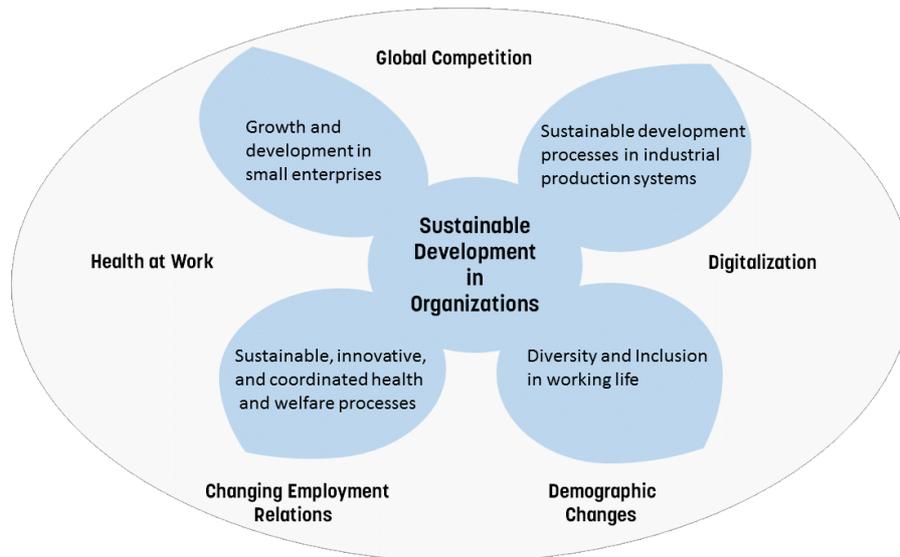


Figure 2: Society Challenges and Research Themes in the HELIX Research Program

Within each of the themes, the questions are addressed by means of interactive studies using a range of research methods. The specific research designs will be developed in collaboration between the partner organizations and researchers during the autumn 2016.

Theme 1: Sustainable Development Processes in Industrial Production Systems

This theme focuses on organizational and technological changes in industry due to societal changes, competition, globalization, and digitalization. In a global context, Swedish production of goods and services needs to be highly competitive and efficient. The service content accounts for an increasing share of values created. In particular, there is a need for flexible companies that adapt to changing market situations, and there is a growing importance of learning to accomplish sustainable change and innovation in organizations. Further, the changes require new forms of employment, and reintegration of unemployed. Change initiatives such as Lean production sometimes lead to deteriorating working conditions, causing sickness, absenteeism, reduced motivation for development, and a loss of competitiveness (Hasle, Bojesen, Jensen & Branning, 2012; Eklund, Halvarsson Lundqvist & Lindskog, 2015).

Earlier research has often focused on economic or production aspects only (Womack, Jones & Roos, 1990) or on human reactions such as health consequences. One problem is that industrial performance is tightly interrelated with working conditions, innovativeness, and competence development, but is seldom researched in an integrated approach. Management of human aspects of production, such as learning and health, can be pivotal for the performance of the organization (Fagerlind Ståhl, Gustavsson, Karlsson, Johansson & Ekberg, 2015). The research emphasizes the dual perspective, considering human aspects of work and organizational performance simultaneously. Several important areas to be addressed in this theme are: smart, flexible, and resource-efficient systems; sustainability and progress in the use of digitization opportunities; high levels of automation, meeting complex customer needs; learning and development of employee-driven innovations for sustainable production; and healthy employees who are involved in development activities.

The following key questions are addressed:

- Why do change projects often not meet the expected results and fall short of sustainability in the long run?
- What conditions support employees' health, learning, and development of innovations in work?
- How can organizational changes and digitalization of work be managed for improved competitiveness and better working conditions at the same time?
- How can companies promote work health and contacts with the welfare system?

Theme 2: Growth and Development in Small Enterprises and Organizations

There are several developments influencing the conditions for managing small enterprises in today's working life. With small enterprises we refer to small private ventures but also small organizations of hybrid forms as we today can observe a large variation between different types of small enterprises with respect to ownership, distribution over sectors, relations to larger organizations, work characteristics (Davidson & Klofsten, 2003). This variation is important to take into consideration in this realm of research (Josefy, Kuban, Ireland & Hitt, 2015).

The digitalization of the economy concerns the majority of all small enterprises and allow enterprises to stay small while operating on an international arena. An increasing number of small organizations are virtual and global. This may improve innovation and effectiveness, but may also have consequences for the management of the firm, as well as for working conditions. Ample research describes small enterprises to have the potential to function as engines for economic growth and labour market expansion, e.g. for young people and immigrants (Eurofound, 2015). However, there are important challenges. Employment relations have changed over time and new types of precarious employment arrangements, e.g. temporary work agencies and subcontracting (including self-employment) increase the risk for job insecurity, which challenges the inclusion of people with disabilities or limited resources in the labour market and may also have health implications (Tompa, Scott-Marshall, Dolinschi, Trevithick & Bhattacharyya, 2007). Other important aspects, as for example gender, ethnicity and age need to be addressed in order to realize the potential for growth and development. Previous research on learning and human resource development (HRD) in small enterprises shows that small firms, in relation to larger firms, put less resources into HRD and also uses different strategies to increase the competence of employees (Kock & Ellström, 2011). This underlines that small enterprise should not be seen as a scaled-down version of larger organizations, but rather as an entity, or even multiple and diversified entities of their own (Josefy et al., 2015).

The aim of this theme is to develop new knowledge of the role of small enterprises as agents for the development of sustainable workplaces, and to develop policy recommendations regarding management and leadership. The theme also focuses on the interaction between small enterprises and public authorities (such as social insurance and the educational system), private and civil society organizations. The currently expanding market for welfare services is another arena where public organizations, private companies and civil society organizations interact. Both these interactions and the conditions for small enterprises on these markets will be targeted by our research.

The following key questions are addressed:

- How to explore the development of traditional as well as non-traditional enterprises due to changing conditions, such as digitalization, globalization, new employment arrangements, and user-driven innovations?
- How to develop a small enterprise leadership that promotes an attractive workplace with a diverse set of people who are included in the development of the organization?
- How to increase the learning capacity of small enterprises that support a balance between personal development of employees and organizational performance?
- How to promote health and manage work disability, including small enterprises' support from and contacts with the welfare system?

Theme 3: Sustainable, Innovative, and Coordinated Health and Welfare Processes

In light of the current working life challenges described above, sustainable organizing of health and care services requires coordination at various levels. This includes organizing within health care departments as well as between clinics, between various public health and caregiving organizations. Furthermore, this trend is also increasing within multinational enterprises and small local businesses, as well as civil society organizations (Sundin & Tillmar, 2010). At the

same time, policymakers, professionals, researchers, patients, clients, and users represent varying interests that influence the directions of change, and approaches to induce change may have varying starting points (Bejerot & Hasselblad, 2013).

A significant change in the welfare systems has been the New Public Management marketization (Hood, 1991; Christensen & Lægheid, 2001), lately combined with social entrepreneurship (Lundström & Wijkström, 2012). The fuzzy borders between the three sectors of society are therefore changing and becoming increasingly blurred. The situation requires increased coordination and is challenging to all involved organizations (Ståhl, Svensson, Petersson & Ekberg, 2010). The various actors within the health and care systems frequently fail to understand each other, leading to increased transaction costs. Obstacles to small enterprises and idea-driven organizations are among the challenges.

One tangible approach is coordination through standardization. However, health care professionals often perceive that organizational restructuring initiatives such as standardized care processes hamper work, professional autonomy, and work satisfaction. Another initiative is redefining the patient's role from being a passive recipient to a more autonomous, active, collaborative participant in health care delivery and development (Elg, Engström, Witell & Poksinska, 2012). These changing conditions challenge knowledge and learning in work, and have implications for the continuing development and training of health professionals. (WHO 2010; Frenk, Chen, Bhutta, Cohen et al., 2010). A crucial feature of contemporary health care work is increasing complexity, and the notion that skilled workers must be adept at responding to unforeseen changes. In turn, this responds to a notion of workplace learning as being a crucial feature in practice. Simulation of health care work is increasingly used as a way to arrange a safe environment with the purpose of learning clinical, communicative, and interprofessional competence. Simulation-based learning has come to be a commonly used strategy to reduce the risk of medical errors and improve patient safety, as well as to increase the efficiency and capacity of the health care workforce.

The following key questions are addressed:

- How are new challenges of inter-sectoral collaboration perceived and handled in contemporary welfare production?
- How to develop forms of co-creation and collaboration in public sector organizations that lead to successful outcomes?
- How to arrange learning and training in simulation-based learning environments?
- What competencies are needed for interprofessional collaboration in situations demanding prompt decisions of critical importance for patients' safety and well-being?

Theme 4: Diversity and Inclusion in Working Life

This theme targets diversity for an innovative and healthy working life. We deal with two challenges; 1) full utilization of those who are active in the workforce, including norm-critical innovation support, and 2) utilization of those who have been temporarily or permanently excluded due to long-term unemployment. Utilization of all human resources requires inclusion, but research shows that different aspects intersect to hinder inclusion, such as gender, functional disability, ethnicity, age, sexual orientation, and religion. The aspects are very different, and demands specific analysis, as illustrated below. Our aim is to develop knowledge about how to organize and support diversity for innovation – inclusive and unprejudiced workplaces, where employers are knowledgeable and supportive of different groups of employees, with positive gains on the performance of the workplace.

The gender issue, which has been on the political and research arena for long, is among our starting points. How working life is being re-gendered with new changes is a never-ending challenge. 'Ageism' in working life is also an obstacle to inclusion and diversity, yet to date understudied. The exclusion of experienced individuals is to the disadvantage on all levels. The

same of course applies to the issue of ethnicity. In the field of work disability prevention, there are several evidence-based return-to-work models involving complex multi-stakeholder interventions. This requires cooperation between employers, health care and social insurance. The models are sparsely implemented, due to factors such as problems of interorganizational cooperation and employers' priorities. Employers tend to focus their interventions on younger and more well-educated employees (Wåhlin, Ekberg, Persson, Benfort & Öberg, 2012), and lack the relevant knowledge and support to hire people with functional disabilities.

Increasing pressure from demographic developments and large groups of migrants challenge organizations' capability to use and develop those human resources. Vocational education and learning can act as resources and instruments for the inclusion of young people from various backgrounds. Vocational education may constitute a central arena for peoples' transition from education to workplace settings (Deissinger, Aff, Fuller & Jorgensen, 2013). In Sweden in recent years vocational education has been characterized by a stronger orientation to workplace-based learning and a general labour market orientation, including new apprenticeship tracks and intermediary institutions for cooperation between schools and workplaces (Persson Thunqvist, 2014). Also, different employment arrangements may influence who will get sufficient support from employers and welfare actors.

From an entrepreneurship perspective, it is crucial to recognize entrepreneurship in all kinds of organizations, including the public sector and civil society (Sundin & Tillmar, 2010). Entrepreneurial and innovative potential in everyday working life encompasses individuals at all levels in organizations. Cooperation between organizations from different sectors as well as intermediaries of various kinds has come to play a larger role. In the ongoing working life change, organizations from civil society, with knowledge about types of work disabilities, are currently entering the scene. Simultaneously, women, migrants, and youth are encouraged to start businesses to employ themselves. Research has revealed that norm-related constraints also affect the self-employed (Tillmar, 2009; Sundin & Holmquist, 2016), but also that commodification of ethnicity and age enables a competence approach to ethnic businesses (Högberg & Mitchell, 2015).

The following key questions are addressed:

- How can workplaces be organized to become inclusive and diverse?
- Under what conditions can self-employment be a viable mode of inclusion?
- How can inclusion be supported and facilitated, for example by public authorities, and/or through measures such as vocational education and training?
- How can civil society organizations add value to working life in terms of inclusion and diversity?

Expected Results and Effects

In this section we illustrate the expected results and impact goals of HELIX Competence Centre by a so called program logic model. The model is divided into four basic elements; activities, results, short-term effects and long-term effects. In our interactive research processes, the cause and effect logic is of course very complex and dynamic. Here, we confine ourselves to the overall structure of the program logic. Rather than specifying the multiple links between specific elements, we roughly indicate the correlations between the main components in the program logic (see Figure 3).

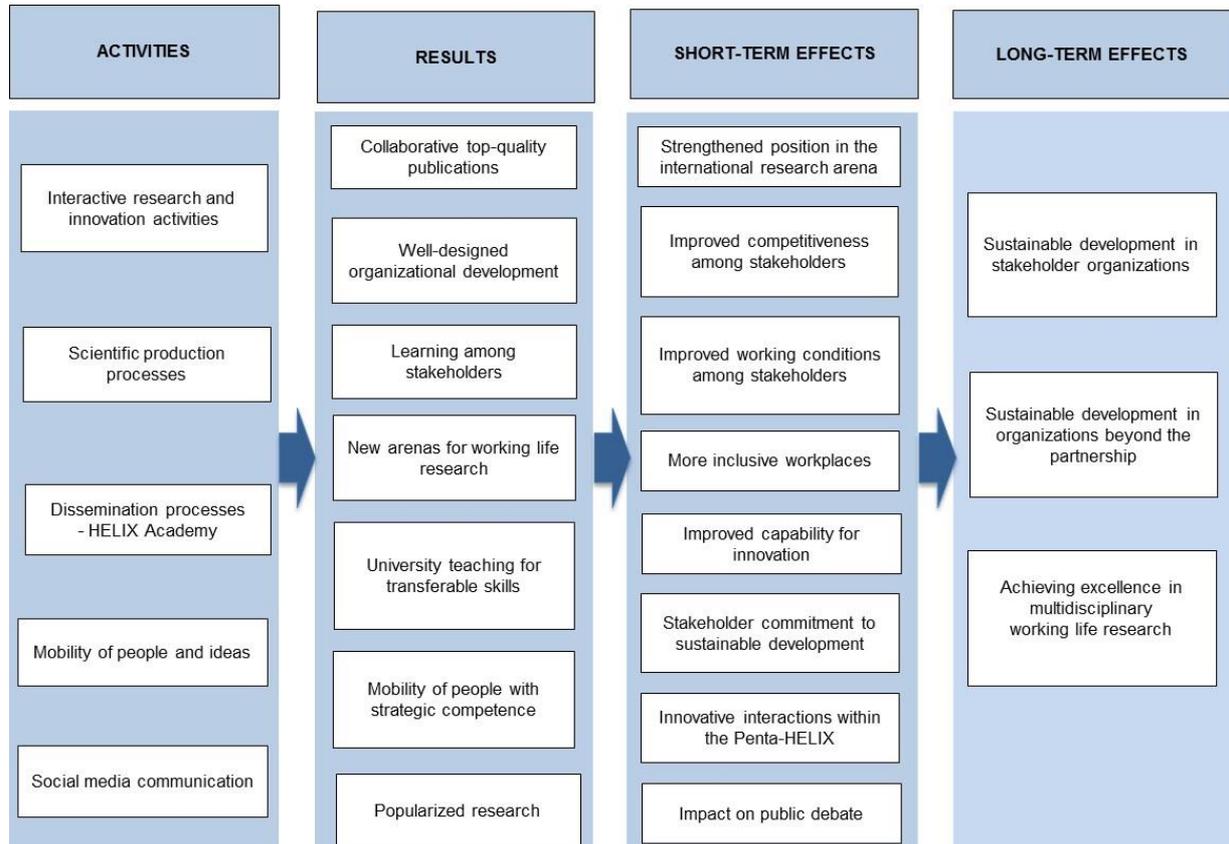


Figure 3: Results and Effects of the HELIX Competence Centre Activities

3. Stakeholders

We organize the stakeholders in the HELIX Competence Centre in line with a Penta-HELIX partnership approach. This means that we engage universities and private firms as well as actors within the public sector, labour market, and civil society organizations. The expanded academic constellation in HELIX consists of Linköping University as a coordinator together with two academic partners: KTH Royal Institute of Technology in the Stockholm/Södertälje area and Swerea IVF in the Gothenburg/West Sweden region, in connection with existing and new partner organizations. Our work in this direction is strongly linked to the overall strategy of Linköping University.

The partnership, in combination with the interactive research model, has been of utmost importance for the HELIX program. The partners have provided access to workplaces, are involved in the process of generating research questions and projects, and participate in feedback seminars. The partnership can be described from this viewpoint as an *arena for inter-organizational learning* where different actors participate in mutual learning activities.

HELIX and the Long-term Strategy of LiU

HELIX Competence Centre is strongly aligned to the long-term research strategy of LiU, both with respect to the Centre's approach and vision as well as with respect to its organization and research priorities. This is evident in the contribution and proposal to the government's bill for the Swedish research policy submitted by the University in October 2015, including its long-term research strategy. The LiU strategy is based on cooperation with the surrounding society, utilization and impact of research-based knowledge, and a strong focus on innovation. Furthermore, the strategy identifies four highlighted research areas with a strong connection to the previous HELIX Centre, and also to a very large extent to this proposal. The research strategy addresses important future challenges concerning "Working life of Tomorrow", "Competitiveness of Companies and Organizations", "Tomorrow's Healthcare" and "Education and Learning" (LiU, 2015) – all four areas with a significant relevance to HELIX Competence Centre.

In line with this strategy, Linköping University is willing to establish and manage a new centre for research on "The Working life of Tomorrow". The university management urges the government to place such an assignment at LiU, where the proposed Centre can make substantial contributions. This new LiU research strategy is a significant recognition of the research at HELIX and thus there is a strong support for continuing to make important contributions also in coming years.

The proposed Centre's vision and strategies are very well connected to corresponding visions and strategies of VINNOVA, as the HELIX Competence Centre aims to deliver and utilize research-based knowledge addressing several knowledge demands highlighted by VINNOVA Increased knowledge concerning sustainable development in organizations, need for innovations concerning the organizing of welfare and health systems, strengthening of sustainable economic growth, and increased competitiveness and innovativeness of Small and Medium Enterprises (SMEs).

From Quadruple to Penta-Helix

Due to new working life challenges, and as a consequence of our research results, we have realized the need to add a fifth category of organization, namely those from civil society (see Figure 4). During the last decade, sectoral relationships have changed in the Nordic welfare states. As the public sector in Sweden has downsized and outsourced, civil society organizations play increasingly prominent roles, both as welfare producers and as employers. As argued by

Carayannis and Campbell (2012), there is a need for “sustainable development perspective that brings together innovation, entrepreneurship, and democracy.” Many social innovations emanate from everyday operations within civil society activities, and the sector is, to a large extent, composed of social and societal entrepreneurs. We are hence convinced of the mutual learning opportunities inherent in the incorporation of civil society organizations in the HELIX partnership. Inspired by Björk, Hansson and Lundborg (2014), and as a logical consequence of adding one sector to our quadruple, we term our new approach Penta-HELIX. In our version of Penta-HELIX, the organizations as such, and not only the entrepreneurs within them, are of interest. Furthermore, the public sector, the private sector, the unions, and civil society are equally important to reach our vision. In the middle of the partnership is hence depicted academia, in this case the HELIX Centre.

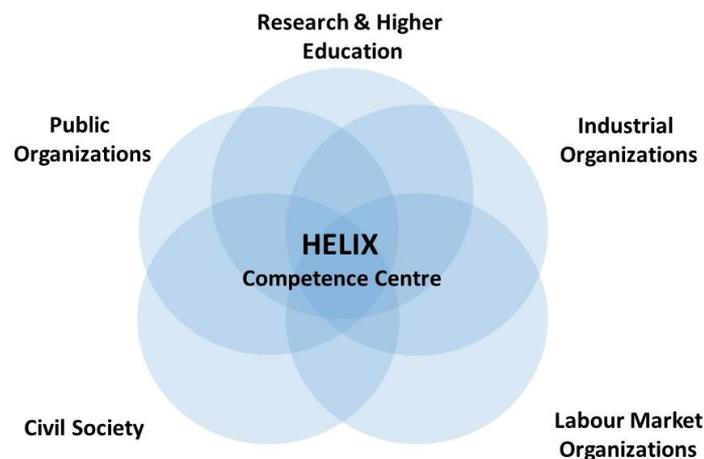


Figure 4: The Penta-HELIX Partnership Approach

The sector here called ‘civil society’ is very diverse. HELIX focuses on organizations active on the labour market and/or as supplier of welfare services. The organizations are reached through intermediaries capturing a large part of the diversity. Coompanion gives advisory services to cooperatives of various kinds (mostly small enterprises), FAMNA is an umbrella organization for idea-driven providers of welfare (without profit distribution) and SE-UPP is a partnership of a broad spectra of organizations including sports organizations and organizations for disabled.

An additional development of the partnership is the increased share of intermediary organizations. This has advantages, not least from the perspective of initiation of research projects providing several differing perspectives, but also concerning the dissemination and utilization of knowledge, where the intermediaries have an important role to play. This is a strategy that links to the inclusion of civil society, which is represented through a variety of intermediaries. New partners involve actors organizing SMEs (SMIL, SWEREA IVF, Coompanion), civil society organizations (SE-UPP, FAMNA, Coompanion) and an intermediary organizing public authorities (Samordningsförbundet Östra Östergötland). Network Kinda is a network of organizations dedicated to develop the local labour market and is coordinated by municipality of Kinda. The network comprises the municipality learning Centre, and companies both in manufacturing and services (AbsorBest AB, Finess Hygiene AB, and Schedevi Psykiatri AB).

Table 3 HELIX Partners Based on a Penta-HELIX Strategy

	Organization No.	Employees	Contact person	Phone, E-mail
Industrial Partners				
<i>Astra Zeneca</i>	556011-7482	5 300	Margareta Ozolins Vice President	08- 553 260 00 margareta.ozolins@astrazeneca.com
<i>Industrial Competence</i>	556060-5478	60	Maria Hasselgren Lundgren Director Competence and Network	013-329400 maria.hasselgren- lundberg@industrikompetens.se
<i>Rimaster</i>	556580-1643	600	Tomas Stålnert President	0494-795 00 tomas.stalnert@rimaster.com
<i>SAAB</i>	556036-0793	13 970	Bengt Savén Director Business Development	013-18 00 00 bengt.savén@saabgroup.com
<i>Scania</i>	556084-0976	37 500	Lars-Henrik Jörmving Vice President	010-706 60 00 lars-henrik.jormving@scania.com
<i>Smil</i>	822001-5831	Membership- based	Jan Brugård Chairman	0709-20 94 80 janb@wolfram.com
<i>Swerea IVF AB</i>	556053-1526	140	Mats Lundin CEO	031-7066100 mats.lundin@swerea.se
<i>Toyota Material Handling, Europe Inc. Mjölby</i>	556198-2868	9000	Margaretha Langueville HR Director	0142-86 000 margaretha.langueville@toyota- industries.eu
Partners from Public Sector Organizations				
<i>Region Östergötland,</i>	232100-0040	11 950	Eva Granfeldt HR Director	013-22 20 00 eva.granfeldt@regionostergotland.se
<i>Samordningsförbundet Centrala Östergötland</i>	222000-2485	14	Åsa Swenson, Director	070-326 02 32 asa.swenson@linkoping.se
<i>The Municipality of Finspång</i>	212000-0423	2 325	Helen Wallman HR Director	0122-85 00 00 helen.wallman@kommun.finspong.se
<i>The Municipality of Kinda (coordinator of Network Kinda)</i>	212000-0399	8 775	Anita Silfver Municipal Director	0494-190 00 anita.silfver@kinda.se
<i>The Municipality of Linköping</i>	212000-0449	6 825	Maria Kreese HR Director	013-20 60 00 maria.kreese@linkoping.se
<i>The Municipality of Mjölby</i>	212000-0480	2 525	Carina Brofeldt Deputy Managing Dir.	0142-850 00 carina.brofeldt@mjolby.se
<i>The Municipality of Motala</i>	212000-2817	4 225	Jan Holmberg Development Director	0141-22 50 10 jan.holmberg@motala.se
<i>The Municipality of Norrköping</i>	212000-0456	8 775	Per-Olof Strandberg HR Director	011-15 00 00 per-olof.strandberg@norrkoping.se
<i>The Municipality of Södertälje</i>	212000-0159	5 700	Martin Andreae City Manager	08-523 010 00 martin.andreae@sodertalje.se
Partners from Labour Market Organizations				
<i>IF Metall Östergötland, regional organization</i>	802002-2896	20 000	Joel Zenkert Ombudsman	013-24 38 00 joel.zenkert@ifmetall.se
<i>The Swedish Municipal Workers Union Östergötland, regional organization</i>	822003-0897	26 500	Maj Karlsson Ombudsman	010-442 70 00 maj.karlsson@kommunal.se
<i>TRR in Östergötland AB (Trygghetsrådet)</i>	802400-4825	15	Ulrika Wiklund Regional Manager	010-470 91 54 ulrika.wiklund@trr.se
<i>UNIONEN</i>	802001-5759	15 000	Malin Engström Regional Manager	013-24 75 20 malin.engstrom@unionen.se
Partners from Civil Society				
<i>Coompanion</i>	716426-2813	Membership- based	Camilla Carlsson CEO	011-19 65 46 camilla.carlsson@coompanion.se
<i>Famna</i>	802421-4218	Membership- based	Ulrika Stuart Hamilton General Secretary	08-546 949 33 ulrika.stuart@famna.org
<i>SE-UPP</i>	802436-3148	Membership- based	Thomas Holmgren Board member and authorized signatory	070-250 09 59 thomas.holmgren@folkbildning.se

4. Structure of the Centre

Geographical Focus

The HELIX Competence Centre builds on long-term collaboration with our partnership, originally established in 2006. Thus, the main concentration of resources is placed at Linköping University and the region of Östergötland, including management of the Centre, researchers and partner organizations. The geographical proximity facilitates commitment among the partners. However, it was pointed out in the evaluation of HELIX that a broader presence on the national level is desirable.

Therefore, two nodes outside of Linköping have been created, namely one in Södertälje/Stockholm and one in Göteborg/West Sweden. The node in Södertälje/Stockholm include Astra Zeneca, Scania, and Södertälje Municipality in collaboration with KTH and Södertälje Science Park. The Lean Centre at KTH in Södertälje works in close collaboration with the Ergonomics research unit at KTH, School of Technology and Health in Flemingsberg (headed by Professor Eklund) performing research in the field of Lean production. The School of Technology and Management at KTH is presently building up research in Södertälje within the field of sustainable production. This is in line with the strong focus on Lean production at Astra Zeneca, Scania, and Södertälje Municipality. The organization of this node creates a basis for research on Lean and sustainable production in conjunction with HELIX research in Linköping and Göteborg/West Sweden. This also includes collaboration within the partnership, and between the partner organizations.

The node in Göteborg consists of Swerea IVF, who is responsible for the change programme “The Production Leap” (Produktionslyftet), a large-scale and long-term programme for implementing Lean in medium-sized industrial companies. This programme has become a model for other national programmes for implementing Lean in municipalities and health care, and in agriculture. HELIX has been an evaluator of these programs. Further, the KTH Lean Centre in Södertälje is a regional partner with the Production Leap. This application, if funded, will lead research on Lean becoming better coordinated, and more relevant from a national point of view. The network formed between these three nodes creates the strongest mobilization of Lean research and development in Scandinavia. Also, Swerea with its networks provide an excellent additional channel for the application of research results from HELIX, not least to SMEs all over Sweden.

Organizational Structure

The Centre is led by a Board of Directors and a Centre Director. The management structure of the Centre also includes a Management Team, a Research and Innovation Council, a National Advisory Board, and an International Scientific Board.

The gender awareness that characterizes our research has fed into our ambition to reach a gender balance among the HELIX researchers. This is also the goal in the long term. In the management team we presently have one woman and two men. In the group of researchers there are 8 women and 11 men. HELIX has gender balance as a high priority and we work continuously to consider gender issues when recruiting new staff to the Centre.

The primary task of the organization and management of the Centre is to create conditions that facilitate a successful implementation of the vision, goals and strategy. Such conditions include effective communication, cooperation, and learning among the parties involved. Broad

participation by the members of the partnership in the research and innovation process is necessary. Below each function is briefly described (see Figure 5 below).

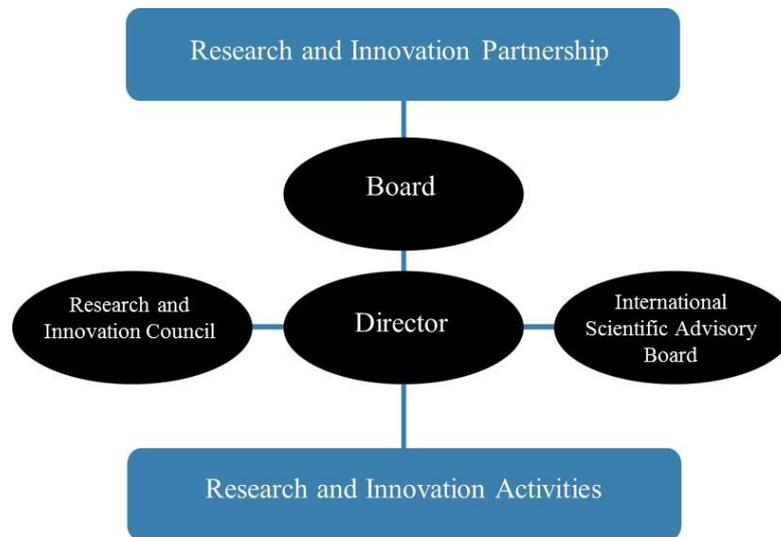


Figure 5: An Organization Scheme of the HELIX Competence Centre

The Partnership is expanded to the principle of Penta-HELIX. The partnership has an ownership function/role in the Centre, including decision about the research and innovation program.

The Board represents the members of the partnership. The composition of the board is crucial, since its main task is to take, in close cooperation with the Centre Director, a strong and active role in decisions about projects and budget according to the formal rules of procedure, in line with the Centre's vision, goals and strategy. All three academic nodes are represented in the board. Jan-Olof Andersson, Executive Vice Chairman and former CEO of Rimaster, is new chair of the Board. The board meets four times a year.

The Centre Management Team, comprising the Centre Director, two Co-Directors and a Centre Coordinator/Communications Officer implements decisions made by the board, prepares and follow-up on meetings with the board, in the Research and Innovation Council as well as partnership meetings. Important tasks include planning and coordinating conferences, seminars, management of the Centres dissemination activities and other HELIX activities. The management team meets twice every month. Below, we briefly present their experiences and competences.

- Mattias Elg (Centre director) is Professor in Quality Technology and Management, Department of Management and Engineering. He has published about 45 scientific international peer-reviewed journal papers and led several research projects. He has held several leading academic positions, including head of division, head of research studies, and director of the HELIX VINN Excellence Centre since 2012. He was also co-director of the research Centre between 2009–2012. In addition, Mattias Elg has a military background, with four years serving as an officer in the Swedish Army.
- Henrik Kock (Centre co-director) is Associate Professor in Education, Department of Behavioural Sciences and Learning. From 2007–2015 he was director of the HELIX Graduate School and from 2012 visiting Professor at Jönköping University. He has been project leader for several large research projects, has written about 30 publications in the fields of HRM/HRD, workplace learning and leadership, and edited and/or authored seven textbooks and a number of research reports. In addition, Henrik Kock has vast experience in consultancy within HRM and HRD.

- Malin Tillmar (Centre co-director) is Professor in Business Administration, Department of Management and Engineering, and since 2011 she has been the Deputy Director of the HELIX VINN Excellence Centre. Tillmar has previously been head of department, and research leader for several previous projects in the areas of entrepreneurship, organization, emerging markets, and gender. She has written 40 publications in these fields of research. In addition, Professor Tillmar has experience in business consultancy both in Sweden and internationally.

The Research Leaders are responsible for the scientific development of the research program, leading research projects and co-ordinating dissemination activities. This group comprises, in addition to Professor Elg, Associate Professor Kock and Professor Tillmar, of the following research leaders:

- Jörgen Eklund, Professor in Industrial Ergonomics at KTH Royal Institute of Technology. Research interests in applied ergonomics, production system design, organizational change and development, Lean, quality, workplace design and occupational health.
- Maria Gustavsson, Professor in Education. Research interest in workplace learning, vocational education, organizational change and development, and workplace health promotion.
- Magnus Klofsten, Professor in Innovation and Entrepreneurship. Research interest in early development processes of businesses, academic entrepreneurship, entrepreneurial universities, entrepreneurship training and support, and regional development.
- Christian Ståhl, Associate Professor in Work and Rehabilitation. Research interest in social insurance, rehabilitation, return to work, policy implementation, and welfare system development.

The Research and Innovation Council, led by the Centre Director, is an arena for discussing ongoing projects, testing new project ideas, developing research and innovation activities and supporting the integration of knowledge. The Council meets once a month and comprises the seven researchers from the HELIX research group presented above.

The Associate Researchers in HELIX consist of a team of highly experienced and well-established researchers. They are contracted for participation in various research projects. They are:

- Madeleine Abrandt Dahlgren, Professor, Medical and Health Sciences, Linköping University
- Helene Ahl, Professor, School of Education and Communication, Jönköping University
- Richard Berglund, Senior industrial researcher, Swerea IVF
- Lotta Dellve, Professor, University of Borås and KTH Royal Institute of Technology
- Kerstin Ekberg, Professor emerita, Department of Medical and Health Sciences, Linköping University
- Per Erik Ellström, Professor emeritus, Department of Behavioural Sciences and Learning, Linköping University
- Ulrika Harlin, Senior industrial researcher, Swerea IVF
- Per Nilsen, Professor, Department of Medical and Health Sciences, Linköping University
- Elisabeth Sundin, Professor emerita, Department of Management and Engineering, Linköping University
- Lennart Svensson, Professor emeritus, Department of Behavioural Sciences and Learning
- Filip Wijkström, Associate Professor, Stockholm School of Economics
- Lars Witell, Professor, Department of Management and Engineering, Linköping University

The International Scientific Advisory Board (ISAB) comprises internationally excellent researchers within relevant research fields. Members of the International Scientific Board and the Management Team, meet once a year in a two-day workshop with the Research and Innovation Council. Being selected from research environments with relevance to the Centre, the members can contribute with valuable feedback, different perspectives and ask critical questions about the research and innovation activities. The following researchers constitute the ISAB:

- François Daniellou, Professor, Equipe Ergonomie Bordeaux INP, France
- Karen Evans, Professor, Institute of Education, University of London, UK
- Henry Etzkowitz, Professor, Clayman Institute for Gender Research, Stanford University, US
- Alain Fayolle, Professor, EM Lyon Business School, France
- Ellen MacEachen, Associate Professor, Centre for Research on Work Disability Policy, University of Waterloo, Canada

The National Advisory Board (NAB) has the role of providing advice and recommendations for dissemination and use of research knowledge from a national perspective. Members of the NAB can function as “door openers” on the national level, providing HELIX with access to important arenas within business, politics, and agencies. In contrast with the International Advisory Board with its research-oriented role, the national advisory board aims to strengthen the link between research and society and to broaden the regional focus, embedded in the partnership approach, to expand nationally. The NAB meets once a year at a one-day workshop.

HELIX Academy as a Means for Creating Impact

An important part of the Centre’s infrastructure for learning and knowledge utilization is the HELIX Academy. This is a platform for joint knowledge, experience, and dialogue, offering seminars and training activities to share and discuss our latest research. HELIX Academy is also a forum where the participants can initiate, introduce, and discuss development and innovation processes.

The aim of the HELIX Academy is to provide inspiration and a new perspective for development and utilization of results, and the programme is intended for people working in all levels of an organization, in industry, services, and public organizations.

The motive behind the establishment of the HELIX Academy is that several of the partners in the HELIX context have expressed a demand for further training and development activities. Such requests cannot always be handled by individual projects; they must be coordinated at the programme level. These requests may also require specific arrangements in the form of workshops or specific courses. A primary task for the Academy is to create arenas and activities to stimulate development processes in relation to our different research areas and topics, for example our industry courses on Leadership and Lean Production and Organizational Change.

In order to generate and implement ideas concerning the dissemination and implementation of research results, there will be an ongoing dialogue with the HELIX Board about these issues, and especially with the co-director responsible for the HELIX Academy. Taking active part in activities related to the HELIX Academy is mandatory for all researchers associated with HELIX. A valuable resource in this respect are the 26 PhD students who have graduated since the inception of the HELIX Graduate School in 2007, the majority of whom are still connected to LiU and HELIX; they demonstrate pronounced experience doing interactive research.

Concerning the dissemination and utilization of knowledge, the inclusion of several intermediaries (IK, Swerea IVF, SMIL, Famna, Coompanion) in HELIX has several advantages. They bring new networks as channels for dissemination and support for knowledge utilization.

Over time, the HELIX Academy may develop into a permanent and integrated part of Linköping University, possibly in collaboration with various external partners.

A Dynamic and Integrated Centre Structure

The HELIX Competence Centre have the formal status of a centre within Linköping University, with its own economy, and its own premises located within the campus area. Formally, the HELIX Competence Centre have an administrative link to a “host department” the Department of Management and Engineering. The collaboration within the Centre is based on the principle that the researchers, doctoral students, and administrative staff keep their positions at their "mother departments" within the university. For example, a researcher may keep her/his position at a certain department and work, say, 50 percent of her/his time at the HELIX Centre and 50 percent at her/his department with teaching duties. Thus, we do not create formal positions for researchers, administrators, or doctoral students within the HELIX organization. Rather, the staff is connected to HELIX by a contract and on a part-time basis.

We experience a number of advantages with this organizational arrangement. First, it facilitates collaborative efforts between the Centre and other departments within the university, and makes it possible to carry out the multidisciplinary research programme without losing contact with the development in the different disciplines involved. A second, related aspect is that this way of organizing the Centre makes it an integrated part of the structure of Linköping University, thereby reducing the risk that the Centre becomes isolated from other departments within the university (“a state within the state”). Being a well-integrated part of the university, HELIX has a high degree of engagement and support from the vice-chancellor and the university management, the three faculties that are involved in the Centre – the Faculty of Technology, the Faculty of Arts and Sciences, and the Faculty of Medical and Health Sciences – as well as from the three departments that co-operate within the HELIX Centre. Third, the structure of the Centre also facilitates flexibility with respect to personnel, and, thereby making it possible to restructure the activities within the Centre in a relatively short time. Thus, the organization has a high degree of flexibility and openness.

5. Implementation and Outcomes

Experiences and Competences of the Centre Leadership

The Centre leadership consisting of Professor Elg, Professor Tillmar and associate Professor Kock has a long experience in leading multi-disciplinary research groups. This team has collaborated over 10 years. Together they have managed the centre's research portfolio, initiating HELIX Academy, organizing an international conference 2013, as editors of an anthology bringing forth an international book on sustainable development in organizations, starting-up the national platform Workplace-Related R&D and finally being responsible for the VINNOVA international evaluation. The leadership also has a history of collaboration in previous multi-disciplinary constallations, for example within CMTO (Centre for studies of Humans, Technology and Organization) that started already 1995.

Structure of Decision-making at the Centre

The partnership acts as a driving force for strategic development of research and innovation activities, and facilitates effective implementation and use of research-based knowledge in process and product innovations. The ownership function of the partnership therefore has an important role in the nomination of board members. The tasks of the board have a strong emphasis on the strategic management and development of the Centre, including decisions concerning annual and long-term planning of research and innovation activities, budgeting, and the annual report. Based on previous experiences from HELIX, an important task for the board is selection, start-up, and termination of research and innovation projects. This way they ensure the practical relevance and impact of HELIX. The board also monitors and fosters the integration of knowledge between different research perspectives and projects. The director and the management team report to the board. Further, they have the main responsibility for successful implementation of the HELIX research programme and innovation activities including budget decisions.

Knowledge Utilization, Creating and Measuring Impact

In HELIX we plan to execute a wide range of knowledge utilization and impact activities. As shown in Table 4, this is done in different ways and different degrees of intensity.

Table 4: Activities and Impact Measurement

Activities in the Centre	Target group	Time table	Follow-up activities/ measuring impact
Research and innovation activities			
Research Theme 1 - 4	Partner organizations and the research community	Starting 2017 and evaluated annually	VINNOVA evaluation, annual questionnaire and impact cases
Scientific production			
Academic journal articles or book chapters	International research community and policymakers	Yearly evaluation	Bibliometric analysis
Edited book	Same as above	2021	Bibliometric analysis

Communication and dissemination (HELIX Academy)			
Partnership meetings	HELIX research community and partner organizations	Quarterly	Annual questionnaire
Courses and seminar series	Same as above	Ongoing	Same as above
HELIX Annual Conference	HELIX and society in general	Annually	Specific questionnaire and annual report
HELIX international conference	International research community, partner organizations and society in general	2020	Edited book (anthology)
Newsletter	Centre partnership and those who have an interest in the HELIX Centre	Quarterly	Yearly questionnaire aimed to evaluate the Centre
Press releases	Local and national media	When needed and related to up-coming events	Bibliometric analysis
Mobility of people and ideas			
International advisory board	HELIX research council	Annually	Written feedback on the Centre activities and performance
International researcher exchange	HELIX research community	Annually	Annual report
Professor of practice	HELIX research community and partner organizations	Annually	Participation in HELIX partnership community
Social media			
HELIX research on YouTube, Twitter and Facebook	The national and international research community as well as the society in general	Available from the start of the Centre	Number of views at the Internet

Concerning research activities and scientific production we consider – as a complement to the classical measures such as number of papers and citations – using measures showing how well we are succeeding in integrating our different research fields in the four research themes. This is measured through impact cases according to the Research Excellence Framework developed by the Higher Education Funding Council, UK. This framework is built around a set of mixed quantitative and qualitative indicators of impact and research utilization. This way of measuring impact has previously been developed and used in VINNOVA’s evaluation of HELIX 2013. A crucial part of the implementation activities is the mobility of people and ideas. This is planned through at least three activities: the international advisory board, an international research exchange, and by what is called a “Professor of practice.” A “Professor of practice” is a person from our Penta-HELIX partnership, who spends time in our Centre carrying out research and providing valuable practical knowledge to our research. We would also like to emphasise that researchers and doctoral students from HELIX meet people from our partner organizations on a more or less daily basis in the context of project group meetings, seminars, partnership meetings, courses etc. In this way, we have created an ongoing "everyday mobility" between HELIX and our partners at the local and regional level, but also with organizations at the national level.

An important part of the Centre’s implementation activities is to use available information technology to effectively reach out to our Penta-HELIX community. We use different types of social media such as YouTube, Twitter, and Facebook to communicate new research and dissemination activities. These tools are going to be in place at the start of the Centre, and it will be important to get started quickly. Furthermore, there are a number of communication and dissemination activities aimed for a wide audience that can benefit from and contribute to the

future development of the Centre. These include partnership meetings, the HELIX Annual Conference, and the HELIX International Conference.

Timetable and Process for Working with the Agreement

We are planning a flying start of HELIX Competence Centre in January 2017. Together with the partners and the legal advisor at Linköping University we will work out the agreement and operational plan during Autumn 2016.

Long-term Potential for Maintaining the Operations

There are a number of steps we have taken to create possibilities for long-term sustainability of the Centre. First, Linköping University strongly supports HELIX Competence Centre as part of its long-term strategy to strengthen worklife research.

Second, through the concentration of resources within the Centre and the multidisciplinary approach, it is possible to initiate a portfolio of projects to meet and satisfy a broad spectrum of research ideas and innovation interests linking the Centre's vision with the strategic priorities of the university.

Third, the establishment of Workplace-related R&D for sustainable working life makes it possible for us to reach a broader spectrum of policy makers, funding agencies, and researchers attracted by the HELIX model.

Fourth, establishing the two nodes in Södertälje/Stockholm and Gothenburg/West Sweden provides excellent means for sustained support to companies and public organizations all over Sweden, based on research findings and methodologies developed within HELIX. Swerea IVF and KTH Södertälje

Fifth, it is a strategically prioritized task to maintain strong links between the Centre and Linköping University's educational programs at the graduate and postgraduate levels. Presently, there are several master's programs running in close connection with the researchers involved in the Centre.

Sixth, the concentration of resources for working life research at HELIX has made it possible to successfully compete for external grants from e.g. European Social Fund, FORTE, VINNOVA and AFA Insurance funding agencies. In fact, during the first 10 years we have attracted external grants to the amount of three times VINNOVA funding.

Seventh, Swedish working life research has a high international reputation. We also have good access to organizations compared to researchers in many other countries. In addition, there is a collaborative culture between management, unions and researchers in Sweden. International researchers are therefore positive to building collaboration.

Eighth, we have over time maintained a structure of research personnel of high level within the Centre as a whole, and within the leadership. The generation shift that has taken place in the Research and Innovation Council has contributed to important renewal. Equally important, the generation shift in HELIX leadership took place gradually and was finalized three years ago. The management team of the HELIX Competence Centre is composed of professors with experience of leading the Centre, which is beneficial for stability and continuity. Last but not least, the current leadership has access to senior advisors, including the previous Centre director, Professor Emeritus Per-Erik Ellström, as well previous research leaders Professor Emerita Kerstin Ekberg, Professor Emeritus Lennart Svensson, and Professor Emerita Elisabeth Sundin.

6. Financial Plan

A total of 26 organizations have agreed to be partners in the Competence Centre. All of the partners have signed a Letter of Intent. As stated in the Letters of Intent, the partners are prepared to contribute with up to totally 10.5 million SEK per year. Of this total contribution, up to 2.8 million SEK will be in cash and 7.7 million SEK in-kind. Funding from VINNOVA, Linköping University (LiU) and the partner organizations for 2017-2021 is presented in the revenue budget in table 5.

Table 5: Revenue Budget for HELIX Competence Centre Through 2017-2021, the amounts are given in thousand SEK

	Year 1		Year 2		Year 3		Year 4		Year 5		Sum
	Cash	In-kind	Cash	In-kind	Cash	In-kind	Cash	In-kind	Cash	In-kind	
VINNOVA	7000		7000		7000		7000		7000		35 000
Linköpings universitet	7000		7000		7000		7000		7000		35 000
KTH School of Health and Technology		1000		1000		1000		1000		1000	5 000
Swerea		1000		1000		1000		1000		1000	5 000
Astra Zeneca	150	100	150	100	150	100	150	100	150	100	1 250
Industrial Competence Inc.	50	320	50	320	50	320	50	320	50	320	1 850
Rimaster Inc	75	150	75	150	75	150	75	150	75	150	1 125
SAAB	150	350	150	350	150	350	150	350	150	350	2 500
Scania	150	100	150	100	150	100	150	100	150	100	1 250
Smil	0	80	0	80	0	80	0	80	0	80	400
Toyota Material Handling	100	200	100	200	100	200	100	200	100	200	1 500
Region Östergötland	350	350	350	350	350	350	350	350	350	350	3 500
Samordningsförbundet Centrala Östergötland	0	660	0	660	0	660	0	660	0	660	3 300
The Municipality of Finspång	100	200	100	200	100	200	100	200	100	200	1 500
The Municipality of Kinda	150	680	150	680	150	680	150	680	150	680	4 150
The Municipality of Linköping	250	500	250	500	250	500	250	500	250	500	3 750
The Municipality of Mjölby	100	200	100	200	100	200	100	200	100	200	1 500
The Municipality of Motala	100	200	100	200	100	200	100	200	100	200	1 500
The Municipality of Norrköping	250	500	250	500	250	500	250	500	250	500	3 750
The Municipality of Södertälje	400	100	400	100	400	100	400	100	400	100	2 500
IF Metall	75	200	75	200	75	200	75	200	75	200	1 375
The Swedish Municipal Workers Union	100	250	100	250	100	250	100	250	100	250	1 750
TRR in Östergötland AB (Trygghetsrådet)	100	200	100	200	100	200	100	200	100	200	1 500
UNIONEN	100	160	100	160	100	160	100	160	100	160	1 300
Coompanion	50	60	50	60	50	60	50	60	50	60	550
SE UPP	0	80	0	80	0	80	0	80	0	80	400
Famna	50	100	50	100	50	100	50	100	50	100	750
In-kind		7740		7 740		7 740		7 740		7 740	38700
Cash	16 850		16850		16850		16850		16850		84250
Total Sum	24590		24590		24590		24590		24590		122950

The cost budget for HELIX Competence Centre is presented in Table 6. The costs are divided in the following posts: Management of the centre; the four research themes, Communication activities, HELIX Academy and Operational Expenses.

Table 6: Annual Cost Budget for HELIX Competence Centre through 2017-2021, amounts in thousand SEK

	Management of the centre	Research theme 1	Research theme 2	Research theme 3	Research theme 4	Com. Activities	Helix Academy	Operational Expenses	Sum
Linköpings universitet	2800	2250	2250	2250	2250	600	700	3600	16700
KTH School of Health and Technology	100	450	100	100	50	100	100		1000
Swerea	100	350	200	100	50	100	100		1000
Astra Zeneca	5	45	10	0	20	10	10		100
Industrial Competence Inc.	16	144	32	0	64	32	32		320
Rimaster Inc	7,5	67,5	15	0	30	15	15		150
SAAB	17,5	157,5	35	0	70	35	35		350
Scania	5	45	10	0	20	10	10		100
Smil	4	36	8	0	16	8	8		80
Toyota Material Handling	10	90	20	0	40	20	20		200
Region Östergötland	17,5	0	52,5	140	70	35	35		350
Samordningsförbundet Centrala Östergötland	33	0	99	264	132	66	66		660
The Municipality of Finspång	10	0	30	80	40	20	20		200
The Municipality of Kinda	34	0	102	272	136	68	68		680
The Municipality of Linköping	25	0	75	200	100	50	50		500
The Municipality of Mjölby	10	0	30	80	40	20	20		200
The Municipality of Motala	10	0	30	80	40	20	20		200
The Municipality of Norrköping	25	0	75	200	100	50	50		500
The Municipality of Södertälje	5	0	15	40	20	10	10		100
IF Metall	10	50	20	50	30	20	20		200
The Swedish Municipal Workers Union	12,5	62,5	25	62,5	37,5	25	25		250
TRR in Östergötland AB (Trygghetsrådet)	10	50	20	50	30	20	20		200
UNIONEN	8	40	16	40	24	16	16		160
Coompanion	3	0	12	15	18	6	6		60
SE UPP	4	0	16	20	24	8	8		80
Famna	5	0	20	25	30	10	10		100
Sum	3287	3837,5	3317,5	4068,5	3481,5	1374	1474	3600	24440

Overall Staffing Structure

In the table below we present the staffing structure of the Centre. We have divided the staff into seven groups, as they represent various competences needed for fulfilling the aims of the Centre. The groups are HELIX Management Team, Research Leaders, Professor Practice, Associate Researchers at professor-level, post-doc researchers, PhD Candidates and Industrial PhD Candidates. In the table staff from all partner organisations are represented. In the Centre we focus a large amount of our resources on young scholars (Post-docs and PhD candidates) in order to build long term capability and competence.

Table 7: Staffing structure at the Centre

Staff	# of persons	Percentage in Centre/person	FTE (totals)	Cost (KKr)
HELIX Management Team	4	Varying	1,7	2 300
Research Leaders	7	30	2,1	3 150
Associate Researchers at Professor-level	8	15	1,2	1 800
Professor practice	4	20	0,8	1 000
Post-Doc Researchers	10	40	4	4 400
PhD Candidates	6	40	2,4	1 800
Industrial PhD Candidates	4	50	2	1 500

The costs for each group is based on an average salary for this particular group. The number of persons and amount of time spent in the Centre is approximate in the Table and will be specifically be decided when the operational plan is worked out.

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