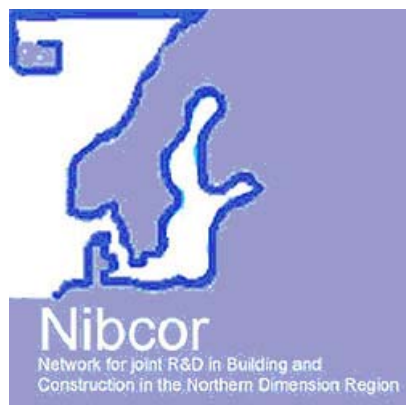




Increased exchange in the Building Sector

Network for joint R&D (Nibcor Phase 1)

Lone Møller Sørensen, Kresten Storgaard og Bengt Turner



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Nordic cooperation

Nordic cooperation is one of the world's most extensive forms of regional collaboration, involving Denmark, Finland, Iceland, Norway, Sweden, and three autonomous areas: the Faroe Islands, Greenland, and Åland.

Nordic cooperation has firm traditions in politics, the economy, and culture. It plays an important role in European and international collaboration, and aims at creating a strong Nordic community in a strong Europe.

Nordic cooperation seeks to safeguard Nordic and regional interests and principles in the global community. Common Nordic values help the region solidify its position as one of the world's most innovative and competitive.

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Summary

High prices, low competition and a high degree of local market are characterising the building and construction market today. It is assumed that a more transparent and harmonized building and construction market in the Northern region will improve the single market between the countries in the region and reduce the housing cost through reduction of construction costs and building prices. This is the objective of the Action Plan “*Increased exchange in the building sector between countries in the Northern Dimension region*” under the *Nordic Council of Ministers*. The Northern Dimension Region covers Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Poland and Sweden.

Co-operation and exchange of knowledge are important premises for trade to be facilitated and mobility and cross-border construction activities to be stimulated. R&D plays an important role in this context by contributing with conducting survey, sharing information and developing new knowledge.

A larger and more transparent market will offer new opportunities for R&D in processes, products and services and thereby providing new opportunities for increased productivity in the building and construction sector as well as obtaining a higher degree of understanding and fulfillment of user and society needs in buildings and the built environment.

This project, Nibcor is intended to be fulfilled in two stages. This particular report covers the result of the first phase with the objective to develop a cooperation programme for a network for joint R&D relevant to the issues of the action plan.

A number of regional or European research initiatives covering both networks and funding programmes for building and construction exists. Even though some of the programmes have elements which could support the Action Plan, none of these have the same research objectives as this Action Plan.

Therefore developing and establishing a cooperation programme for a regional network for joint R&D in building and construction relevant to the issues in the Action Plan is identified as a central part of the Action Plan. However cooperation with relevant networks and funding programmes will be an important part of the Nibcor project. In addition a joint R&D network in the region will strengthen the research capabilities in the region and provide an excellent platform for influence on and success in the Regional and European Research programmes.

Through a workshop and correspondence with a national member of each country in the Northern Dimension three research areas was identified as key focus areas for Nibcor:

- Meeting client and users requirement
- Transformation of the Construction Sector
- Digital Built environment

Theses were selected as important research areas for reduction of barriers to cross-boarder transfer of research, knowledge and building activities.

Further an initial screening of research partners in the Northern Dimension has given a first overview of the research partners. This shows a potential for an increased R&D cooperation both with partners with similar and with complementary research competence.

The objective of phase 2 of the project is to establish a regional network for joint R&D in building and construction covering research issues relevant for the Action Plan. This report has identified an activity plan for establishing a regional network for joint R&D, Nibcor covering:

- Vision and research areas – Confirmation of key focus research areas
- Mapping of research partners and barriers for cooperation
- Research project portfolio preparation – from exchange of ideas to support and facilitate combined research initiatives
- Promotion and dissemination – activities to support and facilitate the network.

1. Introduction

1.1 Background

High prices, low competition and a high degree of local market are characterising the building and construction market today. It is assumed that an increased cross-border exchange and co-operation in the Nordic Dimension countries¹ will

- improve the single market of the European Union between the countries in the region.
- reduce the housing cost through reduction of the construction costs and building prices.

Co-operation and exchange of knowledge are important premises for trade to be facilitated and mobility and cross-border construction activities to be stimulated. R&D plays an important role in this context by contributing with conducting survey, sharing information and developing new knowledge.

A larger and more transparent market will offer new opportunities for R&D in new processes and cooperation forms, new tools and methods for utilisation of ICT, new materials and design solutions. Thereby providing new opportunities for increasing productivity in construction and building sector as well as obtaining a higher degree of understanding and fulfilment of user and society needs in buildings and the built environment. In addition this will support development of a more sustainable construction and building sector and improve the innovation up-take in the sector. Further a harmonisation of building regulations and free mobility of labour will provide an important basis for the single market in the Northern Dimension region.

More transparent markets in terms of housing demand, economics and demography as well as the local legislation and building culture will potentially expand the markets from highly local markets to a regional single market. In addition, household mobility and economic interaction will change the housing landscape in all countries. Analytical instruments and new approaches that can support the development of a more transparent market will provide new opportunities for a more efficient housing market with a higher fulfilment of user and society needs.

Historically there has been a considerably R&D cooperation within the Nordic countries based on similarities in culture, climate and tradi-

¹ Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Poland and Sweden

tions. This is now being gradually expanded to the other countries in the Northern Dimension countries. However lack of funding possibilities and other incentives for joint R&D is creating greater barriers to future expansion of joint R&D in the region.

A joint network for R&D in the region will strengthen the research capabilities in the region and possibilities for joint research projects utilising the regional advantages. Further it will provide an excellent platform for influence on and success of the European research programmes and consideration for a joint European Research Area (ERA). In particular it will support and strengthen the possible outcome of the European Construction Technology Platform (ECTP) for the region. Further the joint Network for R&D will be an important research advisory panel for decision-makers in the various countries regarding research aspects on building and construction. In the long term, the network will contribute to a more transparent and harmonised building and construction market in the Northern Dimension region.

1.2 Goals and objectives

1.2.1 Objectives of the Action Plan

This project is part of a large-scale Action Plan “Increased exchange in the building sector between countries in the Northern Dimension region” under the Nordic Council of Ministers. The primary objectives of the Action Plan are:

- promote increased cross-border exchange and co-operation in the building and construction sector and to
- improve the Single Market of the European Union between countries in the Northern Dimension aiming at
- reducing high housing costs through the reduction of construction costs and building prices.

1.2.2 Goals and Objectives of the Nibcor Project

The overall goal of this project, Nibcor is:

To develop and establish a cooperation programme for a regional network for joint R&D in building and construction relevant to the issues in the action plan.

The project is intended to be fulfilled in two stages. The objective of the first stage is:

To develop a cooperation programme for a network for joint R&D relevant to the issues in the action plan.

and the objective of the second stage is:

To establish a regional network for joint R&D in building and construction, that can contribute to identification of research challenges (of common interest), dissemination of knowledge and to strengthen the research co-operation in the region.

The activities of the first stage are:

- Establishing a working group (national representatives)
- Overview of existing R&D initiatives like National Technology Platforms under European Construction Technology Platform, Nordic Innovation Centre, ENBRI, ENHR etc.
- Draw up a draft programme structure for the R&D network programme (research areas, forms of cooperation, possible R&D co-operation partners)
- Workshop with national representatives for final definition of the cooperation programme.
- Final programme description

This particular report covers the results of the first stage. A main result is the proposed action programme – which is the activities of the second stage.

1.3 Administration of the Project

The steering Group of the Action Plan discussed the project and made useful comments concerning the first phase of the project. The project management was carried out by the Nibcor steering group comprising: Director Lone Møller Sørensen (project leader) and senior researcher Kresten Storgaard, Danish Building Research Institute, and Professor Bengt Turner, Uppsala University.

A working group with one member from each of the participating countries was established according to the Action Plan. Together with the Nibcor steering group the working group provide the proposal for the next phase of the project. It is expected that the Nibcor working group will be the central part of the proposed Nibcor programme, phase 2.

1.4 Executive process and results

All members of the working group have participated in providing input and initial prioritising of the research topics at the Workshop in Copenhagen on 26th of June 2006. Expect for the members from Poland and Latvia which due to political situation and the time constraint for project

were not able to provide input for the first phase of the project. Further the workshop was attended by the Coordinator of the Programme Bengt Nyman. Keynote presentation was given at the workshop by Christophe Lesniak, DG Research, EU Commission and by Knud-Erik Busk, chairman of the Danish Client Association, Chairman of the Danish National Technology Platform and Member of ECTP High Level Group.

A draft report has been circulated to all members of the working group for correction and approval.

2. Overview Research Initiatives

2.1 Overview of existing Research Initiatives on regional level

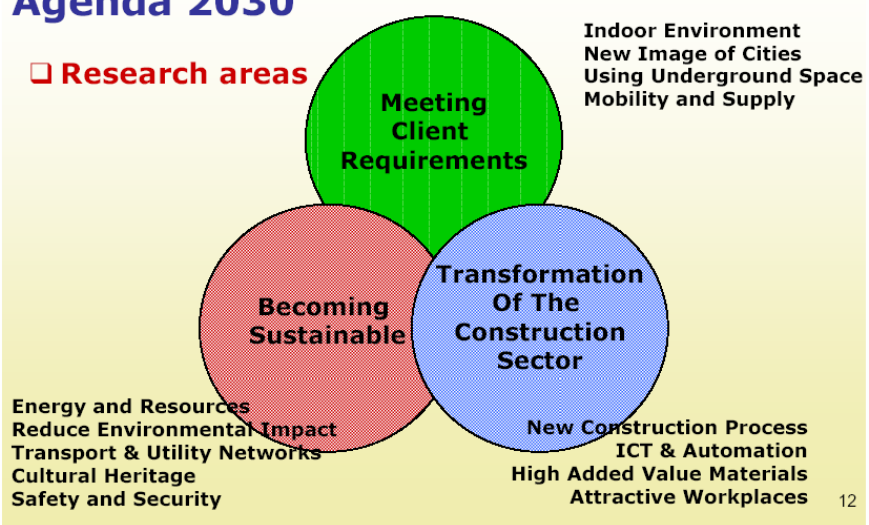
Below an overview of the major existing research initiatives is given covering both networks and initiatives by funding organisations with influence on the region of the Northern Dimension.

2.1.1 European Construction Technology Platform – ECTP

The European Construction Technology Platform (ECTP) was launched in October 2004 at the B4E Conference and is a network formed by all stakeholders in building and construction sector with the purpose of positioning the sector for the coming research programme in Europe (see www.ectp.org). The technology platforms are an instrument founded by the European Commission and are industry lead. Today ECTP is supported by representatives of major stakeholders of the Construction sector and by the European Commission. It gathers more than 700 individual members working at the European level. The ECTP has developed a vision for a sustainable and competitive construction sector by 2030.

Agenda 2030

□ Research areas



Based on the vision and the research agenda ECTP has identified the following priorities for research:

- New technologies, concepts and high tech materials for efficient and clean buildings
- High added value construction materials
- Reduced environmental and man-made impacts on landscape and cities
- Improved safety and security
- New integrated processes
- A living cultural heritage for an attractive Europe
- Underground innovative construction technologies
- Sustainable management of transports and utilities networks
- Nanotechnologies for materials in construction

The ECTP is in close dialogue with the Commission and the relevant DG's about research priorities for the European Framework programme, FP7.

2.1.2 National Construction Technology Platforms

In order to involve the many stakeholders of the construction sector a network of National Construction Technology Platforms was established under the ECTP. Today more than 25 national platforms exist in Europe. For a large number of the participating countries in the Northern Dimension a national platform has been established or is in process of being established.

Table 1. Overview of countries with national platforms in the Northern Dimension

Denmark	Norway
Finland	Poland
Estonia	Sweden
Lithuania	

The vision and the research agenda of ECTP has partly been adopted by National Technology Platforms in most of the participating countries in the Northern Dimension.

Together with 18 National Platforms ECTP has launched an Eureka Umbrella on construction related projects to develop some SRA priorities through Eureka projects.

2.1.3 European Network for Housing Research – ENHR

The European Network for Housing Research, ENHR:

- sponsors major international conferences every two years
- publishes a comprehensive Newsletter four times a year
- provides a framework for nearly twenty working groups
- encourages smaller conferences and seminars every year
- has an active group of PhD students (new housing researchers) (see: <http://www.enhr.ibf.uu.se/>).

The Network is composed of researchers from a variety of social science disciplines dealing with housing and urban issues. In addition to its basic goal of supporting research, the Network also seeks to promote contacts and communications between researchers and practitioners within the housing field. Membership can either be in the form of [Individual Membership](#) or of [Institutional Membership](#).

The ENHR was established in 1988 and now has more than 1000 individual and nearly 100 institutional members representing every country in Europe. In addition to a General Assembly held every two years, the ENHR is directed by a democratically elected board, the [Coordination Committee](#). A [Secretariat](#) including the Editorship of the ENHR Newsletter is located at the Institute for Housing and Urban Research, Uppsala University, in Gävle, Sweden.

2.1.4 European Network for Building Research Institutes – ENBRI

The European Network for Building Research Institutes (ENBRI) links the leading, non-academic centres for building and construction research in Europe (see <http://www.enbri.org/>). Its 21 members employ in total over 3000 professional research staff. The aims of ENBRI are:

- To promote cooperation among its members , and with the European Commission and stakeholders of the European construction sector, in order that ENBRI members may contribute effectively to the improvement of competitiveness, sustainability, quality and safety of the built environment
- To promote the benefits of investment and development in construction and the built environment at regional, national and European levels.
- To advise policy makers and wider public on issues related to research and innovation in the built environment.

Key elements in supporting these aims are research, innovation and knowledge transfer activities for development of the built environment.

Based on the challenges that the built environment is facing today and its strong link with both industry and government bodies and their broad expertise within in the built environment it is the vision of ENBRI to contribute to the development of

A sustainable and knowledge-based European construction sector, which is competitive, innovative, market driven and meets users and societal needs by providing the best living and working conditions for all people.

The main action lines identified to reach this vision are respectively concerned with:

- Raising environmental standards
- Fulfilling user and stakeholder requirements and aspirations
- Changing construction processes and relationships
- Updating and improving the built environment
- Exploiting new materials and technologies
- Promoting education and training, knowledge transfer, quality employment and innovation.

2.1.5 Nordic Innovation Centre

The Nordic Innovation Centre is the Nordic Council of Ministers single most important instrument for promoting an innovative and knowledge-intensive Nordic business sector (see: <http://www.nordicinnovation.net/>). The basic assumption is that each of the Nordic countries possesses knowledge, which through increased co-operation significantly will improve innovation capabilities and competitiveness for Nordic businesses.

Nordic knowledge platforms

Today, the Nordic Innovation Centre is an important player in Nordic knowledge platforms within the areas of innovation policy, creative industries, biotechnology, food safety and innovative building & construction. Establishing common Nordic knowledge platforms on strategically important areas give Nordic businesses access to the best knowledge possible and greatly enhance their innovation capabilities. It is the believing that building common Nordic knowledge markets are vital to all Nordic business life, enabling firms and institutions to compete in a global market which is becoming more and more knowledge driven.

Investments

The total project portfolio of the Nordic Innovation Centre consists of approximately 120 ongoing projects and networks. Together with several hundred completed projects of great value to Nordic businesses, these projects involve the Centre in nearly all strategically important Nordic areas.

Innovative Building

One of the preconditions for living in the Nordic Region is a building shield is of high quality. The traditional market in building and building materials are under change, pushed by new materials, new transnational regulations and a free market for services and labour. A vision can be to

“Establish and develop a new approach for the Nordic property and construction industry – while there are still opportunities. Go in advance of the rest of Europe in working for change that entails very profound consequences for both society and the individual”.

2.1.6 ERABUILD

ERABUILD is a strategic cooperation between national programmes promoting sustainable construction and operation of buildings (see: <http://www.erabuild.net/>). ERABUILD aims at having a major impact on creating the European Research Area (ERA) in research on sustainable development in the construction and operation of buildings. A step towards this aim is planning and preparing a trans-national R&D programme in the area. A short term goal for the project is the development of a learning network of governmental organisations. The ERABUILD will be running from 2004–2007 and the partners are: Finland, Austria, Denmark, France, Germany, Netherlands, Sweden and United Kingdom.

ERABUILD has identified the following three areas for future research needs:

- Renovation and Maintenance
- Energy in the Building Sector
- Processes

So far three joint-calls have been carried out with the following titles:

- Managing information in construction
- RFID – state of art report
- Transformation of the construction sector through industrialisation

2.1.7 Summary

None of the identified networks or initiatives by funding organisations has the same research objectives as the Action Plan. However most of those have elements which could support the Action Plan. Therefore it will be an important part of Nibcor to co-operate with the relevant networks and funding programmes. Through Nibcor it will be possible to strengthen the synergy between the relevant parts of the other programmes and networks for the benefit of the Action Plan.

3. Activity plan

Based on the Action Plan, initial mapping of research initiatives and the workshop in Copenhagen in June 2006 the following activity plan has been identified for the Nibcor programme:

- Vision and research areas
- Networks and partners
- Research project portfolio preparation
- Promotion and dissemination

In the following the objectives and the actions for each part of the programme are described.

4. Vision and Research Areas

The primary objectives of the Northern Dimension action plan are to contribute to a more transparent and harmonized building and construction market in the Northern Dimension region.

Primary objectives of the action plan:

- promote increased cross-border exchange and co-operation in the building and construction sector and to
- improve the Single Market of the European Union between countries in the Northern Dimension aiming at
- reducing high housing costs through the reduction of construction costs and building prices.

As a central part of the initial phase of the project a workshop was held in Copenhagen with national representatives of the participating countries of the Northern Dimension Region. The national input on research areas for the Nibcor programme are given in appendix. Through the workshop and a following up correspondence the following five research areas were identified as potential main topic areas for the proposed Nibcor programme:

- Meeting clients and users requirements
- Transformation of the Construction sector
- Digital Built Environment
- Becoming Sustainable
- Building technology and high added value materials

Together they will have the potential to support the development and expansion of the Northern Dimensions markets from highly local markets to a regional single market. A demand-driven market with more innovation, higher quality and reduced construction costs and building prices.

4.1 Meeting clients and users requirements

4.1.1 Market/Business drivers, impacts and potential

- Increased demand for customer and end user influence on the design of products and systems; diversification of the customer and user segments based on demography, wealth, region, trend etc.

- Increased quality requirements on the performance of the built environment and increased capabilities to simulate the psychical phenomena and human response
- Transparent markets in terms of housing demand, economics and demography, legislation and regulation
- (pressure to reduce construction costs and building prices through better procurement.

4.1.2 Research Focus and scientific goals

- Understanding and defining user and society future needs in a business perspective
- Demand studies (modelling and forecasting of build and human environment) including housing wealth, mobility and demographic changes, cost of building and planning regulations
- Total lifecycle management
- Value-based procurement including new procurement methods and their legal barriers in terms of partnerships and operation etc (public-private partnerships (BOOT, BOT))
- Financial integration and guarantee systems for clients/residents
- Knowledge base of best practice including user feedback, benchmarking
- Remove barriers in regulations as a basis for deliberations in possible harmonization – identification & research of consequences on possible changes.

4.2 Transformation of the Construction Sector

4.2.1 Market/Business drivers, impacts and potential

- Increased global competition, low profit margin in the sector, fragmented sector dominated by small firms, bad image and safety record, low quality, high price
- Pressure to increase productivity and quality in the construction sector
- Diminishing workforce in general or for construction sector will increase the need to increase the productivity and attract other groups of resources.

4.2.2 Research Focus and scientific goals

- New integrated processes (partners, industrialization, productivity, claims by delivery
- Competence requirements and free mobility of resources (labour, materials and activities

- Impact of shadow market/economy
- Building cost analysis + management studies, competition
- Remove barriers in regulations as a basis for deliberations in possible harmonization – identification & research on consequences of possible changes.

4.3 Digital Built Environment

4.3.1 Market/Business drivers, impacts and potential

- Due to aging and diminishing workforce as well as increased global competition there is a pressure to radically improve the productivity of the whole real estate and construction sector from the product manufactures to the owner
- Need for better, more flexible and reliable control of conditions and operating costs according to diverse customer requirements
- High business potential.

4.3.2 Research Focus and scientific goals

- New integrated construction processes with dynamic supply networks (web, e-integration) including digital tender and procurement, both internal and across company boundaries in the building process.
- Information management over the lifetime of the products and systems in the built environment
- Integrated product models: interoperability, simulation and visualization
- ICT-based services for mobile users
- Ubiquitous environment: sensor networks combined with adaptable materials
- Life-long learning and intelligent tutoring systems.

4.4 Becoming sustainable

4.4.1 Market/Business drivers, impacts and potential

- The built environment accounts for nearly 50% of the resource consumption and has a large environmental impact. With the consideration for the environment and energy shortage there is a huge need for development of concepts, business models, technology, materials and solutions for energy and resource reduction, which generates new business opportunities.

- A high percentage of the people live in the cities. However due to wealth, pollution, quality of housing and urban areas people are increasingly moving out of the inner city. Therefore there is a huge need to upgrade a large proportion of the building stock and urban areas.
- Urban sprawl as a result of conflicting individual demands and societal needs for less traffic, less energy consumption
- Public and commercial demand for measures against crime and terror and to mitigate consequences of accidents and natural disasters

4.4.2 Research Focus and scientific goals

- New technologies, concepts, business models and materials for resource efficient and clean buildings and urban areas based on users needs and lifecycle management
- Total lifecycle management – modelling, forecasting and operation of the build and human environment
- Integrated design tools, information systems and manufacturing technologies for high efficient buildings (energy, raw materials, water, low energy industrial processes) fulfilling users needs in terms of comfort, design and price
- Detection, identification, protection and assessment methods for safety and security of people, critical infrastructures, industrial production systems
- Urbanisation, suburbanisation and urban sprawl; Segregation and integration – social cohesion
- Remove barriers in regulations as a basis for deliberations in possible harmonization – identification & research on consequences of possible changes.

4.5 Building technology and high added value materials

4.5.1 Market/Business drivers, impacts and potential

- Quest for more carefree, durable, safe and economical products in various industrial and consumer applications to fulfil user requirements including customized properties
- Demand for sustainable growth, reduction of environmental impact: less materials, durable materials and recycle materials.

4.5.2 Research Focus and scientific goals

- Durability /rehabilitation, performance of products and structures under long-term or extreme exposure

- building technology
- New materials and design solutions, new-fibre based, high added value building products, new and modified materials and methods to bond materials into composites and structural systems
- Functional and nanomaterials using new technologies of bio, nano and it to provide new performance and value of buildings products and systems to the end-user.

4.6 Summary

In the Nibcor programme it is recommended especially to focus on the topics important for reduction of barriers to cross-boarder transfer of research, knowledge and building activities. The following three areas are seen as especially important:

- Meeting client and users requirement
- Transformation of the Construction sector
- Digital Built Environment.

4.7 Objective and action for the programme

4.7.1 Objective

To get confirmation of the main topic research areas from the Northern Dimension Steering Group and the research network.

4.7.2 Action

- To present the result of phase 1 and the proposal for the full programme of Nibcor to the Steering Group of the Northern Dimension including confirmation of the main topic research areas.
- To obtain confirmation from the research network in the initial phase of the research project portfolio preparation (see page 22).

5. Networks and partners

In all countries in the Nordic Dimension Region research in Building and Construction deliver important results for the industry and governmental bodies, participate in education of students to the sector, and participate in international cooperation. But scope, amount of research effort, strength and focus differ to some degree. This also accounts for the national partners performing building and construction research. Below is given an initial overview of the main national research actors in the field.

The overview is based on the workshop for the Nibcor working group, taking place at SBI, Copenhagen, in June 2006, and supplementary inputs from the working group.

Table 2. The Nibcor working group

Denmark Project Leader	Ms. Lone Møller Sørensen, Director Danish Building Research Institute
Secretariat	Kresten Storgaard, Senior Researcher Danish Building Research Institute
Iceland	Mr. Haakon Olafsson, Director IBRI – Icelandic Building Research Institute
Estonia	Mr. Roode Liias, Professor Dean, Faculty of civil engineering Tallinn University of Technology
Lithuania	Mr. Arturas Kaklauskas, Professor Vilnius Gediminas Technical University
Finland	Mr. Matti Kokkala, Research Director VTT Technical Research Centre of Finland
Norway	Mr. Bjørn Svensvik, Professor, Director SINTEF Bygforsk
Poland	Mr. Roman Gajownik ITB
Sweden	Mr. Bengt Turner, Professor Chair, Institute for Housing and Urban Research Uppsala University
Project Coordination Group	Bengt Turner, IBF Uppsala University and Lone Møller Sørensen, SBI
Programme Coordinator	Bengt Nyman, Director Bengt Nyman Competence AB

5.1 National research partners and networks

5.1.1 Sweden

In Sweden Research in Building and Construction are carried out on the main Universities and Technological High School. Institute for Housing and Urban Research (IHUR) at the University of Uppsala is a multidisci-

plinary research department which covers a wide variety of issues concerning housing and the built environment. Mainly financed by the university budget (75 pct) also external funding from research fund and various partners are seen, including EU programmes. In Interreg III B programmes projects in the Baltic region is carried out. In the research the institute emphasis cooperation with the other departments at Uppsala University and in other parts of the academic environment and the importance of large, coordinated projects, where a thematic and disciplinary focus is integrated. The international cooperation is encouraged and there are cooperation agreements with large research departments in Europe (Delft, Glasgow, Cardiff, York, Berlin). The Institute has in-house international journals as HTS (Housing, Theory and Society) and EJHP (European Journal of Housing Policy). The Institute is host for a regular Nordic research seminar (IBF/NSBB) and invite regularly guest researchers to the Institute. Also the Institute are heavily involved in the ENHR (European Network for Housing Research), which involves more than 100 research institutions and nearly 1000 individual members all over the world. Affiliated organisations, created by EHNR are APNHR (Asia-Pacific Network for Housing Research), ANHR (Arabic network for Housing Research), SSNHR (Sub-Sahara Network for Housing Research) and LANHR (Latin America Network for Housing Research).

5.1.2 Iceland

At Iceland research in Building and Construction is mainly delivered by the IBRI (Icelandic Building Research Institute). IBRI is an independent research institute which falls under The Ministry of Industry and Commerce. Its main activities are applied research and technical testing for the whole of the building and construction industry. The concrete division is experienced in material technology and durability and has been acknowledged as one of the leading centres in the field of rheology of cement based materials. Emphasis has been on international collaboration and cooperation and IBRI is currently a partner in eleven EU research projects funded in the 5th framework program on RTD. For the last two years IBRI has been in charge of the presidency of ENBRI (European Network of Building Research Institutes).

5.1.3 Estonia

In Estonia there are not any specialised research institutions for the building and construction sector. At the Tallinn University of Technology research are carried out with importance for the sector. Especially the Departments for Structural Design, for Building Production and for Environmental Engineering are central for the research in sector. At the Government level The Ministry of Economic Affairs and Transportation (De-

partment for construction and housing) and The Ministry of Interior (Planning Department – spatial planning) is of importance. Cooperation with other institutions and partners is carried out with Estonia University of Life Science, Estonia Academy of Arts, Tallinn College of Engineering and Estonian Centre for Standardisation.

Participation in international research projects takes place especially in Interreg programs and also in UN-programs.

5.1.4 Lithuania

In Lithuania research in Building and Construction is mainly delivered by the Civil Engineering Faculty at Vilnius Gediminas Technical University. At the Department of Construction, Economics and Real Estate Management (CEPM) researchers participate in more than twenty European (EC) and US projects. Master students from all over Lithuania are studying in three e-learning master programs: Real Estate management, Construction Economics and Internet and Real Estate Business. The master courses are given in three languages (Lithuania, Russia and English). Spheres of current research are Web-based intelligent systems for building and construction, life-long learning and intelligent tutoring systems, development of knowledge base of best practice and knowledge systems for the build and human environment, exchange and developing of new knowledge, electronic collaboration, e-cities, e-government, retrofit, facilities and real estate management, clean built and human environment, integrated building life cycle analysis, total life analysis, modeling and forecasting of build and human environment, sustainable development, innovation management, total quality management, improvement of competitiveness, sustainability, quality and safety of the built environment, fulfillment of user and society needs.

5.1.5 Finland

In Finland, VTT Technical Research Centre of Finland, carries out research for the Building and Construction sector. Competitiveness of enterprises is the key to all major research activities – and a long tradition of Public Private Partnerships in R&D funding and projects exist. VTT, Helsinki University of Technology and Tampere University of Technology are working on creating a virtual institute in the construction sector. The Ministry of Environment is responsible for buildings and the built environment, but has hardly any R&D funds available for the sector. The most important performers of research in the public sector are VTT, financed especially from TEKES (the Finnish Funding Agency for Technology and Innovation) and are organized under Ministry of Trade and Industry. A Vision for 2010 is developed by Finland's Real Estate and Construction Cluster in 2000 and TEKES has developed a Technology

Programme, which has been input for the VTT strategic programme for 2007 to 2011. Financed by TEKES as well as by other ministries are also other research institutes as the TE-Centres, where research activities in relation to Construction are carried out as well. Under the Ministry of Education are the Universities, where research in Building and Research are seen at Helsinki Universities of Technology and Tampere University of Technology. The role of national borders is disappearing in R&D policy, and an open platform approach is seen. VTT carry out R&D in cooperation industrial and business enterprises, organisations, universities and research institutions. VTT participates in many international projects and in the Finnish national R&D policy, cooperation with technology leaders like US and Japan are above everything else. EU is seen as a domestic market. VTT have had a heavily impact on the paneuropean ECTP work and participate in significant RP projects, as RoadCon.

5.1.6 Denmark

In Denmark the main part of research in Building and Construction take place in 9 universities and research institutions, including Danish Building Research Institute(SBi), Technological Institute, Aalborg University, Danish Technical University, Copenhagen Business School, Copenhagen University, Roskilde University, The Royal Academy of Fine Arts and Aarhus School of Architecture. Beyond this, research is carried out in private firms.

National R&D funding is primarily the responsibility of The Danish Research Councils. Further State Governmental Bodies, such as National Agency for Enterprise and Construction, also influence the research activities, especially by (co)funding activities.

Private firms (consulting and architecture, contractors, developers, etc) as well as trade organisations participates in networking activities related to research, and have been active in the national ECTP work. The Danish National Platform is headed by the chairman of the Danish Client Associations.

Danish research institutions participate in international EU FP projects and in the ECTP work at a pan/transeuropean level as well as in UN programmes. Participation in further international research organisations as ENBRI, CIB, ENHR are especially covered by SBi.

5.1.7 Norway

Construction related R&D in Norway is primarily performed at NTNU (the Norwegian University of Science and technology) and the two major research institutes – SINTEF Buildings and Infrastructure (merger of the previous Norwegian Building Research Institute and the construction related parts of SINTEF) and the Norwegian Geotechnical Institute

(NGI). Research is, however, also conducted at several smaller institutes e.g. linked to regional university colleges and by several of the more technology active private companies and public authorities. The Norwegian Public Roads Authorities, with their several laboratories and the cement producer Norcem (a company in the Heidelberg Cement Group) have traditionally been among the most active R&D performers outside the institutes. The Federation of Norwegian Construction Industries, BNL – organizing the majority of Norwegian construction related industry has established an innovation forum with the aim to promote construction R&D. This forum (FIB) joins together leading representatives from contractors, consultants, building materials producers, branch organizations, building owners/developers, public authorities, research institutes and universities. The FIB also acts as the HLG for the Norwegian technology platform of the ECTP, the secretariat of which is handled by SINTEF Buildings and infrastructure. National R&D funding is primarily the responsibility of The Norwegian Research Council – who is also the official representative versus the EU research programs. Besides, funding of innovation activities/close to market research programs are handled by Innovation Norway.

5.1.8 Summary

Networking is increasingly essential for the research going on in all countries in the Northern Region. The focus in research differs and potentially the research at the different institutes and countries can be complementary to each other. Often diversity in research is not followed by cooperation and there is a tendency for cooperation to take place between partners similar to each other. A need for a special effort to strengthen cooperation can be identified.

A more efficient cooperation between the research institutes to get the advantages of this diversity is seen to have the ability to strengthen the research in all counties independent of the current state and scope of research in each country. Also a will to participate in such a process of collaboration is found.

5.2 Objective and Action for the programme

5.2.1 Objective

To provide an overview of the central partners in construction and building research in Northern Dimension as a basis for the Nibcor activities.

5.2.2 Action

Mapping of research partners and their competence covering:

- public
- private
- other networks

The mapping will be done through a survey including barriers for cooperation.

6. Research project portfolio preparation

6.1 Objective

To provide a regional competence and expertise research platform to exchange ideas of projects, to orientate initiatives, to define strategic issues in research to support and facilitate the primary objectives of the action plan.

6.2 Actions

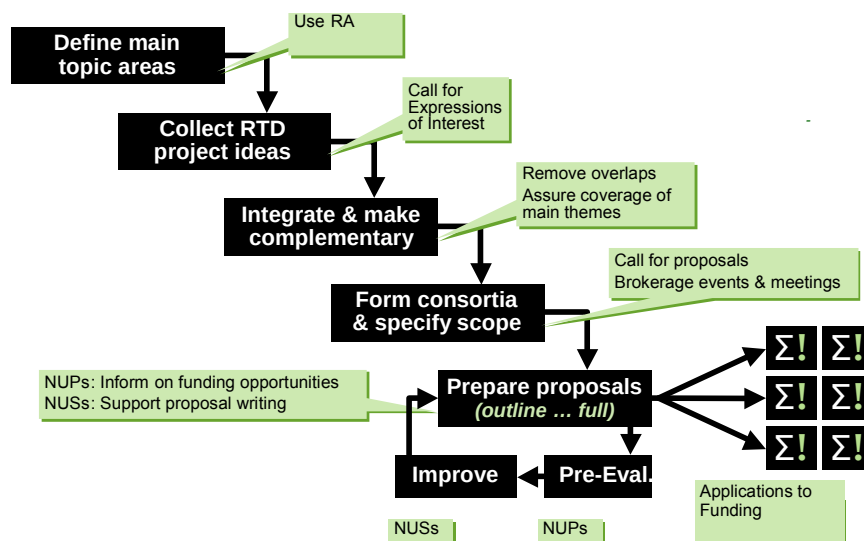
At the workshop in Copenhagen several activities for cooperation was identified, all stimulating the process of establishment of specific project cooperation. Common Action is not a problem, once a common need has been identified. The importance of industries willingness to participate and pay was emphasis as a condition for rising additional national funding as well as EU funding. A special task will be to include the industry to participate in the Nibcor activities for cooperation.

Providing a competence and expertise platform is seen as a process which includes the following activities:

- Define main topic areas (confirm and detail – action plan no. 1)
- Dissemination of opportunities for research projects
- Provide overview for funding opportunities
- Collect project ideas through joint workshops and brokerage events
- Integrate and facilitate forming of consortiums for proposals
- Support proposal writing through focus workshop
- (Application for funding)
- Workshop on projects results both intermediate and end-results.

The process of project creation is given in figure 1.

Figure 1 – The process of project creation



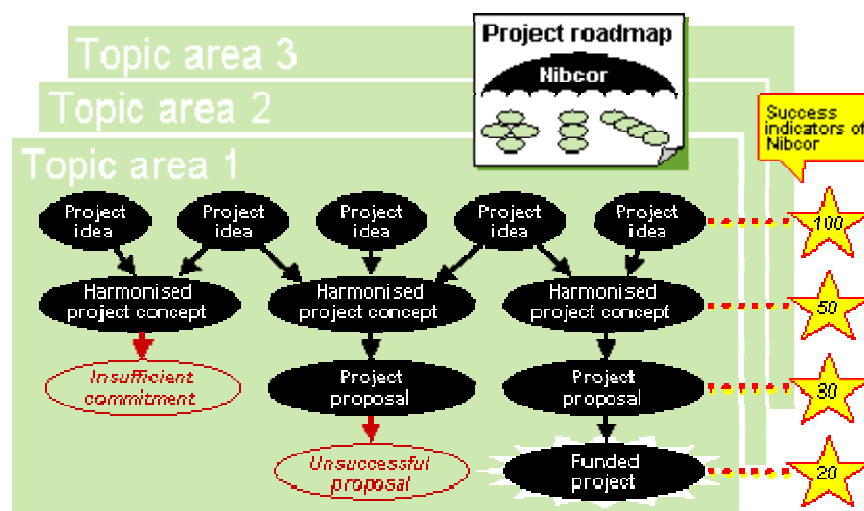
Especially the upcoming 7th Framework Programme is of interest, but also Regional and national programs may be of interest – as NiCE and the ERABUILD Programme.

Besides, other activities will stimulate the cooperation between the research institutes:

- Exchange of research staff
- Collaboration with other networks (ENHR, EURA, IFHP, Eurocities, EMF, EHF etc).

For each of the three identified topic areas (see page 9) the figure illustrates the process of combining project ideas and finding partners and funding.

Figure 2 – The process of project creation



7. Promotion and dissemination

7.1 Objective

To promote and disseminate the activities of Nibcor in order to attract network partners, to explore R&D topics and to promote projects, to facilitate communication between Nibcor members and to set up/facilitate collaboration between research partners in the region.

7.2 Actions

7.2.1 Introduction

Activities for communication is mainly web-based and include establishment of an address file of research institutes, firms, sectoral and governmental institutions, a website for the Nibcor project, e-newsletters, e-information and sharing sites of research, best practice and regulations, e-calendar of activities in the Nibcor focus areas, workshops, exhibitions and proposal activities.

7.2.2 Promotional actions

An address file

Central for communication and cooperation will be a database of relevant research institution, researchers, firms in the building and construction sector, governmental, regional and local institutions as well as trade organisations. Firms are seen as important participants in upcoming work with proposal and projects.

Leaflets

Leaflets will be produced – both in paper and in digital form, informing about the Nordic Region Plan and the Nibcor project. It will be distributed to the research communities, the relevant firms and the national, regional and local bodies.

Nibcor website

A website will be established. Following functionalities will be present:

- Information of the Nordic Region Plan, links to other Nordic Region Initiatives

- Information of the Nibcor project
- Newsletter (also distributed as mail)
- e-sharing of research: Ongoing activities and Results
- e-sharing of best practice in building and construction
- Information about Regulations. Different regulations are a main barrier for establishment of a single market for products and services.
- e-calendar for main activities of interest for the Nibcor participants, including call for partners, dates for Nibcor workshops, FP7 calls, Interreg calls, ERABuild calls – as well as other calls for national and regional technology programmes, conferences and meetings in national and international research communities as ENHP, Telecities, etc.

7.2.3 Workshops and brokerage events

Four types of workshops will be run: introductory workshops, focus workshops, proposal workshops and project workshops.

Introductory workshops

Introductory workshops are seen as an brokerage activity, where the program and objectives of the Nordic Region Plan and the Nibcor project is presented. Focus themes are presented and discussed. Other brokerage activities are seen as an integrated part of the process. This will be carried out in parallel with the first Focus Workshop.

Focus workshops

Focus workshops are established on the themes selected by the Nibcor project as well as on the results from the introductory workshops. The results and the state of the research in the different institutions and firms are presented. Joint partnerships are established both concerning upcoming proposals – and articles and publications from the workshops.

Proposal workshops

Proposal workshops are established for selected themes in accordance with calls – from FP7, ERABUILD, Interreg, National and Regional technology programmes e.a. At these workshops important part of the joint work with proposals can be carried out.

Project workshops

Project workshops are established in selected themes where support for projects is obtained. Important output will be dissemination of intermediate and end results from the projects.

Exhibitions on research and commercial cooperation/ commercial initiatives/drives.

Will be carried out in conjunction with Nibcor workshops and other conferences.

Central in the Nibcor project is the cooperation between research and firms in the building and construction sector. It will be important to let the results from Nibcor projects as well as from the participating commercial partners be shown in the different countries and markets. Information about different cultures, workplace regulations, housing regulations, best practice, products etc.

Study visits and guest researchers

Study visits can be established, often in relation the workshops. Guest researchers and guest staff-members at firms will be an important an effective mean to increase cooperation and sharing of knowledge about markets, regulations and research.

These activities are established especially to support actors in the network without other funding possibilities.

8. Organisation and Management

8.1 Objective

To manage successfully the Nibcor programme as described in the previous part of the action plan.

8.2 Actions

The organisational structure of the Nibcor programme is given below.

8.2.1 Working Group and Advisory Panel

The working Group is central in the project. They will be central element in the national research communities concerning international cooperation and production of international proposal.

They will obtain significant knowledge about the international dimension concerning the building and construction sector in all the focus areas the Nibcor project cover. They will be the advisory panel on research in construction and building on national, regional and European level and advise relevant decision makers.

8.2.2 Focus Groups, Proposal Teams and Projects

For each of the Focus Themes a workshop will be organised. The participant in these will function as Focus Groups.

For some of the Focus Group, Teams for making proposals will be established. Key persons in the Focus groups and in the Proposal teams may be members of the Working Group, the Secretariat or the participating researchers. Some of the Proposals will result in supported projects, having projects leaders, WP leader etc, all financed by their funding programmes. Project Workshops will be established organised by the secretariat in cooperation with the project, the Steering Group and the relevant Working Group Members.

8.2.3 Steering Group

The Steering Group meet twice, coordinate and adjust the activities and report to the Nordic Region Programme Coordinator. As the existing Steering group.

8.2.4 Secretariat

Will continue to be located at SBi.

8.2.5 Project Programme leader

Lone Møller Sørensen, Director
SBi, Denmark.

8.2.6 Contact to international institutions

Important will be the synergy which shall be established in corporation with existing international Funds, programmes and networks.

Contact to: FP 7, ERABUILD, ENHR, ENBRI, ECTP, Nordic innovation Centre and TeleCITIES.

9. Time schedule

9.1 Time schedule

Start of project:	November 2006
Survey, address files etc.	Nov – Dec 2006
Website	Nov – Dec 2006
Newsletter, e-sharing	Continuing
Leaflets	Dec. 2006
Workshops:	
Introductory Workshop (1)	Jan. 2007
Focus Workshops (2)	Jan. 2007; Jan 2008
Proposal Workshops (4)	Marts 2007, Oct 2007, Febr. 2008 , June 2008
Project Workshops (2)	Marts 2008; Nov 2008
Coordination Workshops (2) (Working group) parallel with Focus Workshops	Febr. 2007; Jan. 2008
Exhibitions (parallel with Project Workshops) (2)	Marts 2008; Nov. 2008
Study visits	Parallel with workshops
Guest Staff/researcher	cont.

10. Dansk resumé

Høje priser, lav konkurrence og orientering mod lokale markeder karakteriserer byggesektoren i dag. Det antages, at en mere transparent og harmoniseret byggemarked i den nordiske region vil forbedre de enkelte markeder i regionen og reducere huspriserne via en reduktion af byggeomkostningerne. Dette er formålet med handlingsplanen „*Increased exchange in the building sector between countries in the Northern Dimension region*“ under *Nordic Council of Ministers*. Den nordiske region dækker Danmark, Estland, Finland, Island, Letland, Litauen, Norge, Polen og Sverige.

Samarbejde og udveksling af viden er vigtige præmisser for at facilitere handel og mobilitet og stimulere tværnationale byggeaktiviteter. Forskning og udvikling spiller en vigtig rolle i denne kontekst, idet de bidrager med undersøgelser, delt viden og udvikling af ny viden.

Et større og mere transparent marked vil give nye muligheder for forskning og udvikling af processer, produkter og services, og dermed både give nye muligheder for øget produktivitet i byggesektoren, såvel som forbedre forståelsen og opfyldelsen af bruger- og samfundskrav til bygninger og det byggede miljø.

Dette projekt, Nibcor, er tænkt som et projekt med to faser. Denne rapport beskriver resultaterne af den første fase, der har til formål at udvikle et samarbejdsprogram for et netværk til fælles forskning og udvikling indenfor handlingsplanens rammer.

Der eksisterer et antal regionale og europæiske forskningsinitiativer vedrørende netværk og støtte via forskningsprogrammer i byggesektoren. Selvom visse af disse programmer har elementer, der kunne understøtte handlingsplanen, er der ingen af disse programmer, der har samme forskningsmæssige formål, som denne handlingsplan.

Derfor er udviklingen og etableringen af et samarbejdsprogram for et regionalt netværk for fælles forskning og udvikling en central del af handlingsplanen. Samarbejde med relevante netværk og støtteprogrammer vil dog være en vigtig del af Nibcor projektet. Et fælles forsknings- og udviklingsnetværk i regionen vil derudover styrke forskningen i regionen og dermed udgøre en frugtbar platform for indflydelse på og mulighed for støtte i forhold til de regionale og europæiske forskningsprogrammer.

Via en workshop og korrespondance med en national repræsentant fra hvert land i den nordiske region blev tre forskningsområder udpeget som centrale fokusområder for Nibcor:

- Opfyldelsen af kunde- og brugerkrav
- Transformationen af byggesektoren
- Det digitale byggede miljø

Disse blev valgt som vigtige forskningsområder i relation til reduktion af barriererne for tværnational udveksling af forskning, viden og byggeaktiviteter.

Endvidere har en indledende scanning af forskningspartnere i den nordiske region givet et foreløbigt overblik over forskningspartnere. Dette viser et potentiale for øget forsknings- og udviklingssamarbejde, for såvel samarbejds partnere med en lignende forskningskompetancer som med komplementære forskningskompetancer.

Formålet med fase 2 i dette projekt er, at etablere et regionalt netværk for fælles forskning og udvikling indenfor byggeriet, der dækker de forskningsområder, handlingsplanen udstikker. Denne rapport identificerer en handlingsplan for etableringen af et regionalt netværk for fælles forskning og udvikling, der dækker:

- Vision og forskningsområder – Bekræftelse af centrale fokusområder
- Kortlægning af forskningspartnere og barrierer for samarbejde
- Forskningsprojektportefølge forberedelse – fra udveksling af ideer til støtte og facilitation af fælles forskningsinitiativer
- Markedsføring og udbredelse – aktiviteter, der støtter og faciliterer netværket.

11. Appendix: National input on research for Nibcor from participating countries

As a central part of the initial phase of the project a workshop was held in Copenhagen, June 26th 2006 with national representative of the participating countries of the Northern Dimension Region.

The following research areas were proposed as topic areas for the Nibcor programme.

Sweden

- Urbanisation, suburbanisation and urban sprawl
- Mobility and demographic changes
- Housing wealth and demand studies
- Building cost analysis + management studies
- Costs of building and planning regulations
- Affordability and sustainability issues
- Segregation and integration –social cohesion
- Financial integration and guarantee systems
- Methods–GIS, regression methods, monitoring etc.

Iceland

- Sustainability
- Durability / rehablity
- Housing cost –competition
- Building technology
- Construction process
- IT in construction

Estonia

- impact of shadow market/economy
- effectiveness of supervision (procedures!)
- implementation of the new procurement methods (BOOT, BOT)
- possibilities of introducing different guarantees for the clients/residents

Lithuania

- exchange and developing of new knowledge,
- development of knowledge base of best practice and knowledge systems for the built and human environment,
- harmonisation of building regulations and legislation,
- free mobility of labour and cross-border construction activities,
- fulfilment of user and society needs,
- improvement of competitiveness, sustainability, quality and safety of the built environment,
- technological development,
- internal e-integration in the construction sector,
- electronic collaboration,
- retrofit, refurbishment and facilities management,
- clean built and human environment,
- transparent markets in terms of housing demand, economics and demography,
- development and support of a single European market in the building and construction industry,
- life-long learning and intelligent tutoring systems,
- Web-based intelligent systems for building and construction,
- integrated life cycle analysis,
- total life analysis, modelling and forecasting of built and human environment
- new materials and design solutions,
- new opportunities for increasing productivity in construction and building sector,
- single regional market,
- sustainable development

Finland

Digital Built Environment

- New integrated construction processes with dynamic supply networks
- Information management over the lifetime of the products and systems in the built environment
- Integrated product models: interoperability, simulation and visualization
- Ecoefficient, healthy and safe environment for people and businesses
- ICT-based services for mobile users; telematic services for transport of people and goods
- Ubiquitous environments: sensor networks combined with adaptable materials.

Functional and Nanomaterials

- Surface functionalisation, adaptive and active materials, hybrid materials
- Modification of materials by nanotechnology
- Bionanomaterials and biosensors
- Nanoelectronics and photonics, polymer nanocomposites for printable electronics.

Technology in the Community (safety and security, building performance, transport systems and networks)

- Detection, identification, protection and assessment methods for safety and security of people, critical infrastructures, industrial production systems
- Energy-and ecoefficiency and lifetime management of the built environment, technologies for integrated management of indoor environment
- Transport and traffic systems based on user requirements: services, products, and safety solutions; development of concepts and assessment methods.

Applied materials

(materials for machinery, buildings and consumer products, upgraded fibre-based products, performance of products and structures under extreme exposures)

- Materials for machinery, buildings and consumer products: new and modified materials and methods to bond materials into composites and structural systems
- New fibre-based products; added value wood products
- Performance of products and structures under long-term or extreme exposures.

*Denmark**Meeting clients and users requirements*

- Understanding and defining users future needs in a business perspective
- Value-based procurement
- Client leadership/ clients as change agents
- Benchmarking, best practice and user feedback
- Make market information and “rules of the game” accessible to potential actors.

Sustainability

- New technologies, concepts and materials for efficient and clean buildings and urban areas by an integrated design approach (indoor environment, design, functionality, price)

- Remove barriers in regulations as a basis for deliberations on possible harmonization –identification & research consequences on possible changes
- High added value construction materials.

Transformation of the construction sector

- New integrated process (partners, industrialization, productivity, claims by delivery)
- ICT for construction–process and products
- Competence requirements and mobility of resources
- Legal barriers in public procurement and for public-private partnerships etc.

Norway

- Climate change – consequences and precautions for the built environment
- Under ground technology
- Increase energy efficiency in buildings
- universal design of the built environment
- Concrete Innovation centre – COIN at SINTEF Byggforsk/NTNU
- Advanced cementing materials
- Improved construction technique
- Innovative construction concepts
- Multifunctional design.

Based on the workshop discussions, topics which contribute to reducing barriers or knowledge of barriers for the cross-border transfer of research, knowledge and building activities was decided to be given priority.