Diffusion and implementation of innovation in construction industry: Case studies for an institutional framework

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Abstract

Emerging countries have to develop their own specialised institutional frameworks in order to diffuse and foster innovation in their construction industries. In establishing new institutions, developing countries can take the industrialized countries as a model. However, the differences should be analysed in detail, and the model developed should be adapted to the environment in which the new institution will work. Examining the UK construction industry within this perspective, in this study, universities are taken into consideration as one of the major elements of innovation diffusion and two of the enterprise centres of University of Salford, CCI and SCRI are analysed with the case study method in order to reveal its success factors with an institution building conceptual model. As a result, the important role of these centres in fostering innovation in the construction industry is explored and lessons are driven for emerging countries on how to develop appropriate institutional frameworks.

Keywords: construction, innovation, institution building

1. Introduction

Higher education institutions play a significant role in the production of knowledge and stimulation of innovation within the industry. From the perspective of the construction industry, however, the literature indicates the poor relationship between the universities and the industry. The Fairclough Report [1] describes the construction industry as wary of academia. In order to overcome this barrier for innovation, engagement mechanisms play a crucial role in bringing together the knowledge of the higher education and the construction industry. Four types of engagement mechanisms are identified by Lambert [2] in the UK context: Personal contacts and staff exchanges (such as visiting professors, guest lecturers, or industry secondments); business support and consultancy; collaborative and contract research; establishment of joint ventures and spinout companies. Building specialised institutions is a more holistic approach which comprises a variety of mechanisms designed for bringing together the universities and the industry. Therefore, good practices of the developed countries can be successful models for developing ones.
In this context, the success factors for an institution in diffusing and implementing innovation will be explored according to an institution building model and the applicability of this model for developing countries will be set up for further discussion.

2. Innovation and the Construction Industry

Competitive environment of the world economies is getting more severe as globalization changes the world. Developing countries are challenging developed countries for the value added products and high-tech industries. In this severe environment of competitiveness, even successful companies of the past are trembling against the rapid change we face.

Porter [3] states that, during the past 20 years, western companies have responded the competition with continuous improvement. Companies are remaining competitive by information technology (IT) investments, re-engineering, Total Quality Management (TQM), lean production and other similar techniques for optimizing their productivity. He also suggests that companies have to offer value creating and differentiated new products for creating unique competitive positions by integrating all their competencies.

In addition to these competitive needs, spectacular achievements of the high-technology sectors of the economy have driven interest in the generation of new ideas and its implementation, i.e. what is now being considered innovation [4]. Differentiation of products, processes and services in an innovative way is a major key to sustainability and competitiveness for the market share. This differentiation may be achieved through a completely new product/process or an adaptation, whereas it can be achieved by developing an existing product/process or service.

In this context, there are several different definitions of innovation reflecting its principal characteristics. Rogers [5] defines innovation as “…an idea, a practice or object that is perceived as new by an individual or other unit of adoption”. He argues that the idea should be to new to the observer rather than being newly discovered in that period of time. Freeman [6] defines innovation as “…the actual use of non-trivial change and improvement process, product or system that is novel to the institution developing change” in his popular definition which is also used by Koskela and Vrijhoef [7] and Slaughter [8]. EU and OECD legislations define innovation as “…the implementation of a new service or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organisation or external relations.”.

The definition of innovation in the construction industry is not far away from these above. Tatum [9] highlights the subjectivity of being new, and defines innovation as the first use of technology for construction firms. Toole [10] used the definition of “Application of technology that is new to an organization and that significantly improves the design and construction of a living space by decreasing installed cost, increasing installed performance, and/or improving the business process”. Construction Research and Innovation Strategy Panel (CRISP) defined innovation as “The successful exploitation of new ideas, where ideas are new to a particular enterprise, and are more than just technology related – new ideas can relate to process, market
or management”. “The successful exploitation of new ideas”, which is also used by the Department of Trade and Industry (DTI), is widely used and accepted in the construction industry and academia in the UK.

Academicians seem to share an increased understanding of the differences between construction and traditional manufacturing sectors. Traditionally, product suppliers perform similar to other industries to improve the performance of their products or the process creating them [11]. However, construction activities are project based which have a discrete nature and many different types like roads, bridges, houses, airports. One of the major differences between the overall construction process and most of the other industries is that in the construction sector, design and production are often separated. In most of the industries, design and application are integrated or performed in the same company. In construction industry, design and construction are sub-divided and fragmented. Contractors usually build projects designed by design professionals. Diverse and discrete nature of these projects makes long term development and improvement very difficult. Contractors are reluctant to spend money on anything rather than the immediate needs of individual projects. Even most of the employees are hired for specific projects and firms are being reluctant even for training their work force, because of the possibility of loosing their staff to another company for the next project. In these circumstances research and development are usually being neglected. This market structure seems to be the main barrier for the long term improvement and innovation in construction.

In literature, Construction industry has been examined with some concerns about its innovativeness but these concerns have motivated some researchers to pay attention on the issues and solutions for the construction industry [11]. Although the level of innovation is considered as low compared to other industries and poorly innovative, potential of the industry to innovate is also acknowledged [8,12]. Winch [13] argues that the evidence for this perception is usually based on comparative industrial performance data which is not suitable for construction, as argued above. Hence, like any industry, construction needs to increase the rate of innovation [8].

Most of the literature on technical change and innovation focuses on creation and development, but the real gain will be achieved when they are widely spread and widely diffused [14]. Moreover, innovation theories and diffusion is extensively discussed in the literature but most of these discussions treat diffusion as a non-integral part of the innovation process. Innovation theory and particularly diffusion theory has a gap for project-based sectors such as construction [15].

3. Institutional Development for Innovation in Construction

Without diffusion, innovation would have little social or economic impact [14]. Hall [14] and Widen [15] also state that diffusion is not the means by which innovations become useful by being spread throughout the population but it is also an intrinsic part of the innovation process: Understanding the diffusion process is the key to understanding how conscious innovative activities conducted by firms and governmental institutions (activities such as funding research
and development, transferring technology, launching new products or creating a new process) produce the improvements in economic and social welfare that are usually the goal of the activities. For entities which are “catching up”, such as developing economies, backward regions, or technologically laggard firms, diffusion can be the most important part of the innovative process [14].

Existing institutional structures in developed countries have strong influences on the process of construction like “invisible hands”, but this influence can be benignly as well as malignly [16]. Industrialised countries have an evolved construction industry with specialised institutional frameworks where it relies on the interaction of a variety of institutions, each with its own specialist priorities like training and development of professional skills, organisational management, regulating the industry through contractual procedures, standard setting and implementation. Developing countries have to create their own frameworks by establishing dedicated institutions [17]. On the other hand, besides the strong need for institution building in developing countries, there is a possible danger of creating unwieldy bureaucracies.

In order to find the success parameters in construction industry development and answer questions like how successful institutions fulfil their client’s needs, the institutional factors that carry them to success and their dynamic linkages in their operational environment should be analysed well. Operational environment of organisations are much more complicated than what it seems because they contain both man-made and physical elements. In contrast with the physical environment, man-made-elements tend to be more “irregular, nonrecurring, irrational and unpredictable” [18].

Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints and the framework that shape human interaction. World Bank’s Building Institutions for Markets Report [19] defines institutions as the rules, enforcement mechanisms and organizations supporting market transactions. Policies affect which institutions evolve – but institutions too affect which policies are adopted. The major role of institutions in a society is to reduce uncertainty by establishing a stable structure to human interaction.

In institution building one size does not fit all and guidance is always needed on how to develop appropriate institutions by building on the successes of the countries and the good practices, and learning from the failures. But not withstanding the uniqueness of countries, analysis of country experience does hold important lessons for institutional development. There are roles for private and public, and national, local, and international actors. The World Bank’s Report [19] distils lessons on building effective institutions. Importance of the supporting institutions, human capabilities and available technology that exist are underlined. Countries are invited to innovate to identify institutions that work and that do not as they would gain from expanding successful public innovations. Connecting communities through open information flows will help create the demand for the institutions and the forces for change within the countries and promoting competition will modify the effectiveness of existing institutions and create demand for new ones.
In establishing new institutions, developing countries can take the industrialized countries as a model. However, the differences should be analysed in detail, and the model developed should be adapted to the environment in which the new institution will work. Complementary institutions, such as those promoting transparency and the enforcement of laws, existing levels and perceptions of corruption, costs relative to per capita income, of establishing and maintaining institutions, administrative capacity including human capabilities and the technology available should be considered as the main differences that would produce dissimilar results.

Both existing and newly transplanted institutions can be more effective in developing countries if they are systematically modified to take these differences into account. Institution building is generally a cumulative process, with several changes in different areas building up to complement and support each other. Even small changes can build momentum for future changes, the whole is greater than the parts and even moderate progress in parts can contribute to a better system. Institution builders can be diverse such as policy makers, business people, or community members. Institutional reform is not just the preserve of national governments. Individuals and communities, entrepreneurs, companies, organizations can build institutions, often in partnership with each other. National governments may initiate reform or may simply respond to pressures from the private sector or from external actors.

Developing countries have to find ways to accelerate this evolutionary process, and this usually implies the establishment or development of dedicated institutions. Evidence has been accumulating that such institutions can yield significant benefits in terms of improved national construction capacity and performance, provided they focus realistically on the ambitions and needs of their clients rather than engage in fruitless empire-building (or academic status-building) for its own sake. The qualification is important, since there are other examples of institutions which have failed to understand and meet the needs of their clients, and later foundered through a combination of inertia and the weight of self-imposed bureaucratic procedures. The question to be asked here is if these institutions are accepted as successful in terms of their clients’ needs and priorities, how they managed it and whether the seeds of the success be identified and planted elsewhere. In order to answer this question, it is necessary to analyse the institutional factors which lead to success in this specialist area of institutional development and in particular examine the dynamic linkages that must exist between such an institution and its operational environment [17].

4. Research Methodology

This study is structured as a multiple case design with embedded units of analysis.

Case study approach is considered to be week and dubious [20] by some researchers. However other researchers have regarded this method as effective for appropriate conditions. Cook et al [21] defines this strategy as a fundamentally different research strategy with its own design. This approach allows investigators to gather the holistic and meaningful characteristics of real life events Yin [22].
Evidence for case studies may come from six sources: documents, archival records, interviews, direct observation, participant-observation and physical artefacts [22]. As the various sources are highly complementary, a good case study should use as many sources as possible. Yin [22] explains extremely important characteristics of high-quality case studies as: using multiple, not single source of evidence, creating a case study database and maintaining a chain of evidence where possible.

Institutions can be placed in three broad categories: learned societies, trade associations and training, research and development institutions. This third type, training, research and development institutions are more at the centre of interest of this paper as an institutional category, and the case studies are chosen accordingly.

These case studies rely on multiple sources of evidence. These sources are: documentation, archival records, interviews and direct observations. Agendas, announcements and reports online from the web page of Centre for Construction Innovation CCI (www.ccinw.com) and Salford Centre for Research and Innovation SCRI (www.scri.salford.ac.uk) are used as present documentations. Director of CCI, Mr Andrew Thomas is interviewed. He explained the Centre’s past, targets set, activities and services given, their relationship with public and private bodies and the future predictions for CCI in a two hours open-ended interview. Most of the documents which are not accessible on the internet are provided by him. Director of SCRI, Mr. Carl Abbott answered open ended questions in a meeting and provided SCRI’s last annual report of 2006 for further information. Academicians from the University of Salford like Dr Peter McDermott and Prof Mike Kagioglou filled some gaps by their valuable contribution. Participation to a Twilight Seminar-Innovating in the built environment, held on the 25th of April by CCI, added direct observations to this framework. Finally, a previous case study on CCI “Facilitating Innovation-The Role of CCI” by Carl Abbott and Stephen Allen [23], was both informative and testimonial partially for this study.


4.1 Esman’s Model

Milton J Esman [24] captures the essential elements of the institutional process in his conceptual framework “The institution building universe”. These essential elements are characteristics of the institution itself, institutions linkages with its environment and purposeful exchanges in between: “transactions” (Figure 1).
Five major variables of the institution are listed as follows:

- **Leadership**: An innovative organisation needs strong leaderships to reach their aims; especially when they are new. Every single organisational procedure should be set from the beginning, from a draft of ideas. This appears to be the most important factor an organisation should have.

- **Doctrine**: Defines the institution’s aim to achieve, what the institution stands for and in relation with the leadership, its values and style.

- **Programme**: What the institution does to achieve its goals, services and functions defining the resource needs.

- **Resources**: The main expenditure of the institution-building is usually the staff they recruit.

- **Internal Structure**: Institution’s management framework. As it has strong cultural dimensions, it should be devised to suit the needs of its local environment.

As the existence of an institution strongly depends on its relations with its environment, these links are considered in four categories:

- **Enabling linkages**: Vital relationships which give the institution its legality, purpose, resources and form.

- **Functional linkages**: linkages with complementary or competing organisations that support or help in general to achieve objectives.

- **Normative linkages**: These are relationships with institutions which have similar interests and purposes. Such relations can be either friendly or on the icy side.

- **Diffused linkages**: Individuals or groups who are not directly related with the Institution but may have big impact for reaching the desired objectives with their influence and create acceptability. Project champions can be an example for this kind of relationship.

### 5. Case Study 1: Centre for Construction Innovation (CCI)

CCI was formed in 2000 for the promotion of the Rethinking Construction agenda in the North West region of UK. North West Development Agency NWDA and CCI was partnering in the first years of the establishment. CCI is a ‘not for profit’ enterprise and one of the three enterprise centres of University of Salford’s School of Built Environment.
• **Leadership:** Centre is being managed by an operations director, an associate director and a general manager. CCI has a strong leadership, directed by a professional from the industry who has a successful past and an extensive knowledge background. He is the one who provides leadership and directs the team strategically. He is the second director of the centre after Dennis Lenard but he has been within the centre from the first day of its foundation. Co-director of the Centre is an academic who has publications on supply chain management, decision support systems, trust, and implementing innovation in construction. Dealing with the centre’s projects and supporting the project managers is the duty of the general manager and he is also responsible for the future work.

• **Doctrine:** CCI is formed to promote the Rethinking Construction agenda derived from the Egan Report, in the NW region. Whilst this started with the 'Rethinking Construction' agenda it has now been expanded to wider issues of the built environment such as sustainability, design, procurement, skills and process. The main aim is to provide industry and its clients act collectively to improve performance in the means of productivity, profits, defects and reduced accidents, through the application of best practices and create a ‘movement for change’. The Centre was also positioned as an organisation for the diffusion of innovation created by the research in its academic sister SCRI.

• **Programme:** CCI has a wide range of activities like training, coaching, consultancy, mentoring, procurement and event management services. Training programmes include Respect for People, Better Public Buildings, Sustainability and Environment, Lean Construction, KPI & Benchmarking, Supply Chain Management, Procurement Value Based, Contractual Agreements, Whole Life Costing, Integrating Teams and Post Project Review. Other main service modules are: Procurement Coaching, Partnering and Team Integration, Bid Coaching and Debriefing, SME Capacity Building and KPI. The Centre also has some ‘products’ like 3D visualisation / VR suite aiming to present practical uses of visualisation in various industries from construction to retailing, showing ideas on how 3D visualisation can implemented for different economical and consultation issues; on-line KPI management tool to allow companies to store and analyse their own data supported through consultancy and advice. The Centre hosts 6 of the region’s Best Practice Clubs, manages the CUBE – regional ABEC Gallery and Seminar space and participates in many AE / Industry Link for University Research.

• **Resources:** CCI is not a large organisation. Total number of employees is currently about 20, including management team, project managers and administrative staff. 9 of them are Project Managers, 3 of them are administrative staff. They also have gallery assistants for the ABEC gallery and seminar space. The ratio of the professionals to the academics is %70 to %30. Academics and postgraduate students also participate in process and services. There is a ‘ring-fenced’ structure between the centre and the University of Salford. This structure enables them to invest surpluses for future research and development. Annual turnover is between 1.5 to 2 million Pounds. Main amount of this turnover comes from ERDF, NWRDA, Construction Industry Training Board (CITB), Manchester City Council (MCC) and Constructing Excellence. Apart from these, sales of the products and services developed by CCI have an important share in the total turnover. 3D visualisation / VR suite and on-line KPI engine are two of the most money-earning ‘products’ of the Centre. Apart from the listed above, at least half of the income is from the other small projects and consultancy services. The centre is trying to secure itself by bidding for new opportunities continuously. The main expenditure of the Centre is its staff, which is common for similar institutions all over the world [17]. Termination of the ERDF funding in 2008 will be challenging for
the near future. A replacement should be found in the near future, to secure the Centre’s human resources and activities.

- **Internal Structure:** Being a small organisation, CCI does not have a complex organisational structure. The Centre is guided and advised by a non-executive Board. The Board consists of representatives of University of Salford and other academics, representatives of other organisation’s (like Northwest Development Agency, Constructing Excellence, CITB and so on), contractors and even clients who all have an influence on the Centre’s activities. They come together bi-annually and focus on the sectoral activity and interaction of the CCI. Under the management level, there are two functional divisions: Project Management and Project Support. The centre has nine Project Managers (PM), each of them experts of their field. Every PM runs projects and service modules of his/her own interest. However, the team work approach adopted by CCI is also leading them towards supporting other projects of expertise, running under the initiative of other colleagues and work together as equal parties in the workshops. Administrative staff including an events manager and exhibition assistants are in the Project Support section.

- **Linkages:** In many ways, CCI case study is a study of linkages. The Centre has strong relationships with every stakeholder in the NW construction industry with a contact database of 14,000 individuals and 2300 companies of varying sizes. The number of people the centre engages through its many activities in a year is over 2000. The fact that it was founded, and is governed in partnership by academia, members of industry and public bodies gives CCI strong enabling and functional linkages. Its educational programmes involve significant number of members of academic institutions and professionals from the main sectors of the industry, thus enhancing the functional linkages and promoting normative ones. Through the development of the ‘Rethinking Construction’ agenda CCI has become a key provider of advisory and grant aided services to the construction sector. The Centre is now promoting influence of a powerful agenda-rethinking construction and is promoting these agendas for the UK construction industry. CCI keeps its good relations with all the participants of the Industry and is part of a wide industry network including research centres, governmental and regional policy bodies, training organisations, professional organisations like CIC, RICS and RIBA as well as private sector companies and clients. The Centre is now at a stage of establishing both national and international franchises.

### 6. Case Study 2: Salford Centre for Research and Innovation (SCRI)

The Centre has been established since January 2002, and it brings together a diverse group of leading international academics from the schools of Construction and Property Management, Information Systems Institute and Art and Design. SCRI is positioned within the most highly rated Built and Human Environment (BuHu) research institute in Britain. SCRI is collaborating closely with more than 60 national and international companies and institutions, representing all elements of the supply chain. The Centre develops industry relevant and appropriate research-based processes, management and operational frameworks, and Information Technology solutions in a holistic, multi-disciplinary, integrating and inclusive manner.

- **Leadership:** SCRI is managed by the integration of four committees. The Executive Committee is responsible for the overall management of the Centre and it comprises the Chairman, Director and the Centre Manager. The Centre Manager has changed recently
as the previous manager is appointed as professor in University and now co-directing SCRI, with responsibility for Health and Care Infrastructure Research and Innovation Centre (HaCIRIC). The Executive Committee meets as and when need arises.

- **Doctrine**: SCRI is a major influencer of the international research agenda. According to the Centre’s vision and strategy statement, they are targeting an institution that will reveal the long term needs of the industry and society to challenge current thinking and develop integrated solutions as well as exploiting research outputs. They are helping create a built environment for society that will facilitate future aspirations and compares well with world-class standards in the provision of built environments. Centre’s industrial perspective is a construction industry that is socially responsible, sustainable, innovative, diverse and flexible. They are actively engaging with the agendas of national and international academic and industrial communities. These engagements create sustainable strategic alignments. In this context, they are addressing selected research areas in which SCRI has international intellectual leadership. In order to achieve these goals, they are operational to be recognised as one of the leading multidisciplinary centres in the built and human environment globally, trying to increase the value set on the construction by society. They are regularly revising the vision and strategy of the Centre are being revised regularly with workshops, scenario planning and vision development activities.

- **Programme**: Consistent with the doctrine of the Centre, research is conducted with four themes: process, people, IT and integration and five programmes that are: revealing long term needs, challenging current thinking, developing integrated solutions, building research capability, exploiting research outputs. Under the IT theme SCRI develops its integrated IT platform. They work on tools for measurement of work in progress on site and technology foresight. In the process theme, they are focused on research into a better understanding of design process, health outcomes of the built environment, agile project management, production control in construction and the incentive flow down in complex product service projects. People theme involves research such as conflicting policy objectives, and future policies. In the integration theme, the Centre has successfully applied the development of a new centre dealing with health and care infrastructures. Health and Care Infrastructures Research and Innovation Centre (HaCIRIC) has a high potential as it is addressing an important field of research in which recent work is far from convincing the rising requirements. In this context, SCRI has a number of collaborative research with other leading research centres and industry partners. Researchers of the Centre are also involved in the teaching within the University. This is a policy of the Centre both for their careers and dissemination of the work undertaken in SCRI. The Centre organizes many seminars and conferences like SCRI forum and the Annual International Research Week. SCRI forum brings together a wide range of industrialists and key academics enabling them to discuss range of issues. Annual International Research Week brings together researchers from all over the world and they find the opportunity to represent their work to other researchers and also people from academia. This event makes valuable contribution to the researchers work as well as providing a fertile ground for new projects.

- **Resources**: Under the steering Committee, SCRI has 2 different “teams” which are management team and research team. Management team comprises centre chairman, centre director, centre co-director, centre manager, lead investigator, EPSRC star recruit coordinator, centre administrator, assistant administrator, academic enterprise-industry engagement coordinator. Research team involves 15 Investigators, 18 researchers, 10 associates and 15 academic associates. The Centre also has 3 support personnel. SCRI is funded by the Engineering and Physical Sciences Research Council (EPSRC).
have been funded 2.950.000 GBP for the 2002-2006 period as Salford Innovative Manufacturing Research Centre (IMRC). Renewal of this funding was a total of 4.950.000 GBP for another 5 year period (2007-2011). This amount is expected to be the last full funding. There are also various contributions to the Centre from project partners and collaborating companies. Contributions both in kind and cash have a total amount of around 2.150.000 GBP since the date of its establishment.

- **Internal Structure**: SCRI is managed by a group of integrated committees. Steering, Executive, Management and Research committees are acting to enable a constant dialogue between the members of research and administration and to certify a transparent management and effective decision making system. Steering Committee embraces key individuals of academia and industrial sectors, both from the UK and abroad. It is responsible to improve the Centre’s activities and portfolio as well as developing its strategy and vision. This committee includes the Centre manager, Director, Co-director and consultants with a total number of about 20 people. SCRI Executive Committee involves the Chairman, Director and Centre Manager. It is the board that is responsible from the overall management of the Centre and reports to ESPRC on progress, finance and human resources. Structure of this committee is recently changed, altering the previously existing Management and Extended Management Committees that existed before in order to accelerate the routine decisions. The Extended Management Committee is changed and titled as the Management Committee which is responsible for the academic leadership and strategy of the Centre. It is established to ensure transparency and for greater engagement with academicians. Co-director of CCI is also a member of SCRI Management Committee. And finally the Research Committee provides a forum for all members of SCRI to discuss research issues as well as workshops where issues like research methodology, theory development etc. are debated.

- **Linkages**: The SCRI chairman is a member of European and National Technology Platforms (ECTP and NTP). That ensures the Centres international influence but also SCRI’s research agenda to be strongly influenced by international issues. Their research under the Revaluing Construction theme has influence on construction strategies of both UK and EU and they lead in many CIB workgroups internationally. SCRI is the highest rated Built and Human Environment Research Centre in the UK. Multi-disciplinary research landscape of the Centre includes many activities within the University of Salford. Research Institutes like IRIS and Adelphi and other IMRC centres and institutions as well as some project groups they are involved are closely linked to each other in the SCRI’s research area. They have strong relations with industry intermediaries that diffuse knowledge from academia. Centre for Facilities Management (CFM), Construct IT (CIT) with many others are examples of such intermediaries. The other case study of this paper, Centre for Construction Innovation (CCI), is one of these centres as positioned to diffuse and implement the research of SCRI. Teaching activities within the University forms the Centre’s linkages for teaching. They are in masters training, courses and they work with Education in the Built Environment (CEBE) as well as their research into teaching. Relations with government and policies, such as Regional Development Agency (RDA), ERDF regionally, DTI nationally, EU and CIB internationally complete the picture of linkages.
7. Conclusion

Centre for Construction Innovation is an institution established and formed with the influence of the reports commissioned by both the Government and industry, towards enabling the construction change agenda in the Northwest region of UK. Affiliated to the University of Salford, the Centre transfers knowledge and acts as a hub for the industry. They bring together research and industry and help working in close partnership with other agencies to deliver knowledge, skills and services to all members of the construction supply chain; from clients through to construction delivery teams and product suppliers. CCI is a sound example for diffusing and fostering innovation in the construction industry. The Centre has a flexible structure that can easily adopt the market conditions of the construction industry.

SCRI, on the other hand, have a strong vision to reveal and build research competencies and capabilities. They are trying to challenge the current way of thinking, exploit research outputs and develop integrated solutions for the long term needs of the industry. They are funded by ESPRC as one of the 16 Innovative Manufacturing Research Centres in the UK. Their research based environment is managed by committees consisting key people in their scientific field of interest. Researchers of SCRI produce a vast number of scientific journal and conference papers, reports, articles, book chapters and books. In accordance with its research based structure, SCRI is managed by a hierarchy of committees.

These two case studies show the importance of the efficient governmental policies and support of public and private bodies for their common interest. University/research link provides prestige and gravity to the institution. Strong leadership, close relations with public and private bodies as well as the industry, wide range of activities, not for profit structure of the centres are all important issues for being leading institution examples. However the governmental policies and the movement for change agenda shapes the UK construction industry and requires a good understanding to form similar institutions in developing countries for the diffusion and implementation of innovation in construction. Further examples should be studied and number of case studies should be increased for further decisions.

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