



Development of timber framed firms in the construction sector – Is EU policy one source of their innovation?

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ABSTRACT

To enhance competition in the construction industry, EU policies have created and harmonised functional building codes. Moreover, many actors advocate the construction industry moves towards a lean production, process-based way of working for quality and cost reasons. Here, Timber Framed Engineering approaches are considered to have a competitive and environmental advantage. There is however underlying concerns that conservatism in the construction industry, and lack of timber engineering skills, may be obstacles to change.

This paper therefore assesses whether EU construction policy innovation contributed to innovation at the firm level. Timber framed innovators in six European countries were identified, and their sources of innovation assessed.

The results indicate that timber framed firms have become actors in the construction industry. Firms have made product, process and organisation innovations.

All case firms have similar sources for innovation. The common factor that triggers the firms to innovate is business opportunities that arise from demographic changes in the environment outside the firm, such as environmental sustainability and affordable housing for lower income groups.

To address these opportunities, the case firms implicitly recognised that traditional project and site-based construction approaches are an incongruity. The firms have consequently established in-house prefabrication, including developed of lean production processes to ensure quality as well as effectiveness.

The firms have all recognised that a fundamental barrier to their business was the lack of timber framed engineering competencies in their customers' organisations. Accordingly, a business necessity for the case firms was developing construction design competencies.

Firms benefited from governmental policy instruments that support timber framed R&D and knowledge transfer. However, firms also gained new knowledge from their own experiences, which they also use in their operations. Accordingly, policy instruments are not a sole or dominant source for innovation in the case firms. Nonetheless, the change in building codes has been a pre-requisite the firms' commercial developments.

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1. Introduction

Researchers with an interest in the forest products industry have assessed European Union policies. They have concluded that there are no EU policies which have the specific intent to promote timber framed

construction. However, a number of other EU policies may indirectly support this construction approach (Rametsteiner et al., 2009).

The underlying rationale for this perspective is that current EU policy aims to promote sustainable development and manage climate change (EU Lisbon Strategy, Competitiveness and Innovation Framework Programme 2006). Accordingly, to enhance competition and promote more sustainable energy use, building codes have therefore been harmonised throughout EU member states (e.g. EU Council Directives 89/106, 93/68 and Regulation No 1882/2003). These codes place functional requirements, such as fire resistance and thermal insulation, on the building's performance. Such functional codes have

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replaced previous building codes that included prescriptive material decrees, which essentially banned the use of wood in built-up areas. Thus, harmonised functional codes are perceived to indirectly support timber frame in multi-storey construction (Visscher and Meijer 2007).

Such harmonising EU directives, regulations and building codes have often been formalised in various country-specific building codes (Bregulla et al., 2003; Visscher and Meijer 2007). Latter EU directives have in effect been automatically adopted (Visscher and Meijer 2007). Therefore, today, there is no formal policy barrier to the enhanced use of wood in European construction, including multi-storey apartment houses (Bregulla et al. 2003). However, there are concerns that there may be local variations in building codes and the forest product industry should be actively involved in removing this barrier (Bregulla et al., 2003; CEI-Bois 2004).

Such building policy innovations awoke keen interest within the sawmill sector, which sees the opportunity to significantly increase the percentage of wood used in construction (CEI-Bois 2004). Moreover, some countries have introduced policies which aim to considerably enhance the construction industry effectiveness by radically changing the industry's processes: instead of constructing on-site, it is advocated that building elements be prefabricated in factory-type environments, and then assembled on-site (e.g. Postnote 209, Näringsdepartementet 2004).

Calls for such process innovations are particularly influenced by lean manufacturing ideas from the automotive industry (e.g. Womack et al., 1991, International Group for Lean Construction). With such process concepts, timber is considered to be a competitive and interesting construction material (Björnfort, 2006; Höök, 2008; Nord, 2008). Additionally, wood is considered a more environmentally sustainable framing material than concrete or steel (e.g. Bregulla et al., 2003; Gustavsson and Sathre, 2006).

A classic definition of innovation is the generation, acceptance, and implementation of new ideas, processes, products, or services (Thompson, 1967). Accordingly, introducing prefabrication-based processes and use of wood as a load-bearing element implicitly requires firms in the construction industry to innovate. However, the construction industry is known for its conservatism and low rate of innovation (Pries and Janszen, 1995; Winch, 1998; Widén, 2006). There are also practical obstacles to timber framed innovation, including the lack of wood engineering skills as well as perceived cost risks (Bregulla et al. 2003; Taylor and Levitt, 2004; Visscher and Meijer, 2007; Goodier and Gibb, 2007; Pan et al., 2007; Roos et al., 2008). Moreover, there is a general concern that the construction industry's structure may negatively influence innovation and its adoption (Sardén, 2005; Winch, 1998; Blayse and Manley, 2004; Pries and Janszen, 1995).

Such obstacles raise the concern that, despite policy innovation, firms may NOT innovate. This work therefore addresses the fundamental question: Has EU construction policy innovation contributed to innovation at the firm level?

1.1. Purpose

From a perspective that is interested in assessing the business opportunities of the forest product sector, this research will assess the sources of innovation in innovative timber frame construction firms to ascertain whether policy is one source of their innovation.

1.2. Disposition

Our approach identified firms that are recognised innovators in six European countries, and assess their sources of innovation (Drucker, 1985). The *Methods and techniques* section describes analytical framework for assessing innovation and firm's sources of innovation, as well as the criteria for selecting firms. The use of timber as a load-

bearing element was one criteria. In the *Results* section, the particular regulatory and business context of six case firms in six countries is then outlined, along with an assessment of the case firm's business concept and processes. In the *Conclusions and discussion* section, the work assesses whether policy was one source of innovation.

2. Methods and techniques

2.1. Policy and business perspectives on innovation

The OECD's definition of innovation (OECD, 2005) is commonly accepted by various actors in the European Union. This definition distinguishes types of innovations:

1. A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses.
2. A process innovation is the implementation of a new or significantly improved production or delivery method.
3. A marketing innovation is the implementation of a new marketing method involving significant changes in product design, packaging, product placement, product promotion or pricing.
4. An organisational innovation is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations.

The role of the state is to establish an appropriate regulatory environment which enables such innovations to occur (Lundvall, 1992).

Innovation is traditionally associated with technological innovation, where firms use R&D processes to develop new, or radically improved, products for markets. Such a technological and linear model perspective of innovation prevailed especially during the first half of the 20th century (Edquist, 2004; Kaufmann and Tödtling, 2001; Galli and Teubal, 1997; Lundvall, 1992). However, theorising on the nature of policy has developed significantly and it is recognised that policy makers must also innovate policies to change the direction of society's development and address intended and unintended policy effects (Arts and Van Tatenhove, 2004).

Regarding innovation itself, policy perspective has recently changed from a product-based emphasis to the view that innovation is a process which is systemic (Kaufmann and Tödtling, 2001; Edquist, 2004; Galli and Teubal, 1997; Lundvall, 1992). Similarly, the business literature currently advocates a shift from the perspective that only products themselves are of value to a concept where value is generated in business systems that are innovative in their ways of combining the firms and other actors' (firms or customers) resources for service production and delivery (Drucker, 1998; Hamel, 1998; Prahalad, 2004).

Both the policy and business literature consider policy to be an environmental factor that impacts firms by defining the rules-of-the-game (Ansoff, 1979; Arts and Van Tatenhove, 2004; Galli and Teubal, 1997; Ghemawat et al., 2001). However, firms' socio-cultural environment, which includes norms, customs and institutions, can also influence industry, business and organisational culture. Since innovation requires learning new ways of doing things, which also necessarily involves a continuous process of unlearning and forgetting old ways of doing thing (Senge 1990), culture can therefore significantly affect firms' propensity to innovate as well as their innovation success (Elenkov and Manev, 2005; Simmie, 2004; Ansoff, 1979; Drucker, 1998, Senge, 1990). In this respect, the construction industry is viewed as particularly conservative, with low innovation rates (Winch, 1998; Bregulla et al., 2003; Taylor and Levitt, 2004; Widén, 2006; Visscher and Meijer, 2007).

2.2. Framework for assessing sources of innovation

Innovation theories address a wide range of perspectives and concepts. Contemporary approaches emphasise an opportunity

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