

Conceptual model of SME network economy business and e-marketplace



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Publishable executive summary

The 'Proficient' Collaborative project is funded under the FP7 programme "Energy efficient Buildings (EeB)" within the theme EeB.NMP.2012-3 [Development and validation of new processes and business models for the next generation of performance based energy-efficient buildings integrating new services].

The subject of the project is Collective Self Organized (CSO) housing, referring to a group of individuals that acts in association to organise and commission the processes from definition and design to implementation and / or maintenance of their own energy-efficient housing project.

This report presents a conceptual business model of a networked approach to delivering large business opportunities for SMEs in the construction sector by exploiting the newly emerging process of Collective Self Organised (CSO) housing on a district-wide scale. This business model aims to bring together SMEs to allow the economies of scale necessary for large project delivery, utilising the functionality of the e-marketplace where possible.

This report is based on a literature review of networked business models and interviews with construction company SMEs in the Netherlands, Hungary, Germany and the UK.

Drawing on existing networked business models in the construction industry and wider examples of successful networked models, an 'Open Innovation Guild' model is proposed. Membership of such a Guild should be open to all interested SMEs through the SME portal of the e-marketplace, with stricter membership criteria introduced for those members who wish to undertake projects in partnership. That is, the Guild would support both exploration of new opportunities and the open innovation that can arise from such exploratory activities and exploitation of project opportunities through project delivery in partnership. This will encourage what the literature defines as ambidexterity; the ability of firms to engage in exploration and exploitation activities simultaneously, which is often difficult for SMEs due to resource constraints.

The study finds that business model solutions need to be context specific to the national or regional environment and for this reason it is proposed that Guilds are established on a national or regional level to serve their local environment. Consideration is also given in this report to the range of housing provision that falls within the definition of CSO housing, ranging from new-build intentional communities through to the energy efficient retrofitting of existing housing stock.

List of acronyms and abbreviations

- **CSO Housing:** **Collective Self-Organised Housing**
- **SME:** **Small and Medium sized Enterprise**
- **IPR:** **Intellectual Property Rights**
- **ESCO:** **Energy Services Company**
- **SPV:** **Special Purpose Vehicle**
- **CSCW:** **Computer Supported Co-operative Working**
- **HiH:** **Hand-in-Handwerker**
- **NGO:** **Non-Governmental Organisation**

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1. Introduction

The 'Proficient' Collaborative project is funded under the FP7 programme "Energy efficient Buildings (EeB)" within the theme EeB.NMP.2012-3 [Development and validation of new processes and business models for the next generation of performance based energy-efficient buildings integrating new services].

The subject of the project is Collective Self Organized (CSO) housing, referring to a group of individuals that acts in association to organise and commission the processes from definition and design to implementation and / or maintenance of their own energy-efficient housing project.

In order to enable the PROFICIENT project to meet its stated aims 'to create large business opportunities for SMEs in the construction sector by exploiting the newly emerging process of Collective Self Organised (CSO) housing on a district-wide scale', a networked business model is proposed. This business model aims to bring together SMEs to allow the economies of scale necessary for large project delivery.

Given the nature of CSO housing processes, where collective endeavour and co-design with residents and homeowners is integral, the delivery of CSO housing projects will of necessity call on specialist skills not found throughout the traditional construction industry. The reality of the construction industry in the EU is of predominantly hierarchical business models. In these models, clients work with prime contractors who sub-contract to specialist businesses for skills above and beyond their own knowledge or experience base. There are, however, a number of partnership models in use and these are explored further here.

The CSO housing market covers a range of housing provision, from new-build for intentional communities through to the retrofitting of energy efficient technologies in apartment blocks in multiple occupation and ownership. This variety of market segments offers its own challenges to the development of business models to support the expansion of CSO housing provision. New construction is, at present, mostly small-scale and needs the interaction of specialists (e.g. architects, constructors and community/group facilitators). Networks in this context rely very much on the known capabilities of actors, due to the sensitive and often iterative nature of these projects.

Retrofitting, on the other hand, can range from small scale to large scale. Networks in this case are needed to achieve the economies of scale necessary. There are no specialist skills necessary, beyond standard design and construction skills. In this case, it is trust relationships that allow multi-company networks to successfully deliver projects.

The theory, use and applicability of business models and business networks are considered in this report. The predominant networked business models used in the design and construction industries are explored in the third section. The fourth section considers the applicability of these models to the CSO housing context and draws on empirical evidence gained from the Proficient project's primary research with potential stakeholders in the Netherlands, Hungary, Germany and the UK to suggest some recommendations for the adaptation of potential networked business models to meet stakeholder expectations. These are mapped within a modified business canvas developed from the Business Model Canvas framework (Osterwalder and Pigneur, 2010). The literature on the effectiveness and potential of these models is explored. Issues of intellectual property rights (IPR) and the potential for these networked business models to protect or dilute IPR are also considered, as IP issues may make co-operation between businesses in a network difficult.

The different models (the ones that are currently used and the ones we are proposing) will be analysed and described partly by the Canvas model but also alongside some major issues, that the Canvas do not handle properly:

- Risk management and guarantee issues
- IPR issues and competition
- Different interests and incentives of actors within the network

2. Theories and Trends in Business Models and Networks

2.1 Business Models in General

Shafer et al (2005, p. 199) define business modelling as comprising 'strategic choices, the value network, creating value, and capturing value', defining a business model as 'a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network' (ibid, p. 202). Similarly, Chesbrough (2010) defines business models in terms of value proposition, market segment, revenue mechanism, cost structure, value network and competitive strategy. Teece (2010, p. 172) reviews the history of the concept and defines business models as where the 'essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit', connecting with 'business strategy, innovation management, and economic theory'. Within the construction industry, value is poorly defined (Anderson and Narus, 1998). As Brady et al. (2005) found, the construction industry has traditionally associated value with reduced costs. Customers have also traditionally acquiesced in this lowest-price approach to value.

2.2 SME Networks for Exploration, Exploitation and Ambidexterity

One of the key benefits of SME networks is providing information, advice and access to valuable resources. One of early studies on entrepreneurial networks (Van de Ven et al., 1984) found that successful entrepreneurs tend to be more externally oriented, involving a broader network of potential customers and professional consultants in their entrepreneurial process as well as support from family and friends. This finding was supported by Aldrich et al. (1986) who also found the contributions of social and professional networks to the development and growth of new businesses. A number of studies (e.g. Birley, 1985) also found that entrepreneurs consistently use networks to get and refine ideas, gather information and recognise entrepreneurial opportunities.

Two terms arise in the literature to explain the benefits of SME networking activity; exploration and exploitation. Exploitation indicates a tendency of firms to invest resources to refine or extend their existing knowledge, skills and processes.

Exploitation can be defined as an extension of core competencies, the search for greater efficiency and improvements to enable incremental innovation and the implementation in practice of knowledge as new services or products (Levinthal and March, 1993; Atuahene-Gima, 2005; Cantarello et al., 2012). In contrast, exploration refers to a tendency of firms to invest resources to acquire entirely new knowledge, skills, and processes. Exploration entails the development of new competencies, experimenting to foster the variation and novelty needed for more radical innovation (Wadhaw and Kotha, 2006; Atuahene-Gima, 2005); “creativity, experimentation, play and discovery” (Hughes et al, 2007, p. 360).

Networks with distributors, suppliers, customers and competitors can be important as a conduit of information and knowledge (Jarillo, 1988; Brown and Butler, 1995; Street and Cameron, 2007). Fang et al. (2010) highlight the importance of networks for small firms that do not have the resources for internal learning within their organisations. Soetanto and Jack (2013) show one of the early needs of small firms is the development of external networks, placing firms in a better position to benefit from accessing knowledge (Beckman and Haunschild, 2002; Fang et al., 2010). Overall, the evidence shows that networks open up opportunities for exploration of new ideas, markets and opportunities and exploitation of existing skill sets and provide an avenue for exchanging information, methods and knowledge (Dyer and Singh, 1998; Lane and Lubatkin, 1998). However, networks are not similar in that they may offer different types of benefits depending on the type of relationship and the structure of network. That is, small firms construct networks in a different way to serve their objectives in exploitation and exploration.

For small firms, developing a new product (or in the case of CSO housing, new markets) is a high risk investment (Song and Montoya-Weiss, 1998) characterized by uncertainty in customer demand as well as less synergy between the needs of the project and the firm’s skills and resources. Small firms will then rely heavily on support and resources from their networks.

In developing competitive strategy, the literature suggests that firms need to maintain and nurture their core competencies (Prahalad and Hamel, 1990). However, at the same times firms need to be innovative and responsive to market changes by improving their offering or creating new products or services. For many firms, the process of new product development becomes an obvious arena for conflict between

the retention of core competencies and the need for renewing or replacing those competencies (Filippini et al., 2012; Leojard-Barton, 1992; Vera and Crossan, 2004; Danneels, 2002). Firms naturally find it easier to maintain their existing competencies, but they appear to falter in developing new competencies (O'Reilly and Tushman, 2004). In addition to the difficulty experienced by firms in diverging from their existing norms and routines and moving toward new competencies, the impact of exploiting core competencies can only be seen in short-term success. Unless firms also perform exploration of new competencies, their success can fall short in terms of long-term viability (Levinthal and March, 1993). Whilst earlier studies have repeatedly discussed the trade-offs between exploitation and exploration as insurmountable, more recent studies have highlighted the existence of ambidextrous firms that are capable of performing both exploitation and exploration simultaneously (Andriopoulos and Lewis, 2010) which is described as ambidexterity.

It has been noted that there exists a trade-off between exploitation and exploration and more recent studies have proposed that firms need to perform both activities simultaneously. Studies (e.g. O'Reilly and Tushman, 2004; 2008; Kim and Atuahene-Gima, 2010; March, 1991; Eisenhardt and Martin, 2000; Ancona et al., 2001; Katila and Ahuja, 2002; Lavie and Rosenkopf, 2006; Hughes et al., 2007; Groen et al., 2008) suggest that an ambidextrous firm, that is a firm that performs exploration and exploitation simultaneously, is more likely to achieve a superior performance than firms emphasizing one activity at the expense of the other. More specifically, the ambidexterity hypothesis has been explored and supported in the case of firm's innovation behaviour. Benner and Tushman (2002) find that overemphasis on exploitation can drive out exploration. Conversely, an overemphasis on exploration can prevent a firm developing and implementing its existing capabilities. As Fang et al (2010) argue, firms often need to balance their core competencies and the lack of broad-based resources and knowledge. Gupta et al. (2006) also suggest the concept of punctuated equilibrium, where a firm may move strategically between exploration and exploitation over time. They refer to the concept of ambidexterity to incorporate both these concepts; both the "synchronous pursuit" of ambidexterity and the "temporal differentiation" of punctuated equilibrium (Gupta et al., 2006, p. 693-4). He and Wong (2004) argue that performing both activities and maintaining balance between exploitation and exploration is a factor in retaining competitive advantage.

Despite the well-established nature of the retro-fitting market in some contexts, new build CSO housing remains a niche, or sub-market, with its inherent risks and uncertainties. The development of CSO housing market opportunities by SMEs indicates a networked approach will be fruitful, both in exploring new opportunities and in exploiting core skills and competencies.

3. Networked business models in construction

The following section outlines both current and proposed models from the construction industry that may serve to increase the economies of scale necessary to upscale CSO housing towards mainstream adoption and large district wide projects

The current reality within construction, both for new build and retrofit, is of a hierarchical model. This model presumes a central organisation that co-ordinates the construction, assumes core risks, provides guarantees and, as a result, captures most of the profit from the project.

3.1 Prime contractors

The traditional construction model however, presumes a division between design and construction (i.e. construction only occurs once designs are finalised) (Figure 1). This distinct separation does not always apply within CSO housing (especially new build intentional communities), given the iterative nature of the collective self-organised design process. Whilst this model may, therefore, allow efficiencies in the construction process, it may not be applicable for all CSO housing projects.

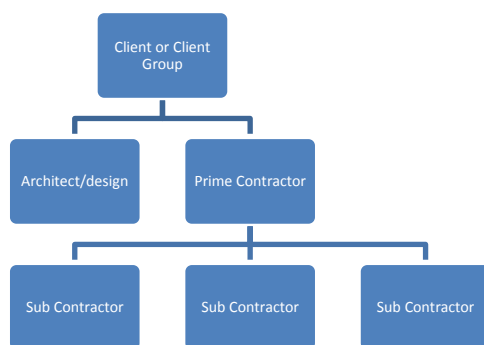


Figure 1: Traditional hierarchical business model in construction

The advantages of this model is that it draws on standard industry practice, allows the clear demarcation of responsibilities and guarantees of quality between the design and construction phases and protects the intellectual property rights (IPR) of the prime contractors, although not the IPR of the designers/architects to the same extent, as this must be given over to some extent to the prime contractor. Furthermore, it draws on and further strengthens existing networks where construction businesses have developed trust relationships with other trades. Risks,

and responsibilities for cash-flow, are held by the prime contractor, which may limit the involvement of smaller SMEs in this role without external financial support mechanisms.

3.2 Design and Build Business Models

Whilst the traditional prime contractor business model does provide a workable solution for some projects, there are limitations to this model, for example in terms of the flexibility to work with clients in the iterative manner desired within new-build intentional communities. This indicates a different business model is needed for some CSO housing projects. Established design and build business models do offer an alternative and more integrated model, where architect/designer and construction are either integrated into a single firm or as a partnership under contract (Fig. 3).

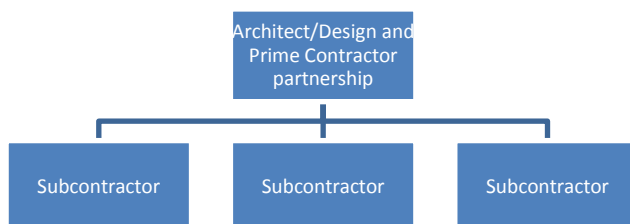


Figure 2: Design/build business model in construction

The advantages of this model are that any ongoing alterations to the project specification can be accommodated by the design and build team. Furthermore, it offers a clear line of responsibility for quality control and guarantees. IPR is shared between construction and design under contract or within the same company, which offers a stringer level of protection than the prime contractor model. Contracted partnerships can allow the development of strong network ties between partners and can aid the exploitation of skills and knowledge. Risks, and responsibilities for cash-flow, are held by the partnership, which again may limit the involvement of smaller SMEs in this role without external financial support mechanisms. As a stand-alone model, design and build does not offer any solution to the scaling up of CSO housing or the generation of profits beyond the capital investment of the design and construction itself.

3.3 Special Purpose Vehicles

As Saxon (2003) suggests, a transformation of the business model of the construction sector is necessary to provide a more customer and societal focus. Saxon offers an integrated solutions (IS) business model, where design, production and operation are integrated into a single customer-facing model. In the case of the construction industry, this could incorporate design, construction and maintenance of facilities. Where ESCOs are engaged in the process this could also include the provision of energy efficient services. This model has the potential to provide ongoing income streams above and beyond the capital expenditure centred on construction. Brady et al. (2005) highlight the use of IS business models within the manufacturing sector, using the example of Alstom trains, who have moved from building trains to providing design, build, maintenance and financing for initial purchase, thus providing ongoing income streams. As they show, the challenge for industries moving towards IS business models is the development of organisations that can “package and deliver effective and efficient solutions to meet growing customer demand” (p. 573).

This approach necessitates building the capability needed to carry out a growing variety of functions, services and solutions that meet customer needs. As Prencipe et al. (2003) suggest, it is in the area of systems integration that the major challenge exists. This is the capability to integrate and coordinate internal and external activities into a functioning system, while coordinating the activities of a network of external suppliers of equipment, components and other specialized knowledge and inputs. As Brady et al. (2005) explain, “the relationships between system integrators and their upstream suppliers is governed by contractual relationships, ranging from traditional arm’s-length contracts to close cooperative relationships” (p. 573).

A Special Purpose Vehicle (SPV) refers to the formation of a new stand-alone company that is set up for very large construction contracts to give clients a single point of contact and contract. The members of an SPV are all companies in their own right who become shareholding partners in the new corporate entity for the duration of the contract. It reduces the need for sub-contracting, shares risk for partners’ core businesses and, as a corporate body, has limited liability for contracts undertaken in its name. Examples of SPV models in practice include the multibillion pound contract for the cross-London rail link construction. It is a stand-alone body that will be dissolved at project end, where the numerous disciplines needed for complex

construction are incorporated within a single company, with shares allocated on a % of input basis. The economies of scale and experience of such large conglomerations allow project finance to be raised more easily than if separate sub-contractors each raised finance themselves.

Winch (1998) points out two traditional systems integrator roles in construction, that of architect/engineer in the design stage and that of the principle contractor in the construction phase. He argues that this separation prevents an integrated approach. The lessons of Private Finance Initiatives (privately funded construction/service delivery projects to deliver public goods and services) within the UK suggests that suppliers have moved to adopt Special Purpose Vehicles (SPV), or consortia set up as standalone companies, to deliver integrated solutions for public sector clients. These SPVs act as system integrators, “combining different specialist inputs and organizing the division of labour amongst the partners of the SPV” (Brady et al., 2005, p 575) offering a single point of contact to clients under a common brand. Brusoni et al. (2001) argue that the governance of integrated systems (IS) business models represents a distinctive type of mechanism that sits between markets and firms. As an SPV with separate company status, the possibility exists to attract finance for that particular project, separated out from the normal function of the SME, reducing risk. The functions of governance, systems integration and coordination of an IS business can be an income generating model in its own right, as the operation of such models becomes a niche business expertise. Other benefits that can arise from an IS approach include increased innovation (Winch, 1998; Nam and Tatum, 1988) through a gain-sharing approach (i.e. reduced client costs and increased profit margins for prime contractors in SPVs) and repeatability and learning opportunities (Green et al., 2004; Gann and Salter, 2000) gained through co-working, with project partners being mutually tied through SPVs. SPVs also allow for the intellectual property (IP), knowledge and experience of participating organisations to be held by those organisations, rather than the SPV company, therefore providing a clear protection of IP rights.

Table 1 below provides a comparison of the existing construction industry business models discussed:

Business Model	Description	Project Scale	Ownership of central decision-making	Role of central decision-making body	Role of member SMEs	Income streams
Traditional prime-contractor model	SME acts as sole contractor and liaison with clients, all other functions sub-contracted	Small and large scale CSO projects	Prime-contractor	Sole control over contract and sub-contracts	No members	Prime contractor profit. Sub-contractor fees
Design/Built model	Partnership between prime contractor and architect/designer. Sub-contractors deliver specialist construction services	Medium and large scale CSO projects	Equal weighting given to partners	Partnership control over contract and sub-contracts	Partnership	Partnership profit share. Subcontractor fees
SPV model	New company formation to act as multi-partner delivery body	Large scale CSO projects	Prime contractor takes a systems integration role. Shares allocated to members dependent on contribution and profit-sharing agreements.	New company Board has control over contract and sub-contracts	Shareholder and Board members	Company profit distributed to partners as dividends. Ongoing profits from energy service provision and maintenance.

Table 1: Comparison of existing construction industry business models.

3.4 Guilds and federations

Merges (2005) points out how the medieval Guilds contributed to the prosperity of both individual families and wider industries by sharing some information about work methods while keeping some proprietary to the family, then draws parallels with open source software, leading to the Open Innovation Guild model. Fuad-Luke (2009 p. 145) identified how the mechanism of open source enabled self-employed designers to create an 'intellectual commons' that can share know-how while protecting the intellectual property of their designs from exploitation in a global marketplace, highlighting how the Open Innovation Guild could work in practice. Bonanni and Parkes (2010, p. 182) developed the Guild concept further in the context of craft, highlighting its potential to be sustainable by creating 'structured communities of experts'. The Guild could thus be a mechanism that can promote sustainability by applying the principles of open source to enable collaboration based on intrinsic values, shared interests and creating a commons of shared knowledge and expertise.

According to Defourny and Develtere (1999), the first Guilds appeared in Europe countries in the 9th century, while brotherhoods first appeared in the 11th century, with the Guilds starting to control labour markets by the 14th century. The original medieval Guilds were closed, quasi-familial federations. Richardson (2001) points out that the common perception of medieval Guilds being about monopolies is based on a misunderstanding of the historical meaning of the word. He sees the medieval Guilds as voluntary cooperatives which played a role in building human capital through apprenticeship. Epstein (1998, p. 684) claims that 'medieval craft Guilds emerged in order to provide transferable skills through apprenticeship' as 'cost sharing rather than price-fixing cartels' (ibid p.688) serving to regulate labour markets and promote technical innovation (rather than suppress it as popularly supposed). Alessi and Staff (1994, p. 477) highlight that trademarks evolved out of medieval Guild marks to assure quality, gaining 'trademark capital'. De Moor (2008, p. 179) draws comparisons between the development of both the commons and Guilds in the Middle Ages, considering this parallel development to be a 'silent revolution'. Both were based on group norms and social control ensuring that members made best use of the (human or land) capital available. Merges (2005) points out how medieval Guilds contributed to the prosperity of both individual families and wider industries by sharing some information about work methods while keeping some proprietary to the family. On the other hand, restrictive practice by the Guilds led to their eventual

demise. Issues of competition, monopolistic and restrictive working practices and barriers to market entry would need to be addressed in any proposed CSO Housing Guild, especially one supported through an EU project such as Proficient.

A related concept; that of computer supported co-operative working (CSCW) has been the subject of rigorous academic study over the past two decades. Benner (2003, p. 203) highlighted how computer professionals are creating membership organisations with a Guild-like structure. Whilst they do not have the power of the original Guilds or the unions that replaced them, they can help their members negotiate with customers and employers and 'provide an important learning infrastructure'. Digital networking technology can enable CSCW, offering resources through a system that can be adapted to the needs of workers (Schmidt 2011). The Xerox Eureka knowledge system for repair technicians is an example of CSCW, where the technicians were able to share their embedded knowledge through a simple database that proved more useful than centrally produced documentation. In this case, knowledge management rather than just managing information was the key, as it highlights the role of the "knower" in the process, creating a community of support that enables social learning (Brown and Duguid 2000).

Although not operating in the construction industry, perhaps the largest Guild model in the world is that operated by SPAR, with Guilds in 36 countries across 5 continents. Guilds are set up on a regional basis to feed into national and EU wide Guilds. The SPAR organisation is made up of two types of members: SPAR retailers, who are independent store owners, and SPAR distribution centres, which provide leadership and services to the SPAR retail members in their respective regions. Both member types belong to the SPAR Guild of their respective countries, set up as non-profitmaking companies to co-ordinate and develop SPAR in their country. The members pay subscriptions to the Guild, which uses these monies not just to advertise and promote SPAR, but to achieve economies of scale in bulk purchasing. To facilitate the operation, countries are divided into geographic areas, each with its own regional Guild of retail and DC members, with the centre of control being the local distribution centre. It's a formula that works effectively to unite the organisation regionally, nationally and internationally. The Guild model allows retailers, suppliers and distributors to exchange ideas that feed in to the strategic direction of the SPAR network. The Guilds also provide training courses for members and their staff,

branding, marketing, business support and promotions. All members are independent SMEs that choose to trade under the SPAR branding, recognising the benefits of shared branding, cost reductions in purchasing and the other support services available. The SPAR Guild central functions are also supported through a subscription model.

4. Networked business models and the Proficient e-marketplace

E-business is a significant recent development in business models. Hagel and Singer (1999, p.134) highlight that the development of the Web reduces interaction costs which can “cause entire industries to reorganize rapidly and dramatically”; their concept of “unbundling” is moved on from the traditional conception that a company has to contain “three kinds of businesses– a customer relationship business, a product innovation business, and an infrastructure business”. This fundamental change in how businesses are structured relates to the work of Hargrave and Van de Ven (2006), who synthesise the technology innovation management and social movements literature to emphasise the role of collective action in institutional innovation, highlighting that it is a political process where actors mobilise resources, act to challenge existing institutional structures, eventually finding a synthesis between the old and the new.

Within CSO housing, clients typically seek value not just on price, but also on inclusive design processes, environmental impact and community facilities. The value in focus will vary with different kinds of CSOs, however. An intentional new-build community may seek different value propositions from a large scale retrofit for vulnerable clients overseen by a Housing Association, for example. Zott et al (2011) draw on several strands from their comprehensive literature review, including e-business, social and economic value creation and capture, and the business model itself as a focus for innovation, particularly open innovation and collaborative entrepreneurship.

Ulhøi (2004, p. 1108-9) uses private property theory and a model of collective agency to consider open innovation as a mechanism for innovation through ‘critical knowledge sharing’, where ‘knowledge and experience have the interesting feature that they tend to grow when shared’. He uses the term “Private model of agency” to explain the holding of intellectual property and operational control within a single organisation and the “Collective model of agency” for those business models where intellectual property and control is shared to some extent.

Businesses are now creating knowledge communities to involve their customers, with von Hippel (2005, p. 1) pointing out that firms are increasingly turning to the users of

products and services to innovate for them, with the advantage that the users can ‘develop exactly what they want’. As a niche market that has user centred co-design as an integral part of the process, this has particular relevance for CSO housing. Similarly, Mangold and Faulds (2009) highlight how firms are already making use of social media such as Twitter and Facebook for communications with customers, including enabling them to contribute to the design of products. The use of networked technology can be extended to marketing and customer relations, with Qualman (2009) claiming that traditional business marketing is becoming replaced by trusted personal recommendations through social media, enabling ‘free markets to easily and effectively service small interest groups’.

Perez (1985) predicted many of the factors that shape modern society, in particular he points out that adding technology to existing organisational structures won’t work, what is needed is a re-structuring of work systems to focus on ‘distributed intelligence’ and decentralisation rather than hierarchical structures. The concept of distributed intelligence relates to the work of Orlikowski (2002, p. 269) on distributed organising, in particular considering ‘how knowledge that is distributed among individuals and embedded in their work can be integrated and shared with others’. Schneeweiss (2003, p. 1) points out that society is moving away from centralised decision-making to ‘distributed decision making’, while Rheingold (1993) introduced the concept of virtual communities, developed further into by Lave and Wenger (1991) and developed further by Wenger (2006), who defines a community of practice as having these elements:

1. Domain: individuals become members of a ‘shared domain of interest’.
2. Community: members ‘interact and learn together’.
3. Practice: members are practitioners who can both access and add to a ‘shared repertoire of resources’.

In the particular context of how digital technology can support group working, the term ‘groupware’ was defined by Johnson-Lenz (1981) as ‘intentional group processes plus software to support them’, creating a virtual community (Rheingold 1993).

Lessons can also be learned from co-operative business models. Co-operatives provide the potential to develop the ‘co-operative advantage’, including trust, being able to respond to market failures, offering social benefits, promoting self-help,

building social capital, promoting participation and working to more ethical values (Spear, 2000, p. 507). Other writers also find that co-operatives can offer advantages over conventional firms including Pencavel (2012, p. 29) who uses empirical evidence to back up his claim that 'co-ops are more efficient work organisations' through revenue sharing and participatory governance mechanisms. Tencati and Zsolnai (2008) highlight the potential for collaborative enterprise to create value for all stakeholders and involve them in the work of the enterprise. Johnstad (1997, p. 50) points out that co-operatives can be seen as a type of federation, which is 'formed when two or more actors join in creating a common unit to promote common interests on contracted issues while keeping autonomy on others'. Johnstad identifies five types of federation, including the con-federation where members have 'total autonomy and power, except for what they voluntarily and unanimously decided in common' (ibid).

The Guild model is now being used again, in particular computer professionals are creating membership organisations with a Guild-like structure that can help their members negotiate with employers and 'provide an important learning infrastructure' (Benner 2003, p. 203).

5. Networked business models for CSO housing

The networked models that are analysed above (Prime Contractor, Design and Build partnerships, SPVs and Open Innovation Guild), as well as more informal pre-existing networks that operate locally within the construction industry can be characterized as in Table 2 below. Supported through the e-marketplace, the Guild can be seen as both offering an opportunity for informal networking through an open SME portal and encouraging more formal networking, through subscription to and full membership of the Guild; Open Innovation Guilds can therefore offer member SMEs opportunities for both exploration (e.g. the identification of new opportunities, knowledge sharing, synergies between skill-sets) and exploitation (e.g. market opportunities, contracts to deliver products or services). The Corporate models are firmly focused on exploitation activities, whilst Informal networks are focused on exploration. Naturally there are the overlaps between these models, as SME may be members of both Corporate and Informal networks:

Table 2, below, indicates that the Open Innovation Guild model can provide for both informal and formalized network opportunities, encouraging and supporting both exploration and exploitation activities; promoting SME ambidexterity. Figure 3, below, provides a model of the ambidextrous nature of the Guild, showing the ability of this business model to support both formalized corporate structures and the informal networking valued by SMEs:

Networked Business Models	Purpose	Outcome for SME members
Open Innovation Guild	With an open portal supported by the e-marketplace offering informal networking opportunities, full membership provides a formal network in which partners subscribe, bring in projects, have strong contractual relations before, during and after the project implementation.	Exploration and exploitation
Corporate models: Prime contractor, D&B, SPV	Formal contracting agreements for project implementation to cover the most sensitive issues of risk, IPR and guarantees	Exploitation
Informal	Informal ongoing cooperation.	Exploration

Table 2: Characteristics of networked business models

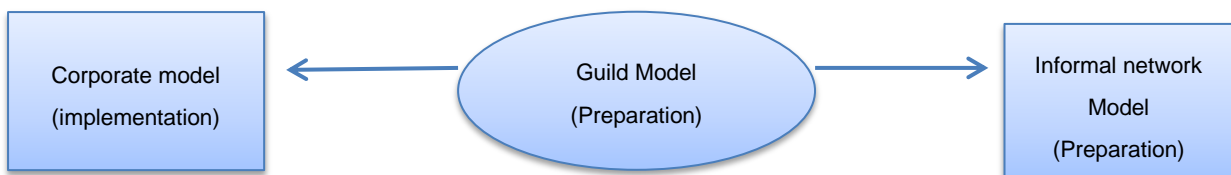


Figure 3: Ambidexterity supported by the Open innovation Guild.

6. Testing the Potential of Networked Business Models for CSO Housing

In order to develop the concept of networks further and to explore alternative networked business models, consultations have been undertaken by Proficient project partners with potential stakeholders in the Netherlands (TNO), Hungary (MRI), Germany (3L) and the UK (LAN/LCH). Due to the various differences in construction sectors across the EU and in order to capture responses from a range of actors, a standard methodology was not used. Full reports of the consultations are included as appendix 1. An overview of the findings is presented here and summarised in Table 3, below.

6.1 Germany: Hand-in Handwerker

The work in Germany focused on semi-structured interviews with four Hand-in-Handwerker (HiH) associations' representatives. The central function of this networked business model is on the marketing, external relations and brand management of the collective. The concept of HiH being to compile a legally organised, informal, open association consisting of craftsmen, architects and engineers in order to fulfill the demands of the clients who requested more turnkey like solutions, even for smaller projects such as single dwellings. The objective of the clients was to have just one partner in charge of each expected performance quality along with project steering and quality assurance as well.

Furthermore, the idea of the associated craftsmen was to approach the market with a more professional marketing and distribution concept in order to overcome the prejudice that they were not service oriented enough to match current client expectations. As a consequence of this prejudice and client behavior in terms of contracts, regular craftsmen have been pushed out of the building market as general contractors managed much better to share the above mentioned vision of the client; this vision being to ease the building process by just talking with one partner who takes care for all services and assures the expected quality. Additionally, the Hand-in-Handwerker is closely related to the building supply industry. On a basis of a win-win situation the industry is providing any support for product application with engineering

and consultancy efforts as well as training in order to promote the sale of their products via an alternative distribution channel. The Hand-in-Handwerker in cooperation with the building supply industry closes the gap between theoretical product application and on site performing problems created by poor knowledge of the performing craftsmen.

Findings from the HIH model indicate that:

- The HiH networked business model operates as a franchise, which enables local variation to address local variation and to meet local need.
- HiH currently concentrates on mid-sized retrofitting projects.
- HiH acts a broker, to provide single point-of-contact with clients and to provide single contracts for multi-trade construction projects (i.e. HiH acts as an SPV).
- HiH takes about 10% service fee for the service provided. Clients are often willing to pay more for ‘turnkey’ solutions, so this should not be a market barrier.
- HiH accommodates projects that include non-network members. The network members simply act as a single contractor and deal with other contractors as in any construction project.
- The HiH offer is a unique selling point for clients in a crowded niche market.
- Pooled skills of members allow economies of scale and a wide portfolio of skills under a single umbrella.
- Some of the coordinating functions have been un-costed in some franchises, although it is recognized that fees need to be charged for this service to ensure network sustainability.
- Whilst some franchises have aimed to create a new self-supporting business from the coordination role in addition to their own businesses, capitalising on their core competencies, slow and steady growth has been found to be more effective.

The HiH business model has the potential of being transformed and further developed in order to fit the needs of the Proficient offer. Nevertheless, orientations to professional structures for driving the network are needed. There is a difference in horizontally or vertically driven networks, while associations with flat hierarchies are sufficient for less demanding projects of smaller size, a vertical concept with strong influence of a network administrator or a management board is urgently needed.

6.2 Hungary: Focus group on the potential for introducing CSO new construction

As a new field of practice, the discussion in Hungary was to explore the possibilities of CSO new construction. A representative of an NGO concerned with co-housing, a representative of a large scale developer, a public sector chief architect and an end-user met to explore the possibilities and constraints of introducing CSO construction models in Hungary. The picture that emerged shows very cautious developers who are not interested in entering new areas – most probably because of their large scale activities. It also shows a public sphere that is unwilling to support the CSO movement – partly as a result of the lack of enough funding partly as a result of the novelty of the concept. And finally, it also shows enthusiastic NGOs, who are faced with sometimes insurmountable administrative difficulties.

The very individualistic Hungarian society mitigates against collective decision making and in particular collective living arrangements. Historically however, CSO housing did have some traction until the 1980's, under socialist housing policies. This collective approach however, was more to do with the construction industry practice and less to do with the collective organizing of everyday living. With the economic and political transition and the appearance of private housing developers, these construction communities ceased to operate as the pushing need for housing could have been satisfied by the market.

As a consequence, both the institutional framework and the framework of trust have to be re-established to facilitate CSO constructions. Currently, the communities that aim to accomplish their dreams do not have enough trust in each other and in the institutions.

A number of barriers were identified:

- Construction subsidies tied to individual properties, not joint loans.
- Existing cooperatives focused on refurbishment and retrofit
- Difficulties of bringing whole communities onboard, where minority vetoes can halt projects.
- Construction regulations focused towards one car per household models (i.e. land needs to be specified for car parking).
- Additional costs of shared communal spaces.

- 30% threshold for pre-sales in order to lever in finance for new developments, mitigating against co-design of district wide new builds.
- Lack of interest from developers.
- Existing alternative models of client choice (internal finish, shared facilities) that may dilute CSO offer.
- Skepticism from developers around managing the iterative CSO planning process for more than 10 dwellings.
- Lack of interest of the public sphere.
- No unique selling point of CSO housing. Social and environmental factors can be captured through other avenues to achieve public benefit.
- Need for municipalities to achieve maximum price for their existing land.

A separate interview was conducted with the head of a large housing developer company about the possibilities of CSO construction in the Hungarian market. In his view:

- Maximum size of such a project would be 10 units.
- Projects where common facilities are built in (residential parks) face difficulties because of the common use and common payment.
- CSO project is not favourable for large developers, as the only role they can play is project management, which has a 1-2% fee that does not bring in enough profit.
- Niche market more suitable for SMEs.
- Flat hierarchical structures would not work with their business model. Prime contractor models would fit their existing practice.

6.3 Hungary: ESCO Networked Business Models Interviews

Two interviews were undertaken with ESCO companies in order to investigate those special cases when a middle-term performance guarantee is in place which automatically results in the leading role of the ESCO company to explore kind of cooperation is possible between the different business actors involved in the same project. The ESCOs interviewed are engaged in energy efficiency, rather than CSO housing. One respondent organisation (ER) was engaged in the housing retrofitting

field, the other with industrial energy efficiency (EH). Both respondents requested anonymity.

ER is a small SME and subcontracted most of its work out to independent or partly owned companies. Its work concentrates on retrofitting condominium and cooperative apartment buildings. The work is mainly financed through subsidies and consists of installation of energy efficiency measures and operation/maintenance functions. The clients pay for 8-10 years for operation and bank installments to cover the upfront costs of the ESCO, in payments designed to equal their original energy bill payments. For deep renovation, the time period can extend to 15 years and can result in higher payments for clients for the initial 8-10 years. The company operate their network through a 'cooperation cloud'; a list of prequalified contractors, partners, experts etc. The network is updated every three months with an annual external audit to ensure quality control. All members of the cooperation cloud must comply with pre-qualifying criteria. These partners can offer services within a specific region, nationally or EU wide, depending on their capability. There are four types of permanent partners of ER company:

- Experts in risk assessment. Engineers, lawyers, economists, structural engineers, tender writers, etc. Trust is a very strong element here as the risk assessment stage is the most crucial one.
- Experts in planning and implementation, e.g. architects, engineers, management specialists, accountant, quality controller. The detailed planning carries less risk than the previous stage.
- Physical implementers like construction material companies, construction companies, window specialists, heat modernisation companies, boiler companies, companies on renewable energies, etc.
- Service provider companies: e.g. banks, energy service companies.

The projects themselves are implemented in two major forms:

- In Consortia, meaning that all consortium members are fully responsible for all the partners and they provide guarantee for a longer period of time. (Even this case the project is prepared and risk-assessed by the ESCO, only the implementation is carried out in consortia.) In this scenario the ESCO company is the coordinator that organises the work. The partners are more willing to provide high quality work if they

are involved in the risk sharing and guarantee system. In response they are entitled to pledge the account of the ER company which results that as soon as the client pays the ER company for the construction they get their revenue as well – except for the 5% security which they get back after the one year monitoring process. The drawback of such a consortia is that it is not easy to replace the partner if it leaves.

- General contractor system. This case the ER company takes the full responsibility and the traditional guarantee tools are used meaning that the subcontractor must have ‘construction-installment guarantee’, and other types of responsibility guarantees.

EH is an SME with 10 employees, but with strong ties to a parent company with 200 employees. The EH company focuses its activities on mid-sized Hungarian firms that aim to reach energy savings in different ways (e.g. modernisation of lighting, utilising waste heat, change of boiler). The usual project size is between 100.000-300.000 euros. The EH company provides financing for the projects by taking a bank loan for which the collateral is the installed facility, which belongs to the company till the end of the ESCO contract. The projects have less than 5 years pay off period which is reflected in 8-10 years ESCO contracts – that means that the client pays for the implementation and operation in instalments. This market segment addresses market limitations of working with

- Bigger multinational firms (they can hold the required human capital to plan and implement project in-house, contracting out only construction)
- Municipal clients (who hold their own resources, usually through EU subsidies) can finance projects at lower borrowing costs than on the open market. EH does take on these projects but they are directly financed by the municipality.
- Residential ESCO market, due to high transactions costs.

Growing access to EU subsidies by mid-sized firms can impact on the viability of the EH business model, as it dilutes the need for third party financing, which is a major profit driver for EH.

EH works as prime contractor on all of its projects, subcontracting work either to its parent company or to external contractors, by competitive tender.

There are two main types of subcontractors:

- In case the EE project is based on one major technical facility (like a boiler), then the subcontract also contains performance guarantees, thus the subcontractor is also responsible for the results of the operation.
- In case the EE project is based on several different interventions and facilities the contractors have to provide the prescribed output and all the performance is guaranteed by the EH company towards the client.

In each case the structure is strictly hierarchical. The risk taken by the ESCO for 8-10 year payback periods negates the use of more horizontal partnership structures, as the ability of all partners to remain in cooperation over that time period is questionable. The respondent could not imagine a network between competitors except for a loose cooperation of similar actors in order to influence the market as such. There is an ESCO association set up some years ago in Hungary with 7-9 participants for promotional and lobbying purpose but it did not have visible results yet.

6.4 Netherlands: E.Nu Cooperatives

A few interviews have been conducted with partners and initiators of E.Nu Cooperatives in the Netherlands. E.Nu operates on a similar basis to the Hand-in-Handwerker model from Germany, in that it offers a single point of contact for clients. E.Nu operates both as a national cooperative that supports again regional cooperatives, of which there were originally 22, and now only 9 are left. Of particular interest to the development of a networked business model for Proficient is their provision of a model for local organisation formation and establishment. A real integrated solution for the client requires all relevant construction and production disciplines working together, and pursuing to perform according to the indicators agreed upon (costs, construction time, energy performance etc.).

The particular focus of E.Nu cooperatives is the promotion of energy efficient building technologies and services for retrofitting residential buildings. An enormous potential in existing housing stock, but with some typical market entry barriers. Like, for example the market approach (how to promote your product / service to private home owners), or the ability of clients to pay and oversee the whole integrated technical

solution (insulation, installation, energy generation, windows, flooring etc.). The cooperative operates on the principle of offering an integrated solutions to clients, with clear agreement upfront on the costs and the performance of the solution.

A cooperative consists of members, that select a chair from their midst, each member having a vote, and all agree on the regulations within the business cooperative. In the past, many contractors and suppliers perceived the E.Nu cooperative as a sales channel, a way to make business. Unfortunately, the (private) housing market suffered a great deal as a result of the financial crisis from 2008 onwards. Only very recently, the outlook for construction work and housing prices are more positive.

According to the real business partners in the E.Nu cooperatives the real benefit of networking is in the exchange of knowledge, the learning over projects, and integration of technological solutions. Up until now, the cooperatives have only done a small deal of the expected work in projects. In some cases, the regional cooperative is primarily driven to provide the marketing service and providing integrated solutions to client enquiries. Project execution often takes place with prime contractor models. When asked why E.Nu was not executing the projects through the cooperative itself, it was felt that the requirements for paper work, insurance and other legal matters was too complex.

The findings (presented in the Appendix), may be summarized as:

- The cooperative encourages the pooling of knowledge across disciplines.
- Interested in the overall life-time performance of their interventions, not just selling an installations.
- The national cooperative provides a shared knowledge platform for regional bodies. It does not impose quality controls or targets on the local cooperatives.
- Various disciplines are working together, often containing an energy advisor, an installer, general contractor, glass fitters and insulation companies. These disciplines are working together under one name and business entity, within a fixed cooperation format.
- Integrated solutions, that is the tailor-made matching of building and installation components, is considered to be one of the unique selling-points of the E.Nu cooperatives.

- The Cooperative is an add-on to existing businesses, which keep their own identities and fixed customers.
- Members provide a financial investment up front (a subscription model), or pay a fee annually.
- The regional cooperatives are legally constituted organisations and are responsible for contract and quality compliance.
- Trust and reciprocity are essential for the smooth running of the cooperative.

6.5 UK: Interviews with architects

In order to test the viability of the proposed Guild as a networked business model for the delivery of district wide CSO housing, three extended semi-structured interviews were conducted in the UK with architect practices with a variety of experience of EeB and CSO housing; one interview with the architect responsible for the Lancaster Cohousing project, one with a partner of an architect practice with experience of Passivhaus new-build construction, but no experience of cohousing and one with experience of district-wide retrofitting and resident consultation, but no experience of cohousing.

The current practice of all three respondents is:

- For networks to be formed and used on an informal basis, using professionals from other trades within the construction industry who belong to an informal network developed through past experience and trust relationships.
- Distrust in the claims made by the wider industry in terms of their energy efficient focus, exemplified by the term “greenwashing”.
- The importance of trust relationships is apparent through all of the interviews. The ability of all respondents to draw on their own trust-based networks can be seen to improve their offer for clients.
- Clients who act on the network recommendations of their architects can expect a quality standard that may not be easily found by directly contacting contractors themselves.
- This is especially true of energy efficient practice, which may rely on the specialist technical knowledge of those contractors.

- Stringent quality controls were essential to establish trust relationships where members had no previous experience of working together.
- Rigorous, fair contracts that provide opportunities for claw-back for poor performance or non-compliance were highlighted as essential for upscaling construction projects to the district level.
- The financing of the network should be on a project % basis, rather than solely through subscription, to ensure buy-in to the network.
- The incorporation of value-added offers, such as training provision in CSO housing construction, could add value to the network and offers the potential to draw in alternative funding streams, both for the network and for CSO housing projects themselves.

7. Project specific function of Open Innovation Guilds and e-marketplace project portal

A major outcome of the Proficient project is the development of an ‘e-marketplace’; an online portal that offers customers and client groups access to design tools and information about CSO housing processes and support. The e-marketplace also offers an SME portal, where SMEs can both tender to deliver products and services to CSO housing groups and develop new networks to enable the offer of district-wide solutions. Drawing on the lessons from the research, it is clear that local variations present challenges to the uniform development of the sector. This is also true of variations between retrofit and new-build CSO housing projects. For this reason it is proposed that the suggested Open Innovation Guild model would be set up for each country or sub-region, rather than across the EU, with perhaps a loose federation on an EU level. Larner (2013), in exploring on-line supported business communities, developed the concept of the “open source Guild”, which builds on models of federation to include the proprietary aspect of the original medieval Guilds. In the context of Proficient, the model may be referred to as an “Open Innovation Guild”, in that it refers here to the sharing and control of intellectual property and to joint working on projects, rather than software development. This Open Innovation Guild model can thus be seen as the adaptation of traditional Guild models to an on-line digital platform, in this case administered through the e-marketplace. Larner indicates that the Open Innovation Guild could be a mechanism to enable the creation of a sustainable business around a community of common interest and shared values. A core of proprietary intellectual property, which in Proficient could include the e-marketplace and its associated software, as well as the name, trademarks, reputation etc., would form the basis for the Guild and its associated member businesses, which benefit from and add to the commons of knowledge and expertise. The Guild model potentially offers the founding SME and members of the Guild the advantages of benefiting from the commons of expertise and knowledge, working with other Guild members to create larger markets, and potentially operating as a larger entity for buying supplies and accessing customers, working in this respect more like a federation. Whilst Larner refers specifically to micro businesses, the model could be easily adapted for application to SMEs engaged in CSO housing developments, enabling them to create a community of stakeholders based on shared values and

expertise, where a stakeholder is defined as ‘any group or individual who is affected by or can affect the achievement of an organization’s objectives’ (Freeman 1984, p. 46).

If the SPV model is applied to CSO housing, the offer of the Guild can be seen as potentially offering design, construction, maintenance, services, utilities and project finance. Thus in this model Guild members can be viewed as a pool of skilled SMEs, construction suppliers, ESCOs and maintenance contractors who can be offered membership of specific SPVs as projects arise. The benefit for member organisations to bring new projects to the Guild is the additional profit for them that can be drawn down from their function as a systems integrator, managing projects from initiation through to conception and beyond. The benefits for clients are single point of contact and overall cost reductions. The examples of the developing effectiveness of the E.Nu and Hand-in-Handwerker co-operative models indicate that there is a willingness and potential for joint working through a membership federation or Guild, where the cultural and social context allows. The data in both the UK and Hungary, however, indicates that more informal networks are the norm, developed from existing trust relationships. As Lockett et al. (2013) suggest, formalized and centralised networks can create issues of communication and expectations that are not necessarily shared and that the mechanisms used to address this problem can create an environment that promotes a short term perspective, overlooking the importance of social relations. Thus any CSO Open Innovation Guild could offer services appropriate to the context of the country, with more formalised exploitation membership networks supported where appropriate, whilst elsewhere a more exploratory informal network would be the main focus. This approach could also accommodate the differences between the retro-fit and new-build sector, as corporate networks would be supported to form as and when required by local construction needs.

The Guild could thus provide templates for organisational structures for tailored formal contracted partnerships for design and build, design build and service and SPV consortia for the delivery of larger-scale or complex CSO housing projects where appropriate to local context. In other instances, through interaction within the e-marketplace, the product and service offers of individual SMEs would provide information not just to end-user groups, but also to other SMEs as a mechanism to

either develop stronger network ties or to also identify potential project partners or subcontractors for current and future tenders and contracts.

As an open innovation community, the structure of the Guild could help to overcome the problems inherent in the medieval guild model; of stifling competition and closing down market opportunities for competitors. The exploration possibilities, through network development, shared ideas and open listing of offers through an e-marketplace should provide an attractive offer for SMEs to engage. Each national/regional Guild would then need to ensure adequate and locally appropriate quality controls (through certification, customer feedback and/or accreditation for example) to allow trust relationships to develop and encourage exploitation of new market opportunities through networked approaches to larger scale developments. Guilds (federations, cooperatives) are not very common as there are issues which are not easy to handle (IPR, guarantees, risks). They can be handled in the implementation period (in a corporate solution, where contracts are in place) but not so easily when no concrete projects are in place. Therefore, despite the range of potential services an established Open Innovation Guild may offer (listed in the Conclusions) it is recommended that the core functions of the Guild is limited to marketing and lobbying until more established trust relationships are established between members and that intellectual property is not shared outside of formalised corporate agreements.

The provision of networking and knowledge sharing through the e-marketplace or events, model contracts or bespoke advice for the formation of project-specific partnerships and SPVs could provide sustainable income streams for these Guilds, but only if there is a 'protected' or closed section of the e-marketplace where such knowledge sharing can be restricted to subscribed members. Future work could include negotiations with vocational training providers, bulk purchase of supplies and other economies of scale activities.

8. Conceptual networked business models

Figure 4 (below) identifies three SME networked business models that may usefully act to address the scaling-up of CSO housing. The models may be more or less appropriate according to cultural and social national contexts. The contexts of the four EU countries where initial research has been undertaken are mapped to these models below:

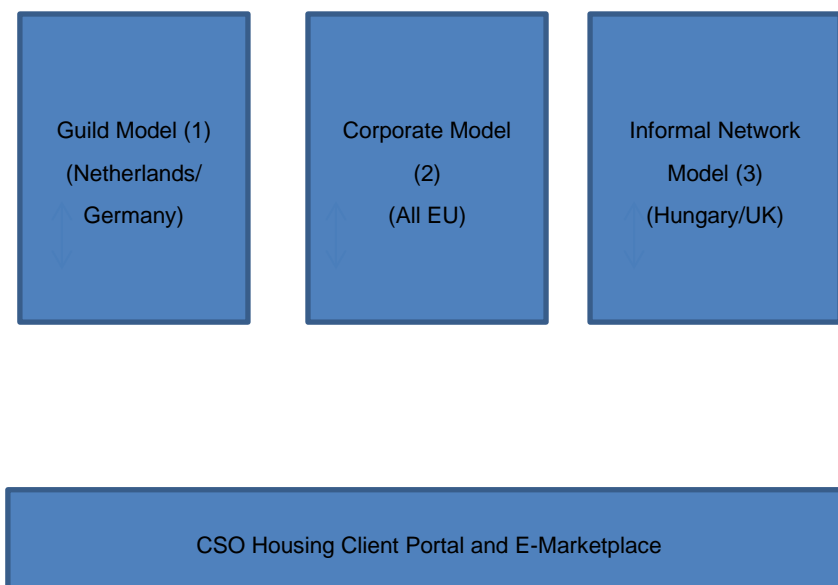


Figure 4: Networked Business Models

8.1 Model 1, the Guild Model

offers a federated approach. This may be more appropriate for those countries where SMEs are used to working within federations (e.g. the Netherlands and Germany, where such models already exist in co-operative form). In this model membership of a Guild would be a pre-requisite for tendering for contracts through the CSO housing platform and e-marketplace, but not for entering the e-marketplace and offering services and/or products, as this can promote the development of loose network ties and exploration activities. The development of strong network ties are facilitated through the Guild and between Guild members for large-scale and complex projects that necessitate a partnership approach. Figure 5 (below) indicates the network ties apparent in this model.

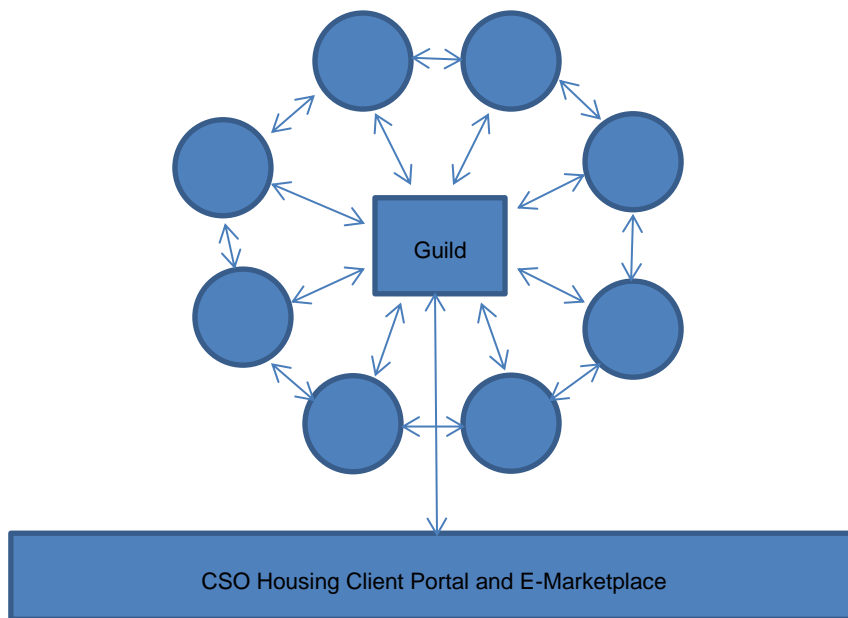


Figure 5: Network ties governed through a Guild

The proposed Guild would operate as a corporate body in the countries of registration. Open access to the e-marketplace would be encouraged, whilst strict quality controls would need to be implemented for more formal partnerships. The levels and function of these quality controls would need to be negotiated according to standard industry practice within the nation/region within which the Guild operates, and a strict auditing regime would need to be implemented. A minimal subscription would be charged to cover basic administration, with the majority of funds arising from % fees for contracts. Following the associate model of the consulting industry, a % finders' fee would be payable to members who bring projects to the Guild. This will encourage members to use the Guild's services, rather than taking projects on with their own businesses.

The Guild would provide a one-stop, single point of contact for clients (user groups, municipalities, housing associations etc.) potential members, the wider construction industry, policy makers, training providers, construction and technology suppliers and the wider public. The SME portal of the e-marketplace would allow the Guild to operate efficiently within each EU state and its functionality would be open to all SME Guild members. The Open Innovation Guild can thus be seen as a conduit through

which more standard construction industry business models can be delivered more effectively, promoting firm ambidexterity.

8.2 Model 2, the Corporate Model

offers an established, traditional prime-contractor, design/build and SPV approach to CSO housing. As in existing construction industry practice, opportunities on the CSO housing platform and e-marketplace can be tendered for in an open, competitive market. As in current practice, this approach would normally entail a lead SME drawing on their existing networks (either through a Guild or in an informal way) or on partners with appropriate reputations. The specific form taken by SME networks would depend on the scale of the project, the nature of the partners and the specific construction industry tradition of individual member states. This model would be appropriate for both new construction and retrofitting. By drawing on the model contracts (see PROFICIENT D3.3), appropriate network structures can be put in place for each contract as they arise. This model is appropriate for SMEs across the EU, as it is adaptable to national context. Figure 6 (below) indicates the networked ties apparent in this model. Network ties are managed through lead contractors.

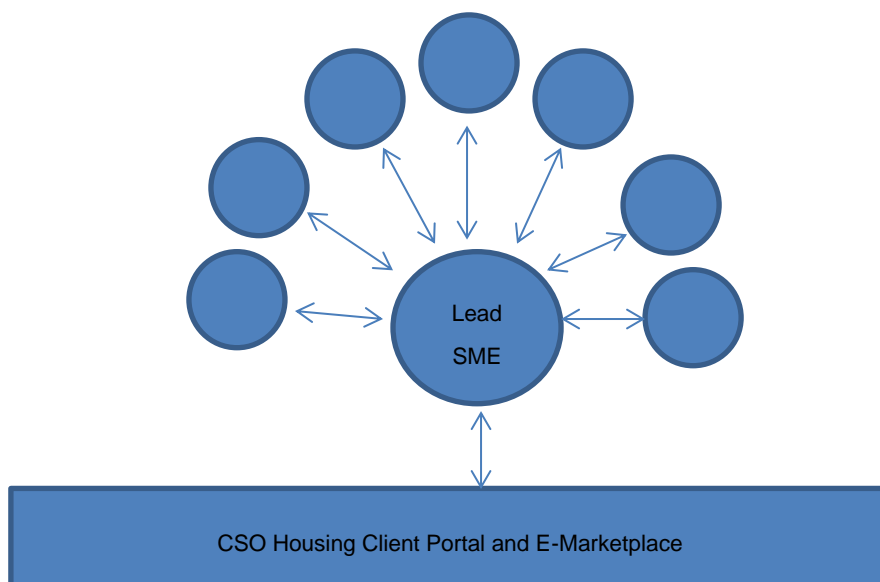


Figure 6: Network ties governed through a Corporate model

8.3 Model 3, the Informal Network Model

relies on the informal networks that are apparent within the construction industry. These trust-based networks rely on shared norms and values, interpersonal relationships and prior experience of joint working. These networks would be most appropriate for smaller scale projects and provide an exploration opportunity for SMEs. More formalized and strengthened networks would develop from these for the delivery of actual projects.

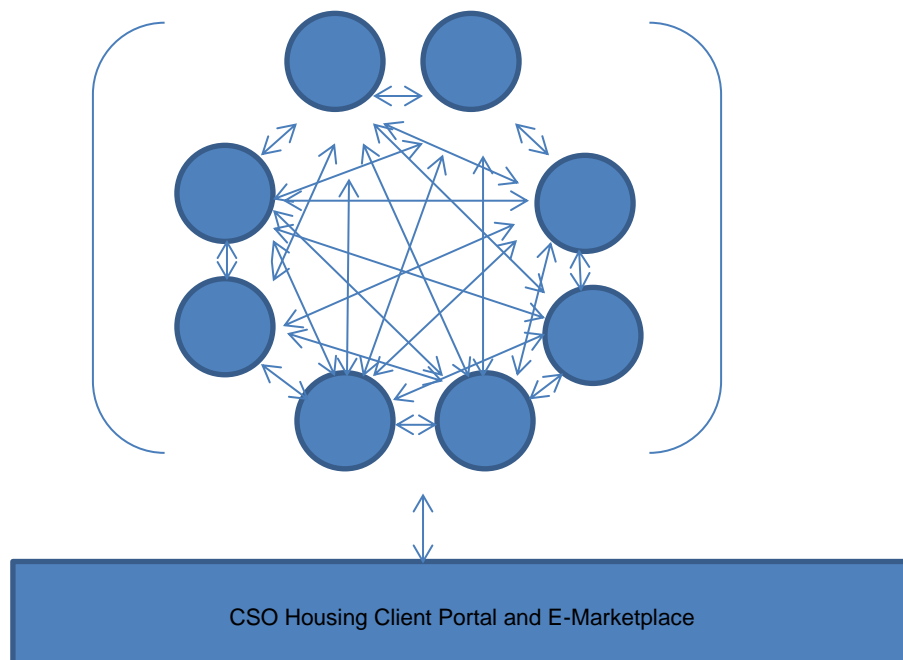


Figure 7: Network ties governed by an Informal Network Model

Table 2 (below) maps the business models (adapted and modified from Osterwester and Pigneur, 2010) in terms of the following:

- Customer segments: Membership of the guild/network and external or networked customers served.
- Value proposition: What are the services offered.
- Risks: How the Guild mitigates risks for each customer segment
- Income: How the Guild derives income and sustainability from delivering value to each customer segment

- Guarantees and IPR : How guarantees can be provided to each customer segment and how IPR are addressed
- Quality Control: How quality is ensured

	Open Innovation Guild	Corporate Model	Informal Network Model
Customer segments	<ul style="list-style-type: none"> • Member SMEs • Construction suppliers • Client user groups • Municipalities/housing associations • Wider construction industry 	<ul style="list-style-type: none"> • Member SMEs • Construction suppliers • Client user groups • Municipalities/housing associations 	<ul style="list-style-type: none"> • Member SMEs • Client user groups
Value proposition	Business expansion in niche market; networking opportunities and events; corporate formation advice; economies of scale; shared expertise; branding; CSO consultation expertise	Business expansion in niche market; corporate formation advice; economies of scale; shared expertise.	Business expansion in niche market; networking opportunities, shared expertise, CSO consultation expertise
Income	Consultancy on corporate formation; membership fees; training provision; % of project fees; % of bulk	% of project delivery or project ownership, % of bulk buying savings, economy of scale in	Incomes are from the implementation period: (same as in the corporate model)

	buying savings; consultancy; model contracts.	the implementation	
Risks	Risks shared through corporate approaches to project delivery (??)	Dependant on corporate structure adopted on a project basis	Risks handled in the implementation phase: same as in the corporate model
Guarantees	Guarantees provided by individual SME networks and corporate structures, not the Guild itself.	Guarantees provided by individual SME networks and corporate structures.	Guarantee is handled in the implementation phase: same as in the corporate model
IPR Control	IPR for model contracts, brand and networks held by the Guild.	IPR held within corporate structures.	IPR is handled in the implementation phase: same as in the corporate model
Quality Control	Open membership for exploration and open innovation activities; Context-specific quality framework for membership of exploitation networks (e.g. Certification, qualification, references etc.)	Context-specific quality framework for membership of exploitation networks (e.g. Certification, qualification, references etc.)	SMEs own quality frameworks; trust and reciprocity

Table 2: Mapping the business models (adapted from Osterwester and Pigneur, 2010)

9. Conclusions

The case for promoting both exploration activities and exploitation activities, through networks, to ensure the success of SMEs in a particular field are well mapped in the literature. Furthermore, the imperative for small firms to engage in both activities to ensure sustainability, known as firm ambidexterity, despite the resource limitations of SMEs, has also been shown.

The proposal put forward in this deliverable is for an Open Innovation Guild model. Different network characteristics for exploration and exploitation can be supported under this structure, allowing for a wide and open membership to encourage open innovation with the ability to facilitate quality controlled structured corporate networks to undertake projects. Existing networked business models used within the construction industry can be facilitated. Value and financial stability for the Guild and its SME members can be provided by business expansion opportunities in the CSO housing market with a direct conduit to clients, municipalities and the wider industry through the e-marketplace. IPR for model contracts, Guild branding and networks could be held by the Guild, offering a sustainable income stream. Networking opportunities and events can encourage entrepreneurial learning and the establishment of trust relationships. The Guild can also offer corporate formation advice, economies of scale, shared expertise and open innovation, branding and shared CSO consultation expertise to members. Risks can be mitigated through standard industry practice, through the formation of limited liability corporate structures for project delivery. By providing open membership for exploration and open innovation activities large scale SME involvement can be promoted. Membership of project specific corporate structures, on the other hand, would be subject to national context-specific quality frameworks for membership (e.g. Certification, qualification, references etc.) to ensure high quality delivery in practice.

The national or sub-regional Open Innovation Guilds could also provide a conduit for promoting and developing the field of CSO Housing, through membership of wider networks within the construction industry and as a stakeholder representative in policy and planning forums, promoting the concept and practice of CSO housing to a wider audience. Input into construction industry training and accreditation planning

frameworks could also assist the development of sector specific skills provision, employment opportunities and SME market share.

In conclusion, the PROFICIENT e-marketplace can provide a platform for the development of networked business models that allow the upscaling of CSO housing retrofitting or new build where appropriate. The Guild model proposed can fulfil a variety of functions, from branding, lobbying, accreditation and back-office support services through to the facilitation of SPV creation to allow very large scale projects to be tendered for and delivered by SMEs involved in the network. It also has the potential for increasing income streams beyond the capital expenditure of design and build to the ongoing income provided by maintenance and energy-efficient service delivery functions (Figure 8). The functions of the e-marketplace platform shown as 'project-based' in the figure could all be facilitated through the Guild.

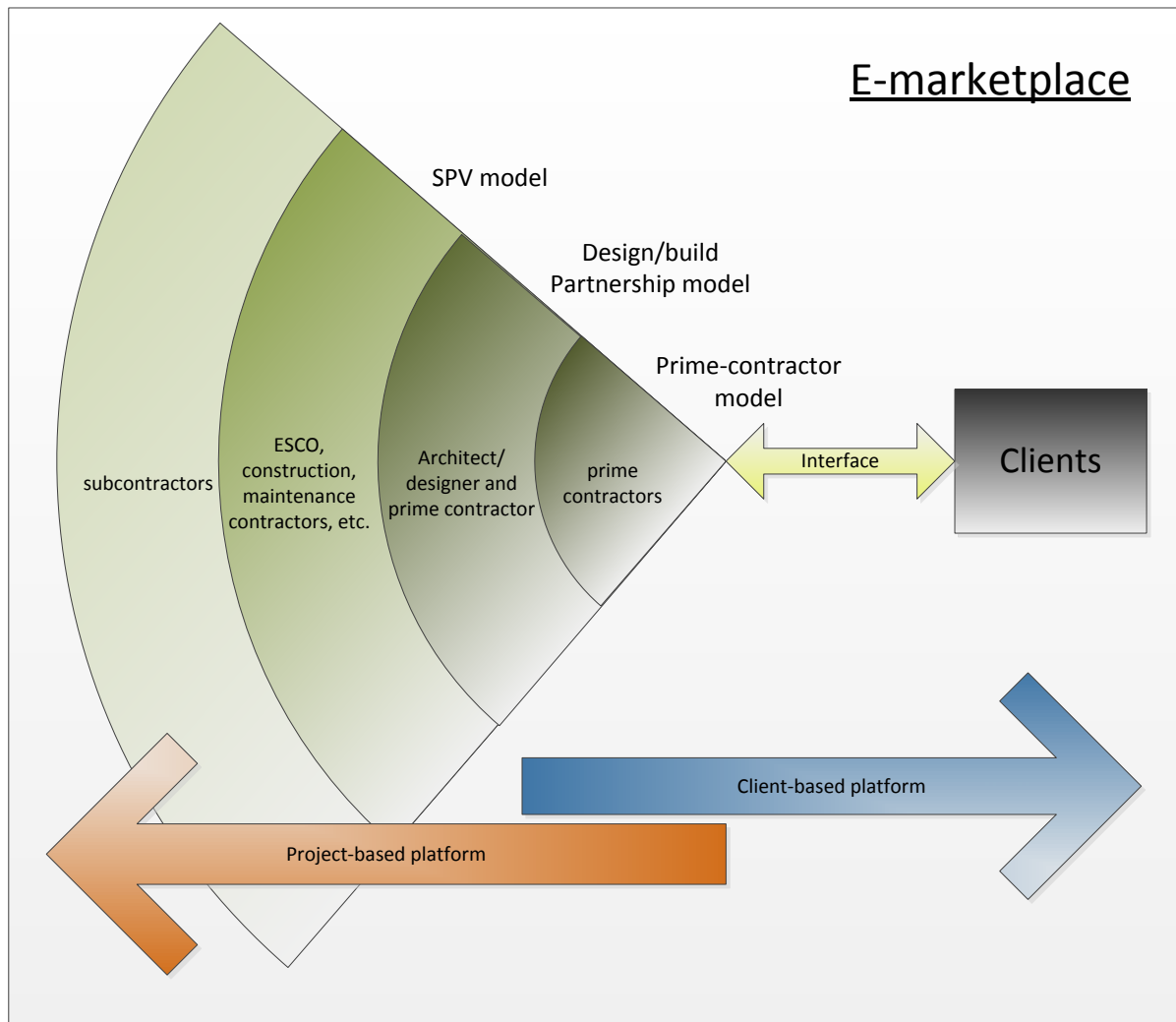


Figure 8: Function of the e-marketplace in delivery of CSO housing projects.

In addition, the Guild model for SMEs engaged in CSO housing could incorporate some of the following wider functions, developing beyond the core functions shown within this paper. Not all functions need be operated for the Guild to perform effectively and some functions can be seen as aspirational depending on the initial success of the Guild model:

- Marketing, branding and PR
- Shared expertise
- Financial Solutions

- CSO Processes, advice and direct support
- Franchising
- Economies of scale
- Quality control after project implementation, through accreditation by the Guild of new-build and retrofit projects that meet Guild criteria post-completion
- Contracting (as lead contractor or through SPV)
- Accreditation of member SMEs, through a process of checking and ratifying qualifications, experience and recommendations from previous customers
- Access to networking opportunities
- Partnership opportunities
- A single point-of-contact for customers, policy makers, planners and other external bodies who wish to engage with CSO-orientated SMEs
- Country specific advice on financial support and compliance for members
- A lobbying platform to impact on EU, national and local policies and initiatives
- Tender opportunities only available to members
- Contract support and corporate formation
- The development of Guild-based training and accreditation for external SMEs in effective CSO practice and the development of apprentices across member SMEs to develop the necessary skills base for the future
- Specialist back-office support in legal, compliance, contract, HR Health and Safety, accountancy etc. services

One benefit of the model would include a direct feed-through from CSO customers, as the accreditation and quality control process would provide a shortcut to establishing trust relationships with SMEs.

The Guild model will not be appropriate for all sizes and types of projects or be suitable for all national contexts. In some cases the use of corporate models

(standard construction industry business models) will be most appropriate. In this case the Guild can act as a conduit for the formation of corporate solutions to deliver CSO housing. There is a challenge and a potential future risk in these models that should be acknowledged however, for SMEs seeking to scale-up, as the open competitive nature of the e-marketplace would allow larger construction companies and developers to tender, and possibly undercut, smaller players in the market. The likelihood of this increases as the CSO housing market becomes more established, the co-design process becomes streamlined and profitability is increased. It is therefore essential that any prospective Guild seeks to increase the knowledge and skills base of member SMEs to allow them to fully engage as equal partners in SPVs and other corporate partnerships in this growing and developing field as a priority function. The reality across the EU, however, is that CSO housing remain small-scale and outside of the remit of large scale development and construction companies. On the other hand in case of small-scale CSO housing projects adaptability and flexibility (mostly in case of new construction), is where SMEs have a significant comparative advantage. The question remains as to how SMEs can be motivated to share their knowledge with others and potentially let their IPR be used by others. The values of open innovation will need to be balanced with the need for SMEs to keep their IPR. On the other hand in the CSO new construction market where the specialty of the SMEs is not the IPR, but rather their personal capabilities and reputation, this cannot be easily shared in an E-market place. The role of an e-market place in strengthening more formal network models (through model contracts, the facilitation of partnerships and through tender opportunities) can be offered as a lure for SMEs to join any Guild structures.

The use of Informal Network models is likely to continue to be beneficial for SMEs whatever the growth of the sector. Where a CSO community works with an architect or other design facilitator to arrive at a final design before tender, it is likely that the use of established networks will continue. In these cases it is unlikely that the e-marketplace will be used to offer tender opportunities; in informal networks membership is usually by invitation. The Guild function in this case will be to work to strengthen informal networks and facilitate the discovery of new partners.

10. References

Aldrich, H., B. Rosen, & W. Woodward. (1987) "The Impact of Social Networks on Business Foundings and Profit: A Longitudinal Study." In *Frontiers of Entrepreneurship Research*, pp. 154–168. Wellesley, MA

Alessi, L. & Staaf, R., (1994). "What does reputation really assure? The relationship of trademarks to expectations and legal remedies" in *Economic Inquiry*, XXXII, pp.477–485

Ancona DG, Goodman PS, Lawrence BS and Tushman ML (2001) 'Time: A new research lens' in *Academy of Management Review* 26(4):pp. 645-663

Anderson J.C. and Narus J.A. (1998) "Business marketing: understand what customers value" in *Harvard Business Review* 76, pp. 58-65.

Andriopoulos C and Lewis MW (2010) 'Managing innovation paradoxes: ambidexterity lessons from leading product design companies' in *Long Range Planning* 43(1):pp. 104-122

Atuahene-Gima, K. 2005 "Resolving the Capability–Rigidity Paradox in New Product Innovation"

In *Journal of Marketing*, 69, pp. 61-83.

Beckman CM and Haunschild PR (2002) 'Network learning: The effects of partners' heterogeneity of experience on corporate acquisitions' in *Administrative Science Quarterly* 47(1):pp. 92-124

Benner, C., (2003). "Computers in the Wild": Guilds and Next-Generation Unionism in the Information Revolution" in *International Review of Social History*, 48(S11), pp.181–204

Benner MJ and Tushman M (2002) 'Process management and technological innovation: A longitudinal study of the photography and paint industries' in *Administrative Science Quarterly* 47(4): pp. 676-707.

Birley, S. (1985) "The Role of Networks in the Entrepreneurial Process." *Journal of Business Venturing* 1(1):pp. 107–117

Bonanni, L. & Parkes, A., (2010). "Virtual Guilds: Collective Intelligence and the Future of Craft" in *The Journal of Modern Craft*, 3(2), pp.179–190

Brady, T., Davies, A. and Gann, D. M. (2005), "Can integrated solutions business models work in construction?" in *Building Research & Information*, 33: pp. 571-579

Brown, J.S. and Duguid P., (2000). *The social life of information* Boston: Harvard Business School

Brusoni S., Precipe A. and Pavitt K. (2001) "Knowledge Specialization, organizational Coupling and the Boundaries of the Firm: Why Do Firms Know More Than They make?" in *Administrative Science Quarterly* 46. Pp. 597-621

Cantarello S, Martini A and Nosella A (2012) 'A Multi-Level Model for Organizational Ambidexterity in the Search Phase of the Innovation Process' in *Creativity and Innovation Management* 21(1):pp. 28-48.

Chesborough H. (2010) "Business Model Innovation: Opportunities and Barriers" in *Long Range Planning* 43, pp. 354-363

Danneels E (2002) 'The dynamics of product innovation and firm competences' in *Strategic Management Journal* 23(12):pp. 1095-1121

De Moor, T., (2008). "The Silent Revolution: A New Perspective on the Emergence of Commons, Guilds, and Other Forms of Corporate Collective Action in Western Europe" in *International Review of Social History*, 53(S16), p.179

Defourny, J. & Develtere, P., (1999). "The social economy: the worldwide making of a third sector" in Defourny, J., Develtere, P. and Fonteneau, B., (eds) *L'économie sociale au Nord et au Sud*, Brussels: De Boeck

Dyer JH and Singh H (1998) 'The relational view: Cooperative strategy and sources of interorganizational competitive advantage' in *Academy of Management Review* 23(4):pp. 660-679

Eisenhardt KM and Martin JA (2000) 'Dynamic capabilities: What are they?' in *Strategic Management Journal* 21: 1105–1121

Epstein, S., (1998). "Craft guilds, apprenticeship, and technological change in preindustrial Europe" in *The Journal of Economic History*, 58(3), pp.684–713

Fang C, Lee J and Schilling MA (2010). 'Balancing exploration and exploitation through structural design: The isolation of subgroups and organizational learning' in *Organization Science* 21(3):pp. 625-642

Fuad-Luke, A., (2009). Design Activism, London: Earthscan.

Filippini R., Güttel W.H., Nosella A. (2012), 'Ambidexterity and the evolution of knowledge management initiatives' in Journal Of Business Research, 65 (3), pp. 317–324

Gann, D. M. and Salter, A. (2000). Innovation in project-based, service-enhanced firms: the construction of complex products and systems. Research Policy, 29(7–8): 955–972

Green, S., Newcombe, R., Frenie, S. and Weller, S. (2004). Learning Across Business Sectors: Knowledge Sharing between Aerospace and Construction, Reading: University of Reading

Groen AJ, Wakkee IA and De Weerd-Nederhof PC (2008) 'Managing Tensions in a High-tech Start-up An Innovation Journey in Social System Perspective' in International small business journal, 26(1): pp. 57-81

Gupta AK, Smith KG and Shalley CE (2006) 'The interplay between exploration and exploitation' in Academy of Management Journal 49(4):pp. 693-706

Hagel, J. & Singer, M., (1999). "Unbundling the corporation" in Harvard Business Review, (April 1999), pp.133–141

Hargrave, T. & Ven, A. Van de, (2006). A collective action model of institutional innovation in Academy of Management Review, 31(4), pp.864–888

He ZL and Wong PK (2004) 'Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis' in Organization Science 15(4): 481-494

Hippel, E. Von, (2005). Democratizing Innovation, Cambridge, Massachusetts: MIT Press

Hughes M, Hughes P and Morgan RE (2007) 'Exploitative Learning and Entrepreneurial Orientation Alignment in Emerging Young Firms: Implications for Market and Response Performance' in British Journal of Management 18(4):pp. 359-375

Johnson-Lenz, P. & Johnson-Lenz, T., (1981). "Consider the Groupware: Design and Group Process Impacts on Communication in the Electronic Medium" in Hiltz, S. & Kerr, E. (editors) Studies of Computer- Mediated Communications Systems: A Synthesis of the Findings, Newark: New Jersey Institute of Technology

Johnstad, T., (1997). Co-operatives and federations in *Journal of Co-operative Studies*, (89), pp.48–60

Katila R and Ahuja G (2002) ‘Something old, something new: A longitudinal study of search behavior and new product introduction’ in *Academy of Management Journal* 45(6):pp. 1183-1194

Kim N and Atuahene-Gima K (2010) ‘Using Exploratory and Exploitative Market Learning for New Product Development’ in *Journal of Product Innovation Management* 27(4):pp. 519-536.

Lane P J and Lubatkin M (1998). ‘Relative absorptive capacity and interorganizational learning’ in *Strategic Management Journal* 19: 461-477

Lave, J., & Wenger, E., (1991). *Situated Learning: Legitimate Peripheral Participation*, Cambridge: Cambridge University Press

Levinthal, D. A. and March, J. G. (1993), “The myopia of learning” in *Strategic Management Journal*, 14:pp. 95–112

Mangold, W.G. & Faulds, D.J., (2009). “Social media: The new hybrid element of the promotion mix” in *Business Horizons*, 52(4), pp.357–365

March J.G (1991) ‘Exploration and exploitation in organizational Learning’ in *Organization Science*. 2(1): pp. 71-87

Merges, R., (2005). From medieval guilds to open source software: Informal norms, appropriability institutions, and innovation. SSRN working paper @ http://papers.ssrn.com/sol3/papers.cfm?abstract_id=661543

O’Reilly CA and Tushman ML (2004) ‘The ambidextrous organization’ in *Harvard Business Review* 82(4):pp. 74-83.

O’Reilly CA and Tushman ML (2008) ‘Ambidexterity as a dynamic capability: Resolving the innovator’s dilemma’ in *Research In Organizational Behavior* 28:pp. 185-206

Orlikowski, W., (2002). “Knowing in practice: Enacting a collective capability in distributed organizing” in *Organization Science*, 13(3), pp.249–273

Osterwalder A. and Pigneur Y. (2010) *Business Model Generation* Wiley & Sons, New Jersey

Pencavel, J., (2012). Worker cooperatives and democratic governance. Forschungsinstitut zur Zukunft der Arbeit Discussion Paper Series, No. 6932, <http://www.econstor.eu/handle/10419/67218>

Perez, C., (1985). "Microelectronics, Long Waves and World Structural Change: New Perspectives for Developing Countries" in *World Development*, 13(3), pp.441–463

Prahalad C. K. and Hamel G. (1990) 'The Core Competence of the Corporation' in *Harvard Business Review* 68:pp. 79-91

Prencipe A., Davies A. and Hobday M. (eds) (2003) *The Business of Systems Integration* Oxford University Press, Oxford

Qualman, E., (2009). *Socialnomics: How social media transforms the way we live and do business*, Hoboken: John Wiley and Sons

Rheingold, H., (1993). *The Virtual Community: Homesteading on the Electronic Frontier*. Cambridge, USA: MIT Press

Saxon R. (2003) JCT Povey lecture, RIBA, 29th October 2003

Shafer S. M.; Smith J. H. and Linder J. C. (2005) 'The power of business models' in *Business Horizons* 48, pp. 199-207

Schmidt, K., (2011). *Computer Supported Cooperative Work*. London: Springer

Schneeweiss, C., (2003). *Distributed Decision Making*, Berlin: Springer

Soetanto DP and Jack SL (2013) 'Business incubators and the networks of technology-based firms' in *The Journal of Technology Transfer* 38(4): 432-453

Song, X. M. and Montoya-Weiss, M. M. (1998) 'Critical Development Activities for Really New versus Incremental Products' in *Journal of Product Innovation Management* 15:pp. 124–135

Spear, R., (2000). "The Co-operative Advantage" in *Annals of Public and Cooperative Economics*, 71(4), pp.507–523

Teece D. J. (2010) "Business Models, Business Strategy and Innovation" in *Long Range Planning* 43, pp. 172-194

Tencati, A. & Zsolnai, L., (2008). "The Collaborative Enterprise". *Journal of Business Ethics*, 85(3), pp.367–376

Ulhøi, J.P., (2004). "Open source development: a hybrid in innovation and management theory" in *Management Decision*, 42(9), pp.1095–1114

Van de Ven, A.H., Huson,R. and Schroeder, D.M. (1984) 'Designing New Business Startups: Entrepreneurial, Organizational and Ecological Considerations' in *Journal of Management*,10 (1):pp. 87-107

Vera D and Crossan M (2004) 'Strategic leadership and organizational learning' in *Academy Of Management Review*, 29(2):pp. 222-240

Wegner, E., (2006). *Communities of practice: a brief introduction* @ <http://www.ewenger.com/theory/>

Winch G. (1998) "Zephyrs of Creative Destruction: Understanding the Management of Innovation on Construction" in *Building Research and Information* 26(4). Pp.268-279

Wadhwa A and Kotha S (2006) 'Knowledge creation through external venturing: Evidence from the telecommunications equipment manufacturing industry' in *Academy of Management Journal* 49(4): pp. 819-835

Zott, C., Amit, R. & Massa, L., (2011). "The Business Model: Recent Developments and Future Research" in *Journal of Management*, 37(4), pp.1019–1042