

THE BUSINESS MODEL EFFECT ON COLLABORATIVE PRODUCT DEVELOPMENT IN SME CONSTRUCTION COMPANIES

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The housing construction industry in Sweden is fragmented with few major actors dominating the housing market and several local or regional small and medium (SME) sized construction companies. This combined with the SME's lack of resources for knowledge consuming activities such as product development and innovations, creates a super competitive situation for the SME companies. Studies shows that innovation and business model are tightly linked to each other. A business model that is robust can be used as foundation for innovation. The business model needs to define the market, partnerships, product attributes meeting market requirements and production parameters such as cost, time and quality, which are all necessary input for achieving product innovation. This paper investigates a SME construction company and its suppliers, initially linked by traditional working agreements, when developing a product collaboratively in order to gain increased market shares. This paper elaborates on whether developing the business model might be a possible key success area for SME construction companies, which might enhance their possibilities in offering a more competitive product to the market. The objective is to find a methodology that is applicable and workable for the SME's in construction industry and to develop a framework for analysis. The work described in this paper aims at improving our understanding of the SME product development process. The result of the product development project has been a new design process with a business model that has longer contractual agreements rather than short-term project procurement.

Keywords: product development, supply chain management, business development, innovation.

INTRODUCTION

The housing construction industry in Sweden is fragmented with few major actors dominating the housing market and several local or regional small and medium (SME) sized construction companies (See Table 1). The housing construction industry is focusing on product development and specially companies working with off-site production. Off-site production is driven by product development and focuses on the design process which implies the need of using resources earlier than on the actual construction site (Björnfot and Stehn 2007).

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Table 1: The EU Commission adopted Recommendation 2003/361/EC regarding the SME definition. Enterprises qualify as micro, small and medium-sized enterprises (SME) if they fulfil the criteria. In addition to the staff headcount ceiling, an enterprise qualifies as an SME if it meets either the turnover ceiling or the balance sheet ceiling, but not necessarily both

Enterprise category	Headcount	Turnover	or	Balance sheet total
medium-sized	< 250	≤ € 50 million		≤ € 43 million
small	< 50	≤ € 10 million		≤ € 10 million
micro	< 10	≤ € 2 million		≤ € 2 million

SME development capabilities can be characterized as having few resources for development and the daily work of managers and key-personnel is hands-on and without support in the initial phase when the business model is defined. The companies also seems to lack the ability to execute their strategies (Elmhester 2008).

Compared to large companies, the SME manager, often the firms's owner, does not have extended management team representing the different competencies needed (Ylinenpää 1997). Multiple responsibilities are often handed to one person.

This means that the SME often lack the resources or time needed for structured product development. The consequence being often that the manager decides based on a feeling when and how to develop a product (Pitta, 2008).

At the same time, studies shows that innovation, product development and business model are tightly linked to each other. A business model that is robust can be used as foundation for product development and innovation (Ylinenpää 1997).

According to Ylinenpää (1997), the importance of small firms was more or less ignored for decades even though small enterprises in Europe are at least 95% of all enterprises. But the political climate has changed and the large mass producing industries rationalisation has an expectation to be compensated by the SME sectors. Small business development importance has been underlined by two studies; in Sweden 78% of the net growth of employment during the period of 1985-91 was created by small businesses employing 1-19 persons and during the economic recession between 1990-93 and the turn-around which took place in 1994, these results were confirmed (Ylinenpää 1997).

This paper investigates a SME construction company and its suppliers, when developing a product collaboratively in order to gain market shares in a cost-efficient way. The idea of network capability as influencing competitiveness positively is supported by Parida (2010). The scientific purpose is to develop a framework for understanding how the product development process in SME construction company can be enhanced, and to build a theoretical model for analysis. The investigated project has been a collaboration project between a traditional house manufacturer and its suppliers. The project members were assumed to participate and share the responsibility for product development.

The fact that SME companies operate in an environment that gives little opportunity to structured research and development, which might be the basis for product

development, gives an understanding of the methodological challenge in production innovation at SME companies. The other reason why it is important to investigate SME competitiveness is that it seems that SME's plays a large role in net growth employment and especially during economic recessions.

The hypothesis of this paper is that a possible key success area for an SME, is developing their business model as a way to enhance their possibilities to offer a more competitive product to the market. The objective is to find a methodology that is applicable to the SME in construction industry; a systematic and practically doable approach for developing competitive products and managing them during their life cycle.

METHOD

A qualitative case study focusing on the **product development process** was conducted, whose analysis was based on the approaches discussed in the preceding section of this paper; the sources of the data analysed are shown in Table 1. The process was led by a Swedish off-site timber construction company. The company produces detached dwellings for leisure and for single- or family-occupancy; the dwellings are constructed using pre-fabricated elements that are assembled on-site.

The construction company invited eight suppliers to collaborate in the design and production of single family housing for the B2B market. Rather than using a traditional approach to development, the idea was to collaborate, i.e., the suppliers were to become part of the product development process and design input was provided by architects and potential clients. It was anticipated that collaboration would lead to a more competitive housing design and a more efficient and innovative supply chain. The product development process was conducted during a series of joint meetings, supported by the authors.

Table 2: Sources of data obtained during the case study.

Data collection	Number
Interviews	12
Group Interviews	7
e-mail	1358
Value Stream Mapping	2

The construction company co-operates with a limited number of key-suppliers, but the nature of its products implies that they work with a broad client base. The complexity of housing products and processes are, if we disregard from the fact that a pre-fabricated house contains a lot of components, generally low. Product development, besides normal client adjustments, is at present non-existent. The typical competence in the project group is represented by blue-collars, either fabricating different types of houses having only a compulsory school background or two years from a practical upper secondary school. Some of the managers holds higher, although not university, qualifications.

THEORETICAL FRAME OF REFERENCE

The theoretical frame of reference for our analysis has been SME company development and product development in small firms and also business model theories.

SME characteristics

Stage gate evaluation is often described as necessity for product development, but smaller companies do not normally employ these. In smaller organizations, such ideas may make it to the introduction stage without being evaluated with a rigorous stage-gate process. (Pitta 2008)

SME companies also often operate in an external uncertainty of the environment that is often greater than in large firms, but compensated by internal understanding and consistency of the firm's goals, strategies and actions. In small firms ownership, management and control are normally integrated and personified by the owner-manager, implicating a more simple and effective decision-making process. This facilitates for a small firm to operate in a more flexible manner than a larger firm, which is often tied up by formal plans, expectations from external shareholders, and a more complicated decision-making process (Ylinenpää 1997).

It might even be so that that a small firm, due to a greater external uncertainty, is more exposed to utilize flexibility as a competitive weapon. This flexibility is understood to be characterized by a more reactive decision-making style and informal planning, often formed more by emergent than deliberate strategies. (Ylinenpää 1997)

Product Innovation

(Pitta 2008) refers to Cooper, R. (1999), "From experience: the invisible success factors in product innovation", *Journal of Product Innovation Management*, Vol. 16 No. 2, pp. 115-33) the "correct" process for identifying good product concepts and shepherding them through the product innovation process. Companies and individuals who ignore them run a higher risk of failure than those who follow them. The reasons that not following the factors means that the process is on a path to higher risk. Cooper (1999) reported perhaps the most succinct set of factors that are:

1. Solid up-front homework – to define the product and justify the product.
2. Voice of the customer – a slave-like dedication to the market and customer inputs throughout the project.
3. Product advantage – differentiated, unique benefits, superior value for the customer.
4. Sharp, stable and early product definition – before development begins.
5. A well-planned, adequately-resourced and proficiently-executed launch.
6. Tough go/kill decision points or gates – funnels not tunnels.
7. Accountable, dedicated, supported cross-functional teams with strong leaders.

The implication is that when the situation becomes more complex, defined as a higher level of competition, more and more complex products, more regulations to follow, and more customers to serve, the need for planning, formalization, goals, and objectives increases. (Pitta 2008)

The business model

The business model describes the business logic and gives a direction how business creates and delivers value to customers. It also defines the basic structures of revenues, costs and profits connected to the company delivering the value. “In essence, a business model embodies nothing less than the organizational and financial ‘architecture’ of a business” (Teece 2009)

Business models are often sprung out of by technological innovation which creates both the need to bring discoveries to market and the opportunity to satisfy unrequited customer needs. At the same time, new business models can themselves represent a form of innovation. Figuring out how to deliver value to the customer and to capture value while doing so are the key issues in designing a business model: it is not enough to do the first without the second (Teece 2009).

But developing a successful business model is insufficient in and of itself to assure competitive advantage. In practice, successful business models very often become, to some degree, ‘shared’ by multiple competitors. Having a differentiated (and hard-to-imitate) but at the same time effective and efficient architecture for an enterprise’s business model is important to the establishment of competitive advantage.(Teece 2009)

In short, innovating with business models will not, by itself, build enterprise-level competitive advantage. However, new business models, or refinements to existing ones, like new products themselves, often result in lower cost or increased value to the client; if not easily replicated by competitors, they can provide an opportunity to generate higher returns to the pioneer, at least until their novel features are copied.(Teece 2009)

RESULTS

Due to the imbalance of size in the market the construction company invited its suppliers to collaborate in a product development process.

The collaboration project ran into a number of early problems. The first product developed by the group seemed to have no value for the client, and it rapidly became apparent that the group did not have a well-defined target client for their product. The project team then decided to use a product development method used by small companies, but quickly became troubled by the price of the new house design. The technique of target costing was tried, but as it was unfamiliar to many of the participants, it did not prove useful. These problems led the group to consider questions of collaboration, such as “How should the collaboration agreement look like?” and “Should we start a new company together” and “Who owns the business model and the client?”. The project group began to lose focus, and the contractor decided to slow down the development.

The suppliers did not seek to play an active role in the design process, and were content to sit back and wait for an order to produce, which is the way they are used to working in traditional construction.

The business model together with the ability of systematically working with client needs and requirements and the use of common and communicated objectives in a product development team seem to affect the supplier willingness to participate in product development process.

ANALYSIS

To understand and to visualize when and in what kind of situation the group came to certain conclusions, a matrix for SME development areas and for the development process where used for drawing a roadmap.

The model, figure 1, for analysis is based on both the theoretical frame of reference and empirical observations.

The matrix is based on established and agreed development areas that has been used by organisations focusing on regional growth by SME's for more the five years, which means that SME companies are well familiar with this categorisation. The development process, on the other hand, aims at visualising important events and the necessary decisions between these events, for example the decision for starting to plan the development of something new. This model was originally developed for supporting communication.

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Development Areas	Development Process	Insight of possibility or problem	Knowledge about area of insight	Planning for change	Performing change	Evaluation and further changes
Export						
Market and sales		⑥	⑦	⑧		
Purchase						
Product		③	④	⑤		
Research						
Production		①	②			
Competence						
IT-support						
Personnel						
Organization incl. board of directors						
Ownership						
Other						

Figure 1: Model for analysis. The model is used as a practical road map used for both discussing and identifying potential developments areas and for identifying where in the development process a SME Company or a specific person is situated.

The generic areas for business models are: Export, Market and sales, Purchase, Product, Research, Production, Competence, IT-support, Personnel, Organization incl. board of directors, Ownership, Other.

The knowledge accumulated is divided into: Insight of possibility or problem, Knowledge about area of insight, Planning for change, Performing change, Evaluation and further changes.

When analyzing the path made by the project group, figure 1, one can state that this might be a typical case for a product development project or any development project. The project group initially approached the problem as a normal production or supply chain problem, with the purpose of making the production more cost efficient.

However after gathering knowledge the group came to the conclusion that they needed a defined product in order to make the supply chain more efficient, which then moved them on to product development. , Once the project group started to learn more and after a while when planning the product production phase and entering product calculation the question “what is the client willing to pay for this?” rose and after that

shortly “who is the client”. This gave the insight that the group lacked selling capacity and also that they lacked market focus

Could the group have shortened the project life cycle if used the model in figure 1?

DISCUSSION AND CONCLUSIONS

The work in the project has focused mainly on criteria's for achieving competitiveness through supplier involvement in the product development process. The conclusion is that the business model has to be more innovative and change from short term contracts and focusing on the lowest bid to long term contracts and the supplier adding value. In fact the business model is probably the main success factor. Then the company needs to look that in their business model that has to be developed; product, production, sales or IT-support and innovate within that area in order to create a win-win situation in the collaboration project.

However, the results do not conclusively prove or disprove the hypothesis. The analysis shows that it is reasonable to assume that business model heavily effect the different processes in a company and specially product development. However, further work is required to obtain a deeper understanding of the effects and the ways in which they are interrelated. Further research is needed both to define the model but also to verify it accuracy.

The research project moves on in order to elaborate on the key areas in order to find a more accurate model for competitive product development in a collaborative research project. All business has to have defined business model since it is that it defines how clients are willing to pay for your product and how you should operate your organization in order to maximize your profit.

The model has its obvious weakness in the areas chosen for the business model. They might be too broad and in that sense they might not pinpoint the accurate problem. Further research is needed to define the areas on the y-axis. In similar way the x-axis corresponding to the learning curve. The model needs to be built on more theory. If using a lean tool like 5 why's it might be that the model could steer an innovation project to the right questions to answer. It might not always be the obvious.

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