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The Importance of Industrial Design for Small Wood Manufacturing Companies – An Analysis from the Manufacturers' Perspective.

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Although industrial design use in small companies has been discussed more frequently in the literature in the past few years, very little research has been specifically done on the wood industry. This article presents a study of design use in small wood manufacturing companies in the northeast region of Sweden. Qualitative empirical data was collected from nine wood manufacturing companies using a structured questionnaire combined with a series of semi-structured interviews. The results indicate that industrial design is important for increasing competitiveness in small wood manufacturing companies. The firms that had invested in design found that it was of vital importance for business success. The general knowledge of design and commercial outcome of investments were, however, limited, and in several cases project management was experienced as difficult to cope with. Thus there is a need for enhancing design awareness and providing training in design management.

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Abstract

Although industrial design use in small companies has been discussed more frequently in the literature in the past few years, very little research has been specifically done on the wood industry. This article presents a study of design use in small wood manufacturing companies in the northeast region of Sweden. Qualitative empirical data was collected from nine wood manufacturing companies using a structured questionnaire combined with a series of semi-structured interviews. The results indicate that industrial design is important for increasing competitiveness in small wood manufacturing companies. The firms that had invested in design found that it was of vital importance for business success. The general knowledge of design and commercial outcome of investments were, however, limited, and in several cases project management was experienced as difficult to cope with. Thus there is a need for enhancing design awareness and providing training in design management.

1 Introduction

Research has shown that effective use of design by small companies can contribute positively to business performance and competitiveness (Walsh et al. 1992). According to Svengren (1995), well planned design could increase the efficiency of product development, serve as a driving force for innovation, lead to more customer-adjusted products and make products easier to identify on the market.

However, studies have also shown that, even though many small companies have a range of business needs for design, their awareness of and competence to manage design effectively vary considerably (Bruce 1999).

Industrial design has been identified by the Swedish Government as a key area for Swedish industry and especially for the small business sector. The Government has given the Swedish Agency for Innovation Systems, VINNOVA, the assignment to promote sustainable growth by developing effective innovation systems and funding problem-oriented research. In their vision for 2010, wood manufacturing is pointed out as a highly prioritized area with potential for economic growth. The present article reports the results of a study of design use in small wood manufacturing companies¹ in the northeast region of Sweden. The

¹ By wood manufacturing is meant here the later stages of processing, with products from these areas: carpentry (doors, windows, floors, interior decoration and kitchen), furniture (home furniture and public furniture) and wood components (strips, edge glued panels, coffins, turned mate-

study is a part of a regional project aimed at finding new resources for development of the local wood industry.

1.1 Small businesses and product development

Small companies² differ from larger ones in many ways. Small companies tend to be managed by the owner, who is responsible for both the company and all employees (Larsson, 2001). Another big difference may be found with regard to both financial and human resources. Storey (1994) shows that larger firms have more capital, net assets and reserves than smaller firms have. The small company does not have the same ability to invest in new projects and seldom has a development department due to lack of staff. As for product development, the small company often tends to have limited knowledge and experience of working with established development methods (Rantakyrö, Larson 1996). Problems are instead solved as they occur (Larsson 2001).

Previous research has shown that many small companies are wary of the cost of employing a professional designer and are unsure about the commercial outcome of design investments (Bruce 1999). According to von Stamm (1998), companies are faced with two questions when contemplating design and development activities. The first is whether or not to develop designs in-house, or use external designers or a combination of the two. The second is how to structure and manage the relationship to make it work. In answering the first question most small companies must rely on external consultants. The second question indicates something that is a critical issue for many small companies. With the owner also being the manager, a potential problem may arise, as the firm may become too dependent on the skills and experience of one individual. If the manager cannot find the time or does not possess the right skills, the integration of design might not succeed.

Product development and design use in small companies have been a subject of discussion appearing more often in the literature than before in the past few years. Despite this, very little has been published about product development in small wood manufacturing companies. Most literature that can be found concerns large companies and is often focused specifically on the furniture industry (see for example Bumgardner et al 2001). One exception is a study reported by Hovgaard et al. (2004), which looked at innovativeness in 17 small forest products firms. They found that the respondents did not undertake consistent, structured processes for product development and that product design is often determined by available production equipment and material costs.

rial, veneer and wooden boards). Wooden houses are not included due to largely differential market conditions.

² Various definitions exist of what is referred to as small companies. In a definition from the European Committee in 1996, companies are divided into micro (0-9 employees), small (10-50 employees) and medium (51-249 employees). According to the EU definitions the sample in this study are all micro or small firms, with fewer than 20 employees.

2 Method

Because little research has been done on the use of industrial design in wood manufacturing companies, the study approach was exploratory in nature. This study sought to create a picture of the current use of and need for design for small manufacturers in the northeast region of Sweden. Specifically it sought to:

- understand how design and product development in general are used and for what purpose
- identify beliefs about the importance and need for design
- find ways of using design more effectively

2.1 Sampling

The population of interest in this study consisted of small wood manufacturing companies in the northeast region of Sweden³. The region may be described as relatively sparsely populated, with a manufacturing industry largely dominated by small companies. The tradition of wood manufacturing goes far back in history and has always been considered an important regional income source. Today there are approximately 35 companies in the region fitting the used definition of small wood manufacturing companies.

With the help of design experts and trade associations with a good insight into local industry, nine companies⁴ were selected to participate in the study. These ranged from 1-17 employees, with medium to high degree of processing and design investments varying from none to continuous. Details of the sample may be found in Table 1. The selection was made in order to give a realistic picture of the heterogeneous conditions and needs that exist for small-sized companies working in the industry and to enable comparisons of conditions.

2.2 Data collection

Data collection was made using a structured questionnaire combined with semi-structured interviews. This procedure made it possible to collect a large number of facts through the questionnaire, allowing the interviews to focus on questions central to each company.

The questionnaire contained 60 questions and covered: company structure, company history, market competition, sales and marketing, customer relations, production, products and product development processes. Before use, the questionnaire was tested and evaluated twice, using a test group of laymen and industrial designers, and a final test with one manufacturer.

³ The region consists of four Swedish municipalities: Kalix, Haparanda, Överkalix and Övertorneå.

⁴ Originally the sample consisted of 10 companies, but one company went bankrupt during the study and was therefore eliminated.

Interviews with senior managers were made on location in the companies, using an interview guide constructed on the basis of the collected questionnaires. Each interview lasted between one and three hours, during which the respondents were asked leading questions, but also given the opportunity and encouragement to expand on themes.

During the interview notes were taken by the researcher and transcribed afterwards. To correct possible misinterpretations, all transcripts were sent back to the respondents for revision.

	Company A	Company B	Company C	Company D	Company E	Company F	Company G	Company H	Company I
Products	Housing components	Furniture for public and home use	Park equipment	Carpentry	Carpentry	Packaging	Packaging	Furniture components (some assembly)	Building components
Size (no. of employees)	7	16 1/2	8	1	1	1	11	7	4
Annual turnover (€)	370,000	1,750,000	875,000	Not stated	Not stated	Not stated	1,950,000-2,200,000	900,000	355,000
Product development	Continuous	Continuous	Sporadic	Sporadic, on demand	Sporadic, on demand	Sporadic	Continuous	Sporadic	Sporadic
Professional design use	Architect	Industrial designer	Industrial designer	None	None	None	None	None	None
Analysis group	1	1	1	2	2	3	3	3	3

Table 1 Sample description

2.3 Data analysis

After transcription and accuracy check, a first review of all the material was made and the most significant results marked. Then there followed a more systematic analysis and reduction of the complete material. In this analysis the respondents were divided into three groups and analyzed by category. The grouping was done according to the following criteria:

Group 1 – manufacture products of their own development. Company A-C

Group 2 - manufacture products on customer order. Company D and E

Group 3 - manufacture components on customer order. Company F-I

A company belonging to several groups was placed in the group that best fitted its main operations.

Finally the preliminary results were presented in a group meeting for all companies to provide an opportunity for feedback and discussion.

3 Results

The results are presented for each group separately.

3.1 Group 1

The first group shows a fairly integrated view of industrial design. Among the three there is a common understanding that design investments contribute to more competitive products and may be used strategically as a sales argument.

In all three companies the managers are responsible for product development, but otherwise the processes differ to a great extent. All three companies had used external professional designers, in two cases industrial designers, in the third an architect. They all agree that this has been of vital importance for their success and considered it a future necessity. A few problems could however be identified.

It was considered vitally important to find the right designer to do the work, but the process of sourcing was experienced as difficult. Two respondents experienced the uncertain commercial outcome of future design investments as a major problem. In both cases large investments in a new product range had been made successfully a few years earlier, and since then only small updates and product improvements had been performed in-house. At the time of the study the respondents recognized that they were in great need of new large investments to update the product assortment. With no money reserved, this would put a great strain on the companies' economy, which makes it tempting to solve more acute problems. In one case this caused the company to look for other less costly opportunities that would yield safe results in the immediate future. The problems experienced were seen to be connected to a lack of strategy and budget for development.

Two of the three respondents state that they feel confident about managing the total product development process and claim that their long experience enables them to cope with most situations. One company states that they feel insecure and mentions the uncertain outcome of investments as the major reason.

Resources are an important issue, where costs and lack of time are given as the main reasons by all three for not engaging in new product development.

3.2 Group 2

In this group the view on industrial design is less integrated and primarily geared to form and aesthetics. Design is neither prioritized in development work, nor used extensively for strategic reasons.

The issue of product development is somewhat different in this group. All product development is customer driven and done on request. Both companies have an assortment of products that is used for demonstration, but also produce other products on demand. Product design is decided on together with the customer,

but to some extent the companies are given free hands. The customer driven development means a wide assortment of products without a distinct company profile. In both cases the variation in work activity was seen as a positive aspect.

Neither of the respondents had used any professional designer and sees little potential benefit from it in the future.

Both respondents stated that they felt relatively confident about managing product development processes and pointed to long experience and training. There was greater insecurity in other areas concerned with administration.

Resources are an important issue also in this group and the largest obstacles to new product development are considered to be cost and lack of time.

3.3 Group 3

Among the last group the differentiation might appear to be larger, but several common aspects may be found. In this group industrial design is defined as merely form and aesthetics and not generally prioritized.

Product development mostly consists of correcting drawings or adjusting models according to order. No budget exists in any company and product development is only done sporadically on demand. Apart from one company, which aimed to increase in-house product development, there was little interest in manufacturing their own products. The confidence about managing product development processes varied widely from high to little.

None of the respondents had used any external designer and no benefit from employing a professional was evident.

Resources are again of great importance, and the most important reasons for not investing in new product development were considered to be cost, and lack of time and knowledge. Acute problems must often be prioritized to ensure day-to-day survival. The exception is one company manufacturing components that tries to increase the production of assembled furniture to increase their profit.

4 Discussion

The results found in this study yield a picture of the great diversification that characterizes design use in small wood manufacturing companies. Great differences were found among the respondents with respect to awareness, experienced design need, and competence to manage design effectively.

The companies in group one are the ones that express the greatest needs for design and stand to see the most benefit from design investments. The recognition of industrial design as a necessary competitive investment among these companies also indicates a high awareness of the commercial effect design investments can have on their business performance.

The benefits cannot outweigh the cost of design investment in every case (Gemser 2000). To what extent the other two groups can benefit from industrial design use is hard to predict. The companies in the second group may not have used professional designers, but in some sense act as designers themselves. The third group shows no explicit need for design, but with growing market competition it might be a possible way to gain profit. Even though both the need for and the profit from design were questioned in these groups, it should be considered that the knowledge and awareness of design effects are very limited, making it hard to discover potential needs.

In all groups the competence for design management is relatively small. With the exception of one company in the first group, all respondents experienced problems running development projects. A majority of the respondents show uncertainty about design investments, and product development in general is performed sporadically without budgeting. In several cases it appears that the lack of a clear strategy or development plan could be the reason. In this situation the importance of the manager's ability to control and make the right decisions is vital for the outcome of a possible investment. An issue of concern in this context is that several companies showed inconsistencies in the description of development work, indicating limited awareness of their own management abilities.

The issue of resources often discussed in earlier research is shown to be of major importance also in this study. Broader issues such as costs, time and knowledge in the companies greatly affect the use of design. It appears that companies with limited resources tend to prioritize acute problems rather than long-term activities such as product development and design. In many cases the greatest challenge to effective design use seems to come down to the will to change and adapt to new processes.

5 Conclusions

To sum up the discussion a few important conclusions may be drawn:

- Industrial design can be of importance for small manufacturers to create a competitive edge.

However, it needs to be pointed out that small wood manufacturers, even ones of similar size and structure, face different needs for design and possess different competence to manage design effectively. To be able to decide how and to what extent industrial design can be beneficial for manufacturers, companies must be studied in their surrounding context.

- The general knowledge of design and the commercial outcome of design investments are limited. Thus there exists a need to enhance design awareness among small wood manufacturing companies.

- There is a need for training in design and project management. Even though external design services are used, more knowledge is needed to be able to run the project smoothly.

There are clear opportunities to assist small wood manufacturing companies in design use. An increased understanding of the design need in small wood manufacturing companies can be applied to better-suited design investments. The information gained in this study can help to guide third-party efforts aimed at effective use of design in wood manufacturing companies, and can aid producers in finding possible approaches to increasing their use of design.

5.1 Limitations

This research was conducted with a sample of wood manufacturing companies in the northeast of Sweden. The conditions specific to this region might not apply in other cases; therefore inferences drawn about the larger population of small wood manufacturing companies within and outside this region should be made with caution.

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