Employees in the dual role of employee and end-user - a new source of innovation for companies?

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EMPLOYEES IN THE DUAL ROLE OF EMPLOYEE AND END-USER – A NEW SOURCE OF INNOVATION FOR COMPANIES?

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ABSTRACT

This study describes a process in which a company involves an employee as the end-user in the innovation activities of the company. While it has been recognised that end-users sometimes innovate and that user/producer relations are important for product development, little is known about employees in the dual role of end-user and employee. This paper argues that companies can benefit from using employees as end-users in their innovation activities. This research is based on a qualitative case study of a major manufacturer of building materials. The study draws on user-driven innovation theories and innovation theories in general. This case indicates that it has been an advantage to involve the employee as a user in the innovation activities of the company as this gives the company access first of all to a new context – the user's context – which is detached from the traditional bindings of the company, and secondly to new knowledge that is based on the user's generation of knowledge and lessons learnt in the use situation. The investigation shows that employees as end-users can contribute to companies' innovation activities concerning the product, the organisation and the marketing. However, in order to benefit from this new type of collaboration, the company may consider how this process influences the practices of both the company and the employees, and attention must be paid to the dilemmas resulting from the process.

1. INTRODUCTION

Buildings consist of many products integrated in complex product systems. Furthermore buildings are produced in complex design and production systems (Gann and Salter, 2000). There is a growing issue of criticism and lack of confidence in the construction industry concerning performance, supply and product quality. Concurrently, the sector faces increasing demands from the building authorities, latest in the shape of the new requirements to energy performance as implemented in the Danish Building Regulations.

Innovation has for a long time been seen as part of the solution to the problems of the construction sector. In recent years, the Danish government as well as other policy makers in Europe has prioritized the topic of user-driven innovation and put it on top of the innovation policy agenda. User-driven innovation has been introduced as a new source for companies' innovation and as a strategy to comply with growing global competition. The strategy of user-driven innovation focuses on developing competences and structures in order to capture inspiration etc. from users. The aim is to understand not only the stated, but also tacit consumer needs and focus more on developing solutions to meet consumer needs. While the prominent policy and research position of lead-user driven innovation focuses on innovation taken place outside the company, much less attention has been paid to the employees in the dual role of end-user and employee.

Seen from the position of manufacturers of building materials, the most important target groups have traditionally been the architects and consultants, while communication with end-users has been rather limited. This study explores how manufacturers can involve user perspectives in new ways to stimulate innovation. More specifically, this case study focuses on the design, configuration and building process of a single-family house and the employee in the dual role of employee and end-user.

2. STATE-OF-THE-ART REVIEW

2.1 Types of innovation

Innovation is generally considered a way to increase productivity in the construction industry (Barrett and Sexton, 2006). In recent years, services have emerged as a growing innovation area together with physical products. Services include 'financial deal structuring, planning and design, specialist consultancy, customer support and training, supply-chain coordination, production and risk management' (Gann and Salter, 2000:962). Consequently, the third edition of the Oslo Manual (OECD, 2005) describes four types of innovation: product, process, organisation and marketing. Further, it is stated that innovation within one area influences other areas and in that sense innovation will often occur in more than one area.

2.2 Innovation process

There has been an ongoing theoretical development of the perception of innovation, where the aim has been to address and define the departure for innovation and to understand the innovation process itself. Jones and Saad (2003) describe the development of the conceptual framework for innovation as a progressive process from a single- to a multiple-factor analysis. Single-factor analyses are analyses with focus on whether innovation is driven by technology push with focus on R&D and with very little attention to users or whether innovation is driven by the perception of demands also known as Need-Pull. The interplay between companies and surroundings is now in focus and more factors have been included. Social, cultural and institutional factors have been assigned an explanatory value for the development of the innovation process and the internal environment of the company has been assigned an influential role. In this way interaction and feedback processes between companies and their surroundings have become important for the perception of the innovation process and focus has been put on their significances for development and adaptation by companies and surroundings.

Jones and Saad (2003:146) point to the fact that today concepts are characteristic of reflecting 'Innovation as a coupling and matching activity marked by a multi-factor process which requires high levels of interaction and integration at intra and inter-organisation levels'. Common for the developed perception of innovation is that a boundary exists between the company and its surrounding. We can almost talk about the existence of an inherent dichotomy in the discussion of innovation. A central theoretical question is whether there is a position on this boundary and whether this departure can give rise to new implications for the innovation process?

2.3 Lead users

Within the innovation management theory, von Hippel has introduced the idea of lead-users. The central actors in this perspective are the users and the manufacturers and the focus is on their interplay in the innovation process. Von Hippel (2005:3) defines users as: 'firms or individual consumers that expect to benefit from *using* a product or service'. In this sense 'users' mean to existing users. In contrast manufacturers are defined as: 'manufacturers that expect to benefit from *selling* a product or a service' (von Hippel, 2005:3). The motivation of the studies can be found in the assumption that traditional product developments can no longer satisfy users' needs. Furthermore products often do not match needs and users have to compromise if they buy the products. On the other hand this is what motivates the users to innovate.

A central driver in user-driven innovation is the users' and the manufacturers' asymmetric knowledge. Von Hippel (2005:8) points out: 'Product developers need two types of information in order to succeed at their work: need and context-of-use information (generated by users) and generic solution information (often initially generated by manufacturers specialising in a particular type of solution'. Users tend to

be experts on knowledge about needs and context-of-use information, while the product developers tend to be experts on generic solution information. So the challenge for management is to find methods to bring these two knowledge bases together. Von Hippel (1986:791) defines lead users as: 'Lead users are users whose present strong needs will become general in a marketplace months or years in the future. Since lead users are familiar with conditions which lie in the future for most others, they can serve as a need-forecasting laboratory for marketing research. Moreover, since lead users often attempt to fill the need they experience, they can provide new product concept and design data as well.'

In this perspective, lead users are very important users and much attention has been paid to identify lead users and to find out under what circumstances companies and lead users can benefit from each other. The difference between this perspective and the perspective in this research is that the employee plays both roles and the asymmetric knowledge of this dual role is integrated in one actor.

2.4 Co-construction of users

Haugbølle and Forman (2006) suggest that users of single-family houses should be considered as *multi-centred users*. That is, users of single-family houses hold multiple perspectives or focal points that are time-dependent in two ways since they are coupled to the life-cycle of the building as well as the life-cycle of the actor. However, from a functional point of view the one and same actor has to deal with at least three different roles rolled into one: that of client, owner and customer.

First, as a client the user has to deal with not only the erection of the building but also continuous maintenance, repair work and re-building – some of which is even done as do-it-yourself (DIY) activities. Second, as an owner (or owner in the making) the user will have to consider issues related to financing often through mortgage loans, taxation schemes, and the potential sale of the building sometime in the future. As Ozaki (2003) has pointed out in his study of home-builders in UK, the users already consider e.g. the selling price of a house when they purchase it. Clearly, the issue of financing is also a very important precondition for users to become users at all. In other words, if you cannot afford a house or the mortgage institution is not willing to lend you the necessary sum of money you will be deemed a non-user. Third, as a customer the user will address issues of identity, security, neighbourliness etc. In a study of families living in older villas and in standard houses since the 1970s, Bech Danielsen and Gram-Hanssen (2004) demonstrated how residential neighbourhoods are associated with different symbolic values and how these values influence the choice of home.

2.5 Innovation in communities and configuration

Jeppesen and Molin (2003) have explored a process in which firms rely on external consumer community for innovation. They describe what commercial firms can do to motivate and capture user-driven innovation and its related benefits. They suggest that learning and innovation efforts, from which a firm may benefit, need not necessarily be located within the organisation, but may well reside in the consumer environment. They point out that consumer innovation can be structured, motivated, and partly organised by a commercial firm that organises the infrastructure for consumers' interactive learning in a public online domain. Thus the company can organise and support consumer communities where members help each other, formulate problems and make innovations.

In this paper, we would like to draw the attention not to a community of end-users but to a community of manufacturers of building material. The difference from Jeppesen and Molin (2003) is that the interplay is between an employee and a network of suppliers and focus is on how a company can borrow and use this network.

Jeppesen and Molin (2003) point to the connection between a high level of complexity in adaptation/configuration of a product for the user in the use-situation and the benefits for the company if the user himself is active in this process, as it mean that a part of the company's work with adaptation to the use-situation can be done by the user himself. Similarly this issue about configuration can be seen in connection with the configuration of a building, but in this situation it is not a single product from a single company that has to be configured but different building-components from a network of different companies.

2.6 Marketing concept as a mediation junction

Schot and de la Bruheze (2003) try to reconnect production and consumption. They focus on the process between production (supply) and consumption (demand). They see this process as a mediation process characterised by mutual articulation and alignment of product characteristics and user requirements. They involve not only the user but also spokespersons for the users in the articulation of user requirements. Mediators are actors who mediate between demand and supply. Schot and de la Bruheze (2003:234) define a mediation junction as 'the place at which consumers, mediators, and producers meet to negotiate, articulate, and align specific technical choices and user needs'. In this paper the development of a new marketing concept can be described as a mediation junction, as they tested new products, developed new building solutions and promoted the products in public space.

Schot and de la Bruheze (2003:245) suggest that an out-house mediation junction creates more favourable conditions than in-house mediation junction: 'out-house mediation junctions seem to provide better opportunities for more symmetry, and in that sense they have more potential for clarifying confrontations, assumptions, expectations, and scripts of the actors involved'. It is a question whether there is a position on the boundary between in-house and out-house for mediation junction and the implications for the mediation process. In the case of the employee in the double role of employee and end-user functions as a mediator on the boundary between in-house and out-house.

3. RESEARCH PROJECT

3.1 Project description and objectives

The overall purpose of this study is to explore user-driven innovation in the construction sector, and in this project the specific focus is on the end-user in the dual role of client and employee of the manufacturer.

The objectives are:

- To explore the end-user in the dual role of client and employee and the conditions under which such innovation processes can take place.
- Advantages and disadvantages of involving employees as end-users.
- To explore the consequences of user perspectives for manufacturers of building material.

3.2 Research methodology

The research is based on a case study. Case studies are relevant in situations where there is a need for exploring phenomena as they appear in reality. The case study is a research method where we go in depth with a single or few cases, and draw out the specifics, which can have a more general character and interest. By choosing the case method, the choice of case becomes an important methodology question. Flyvbjerg (1991) defines different strategies to select cases:

1. The paradigmatic case is chosen when the wish is that the case can work as a metaphor or establish a new way of dealing with issue dealt with in this study.
2. Extreme and deviant cases are cases where you look for example for the specifically problematic or the specifically successful.
3. A critical case concerns a superior aspect and makes it possible to generalise within this superior aspect.
4. Maximal variation cases are cases where we involve various different cases to examine the problem and where the cases are different concerning one dimension.

These strategies cannot be considered as separate strategies, but can be used to specify limits and possibilities of the case you are working with. For this research, especially strategy number 1 is relevant where focus is on the possibilities for using the case as a metaphor for the manufacturers' use of their employees in the dual role of employee and user in their innovation activities and the implications for the manufacturers' business strategies.

Rockwool A/S has many features in common with other suppliers of materials to the building sector. They are often large companies with their own product-development departments and marketing departments. They supply components to the building sector, and their most important target groups are usually architects, consultants, contractors and DIY people. That is why their contact to the ordinary end-users is often missing. In this sense, the case is paradigmatic and the experience gained from the case can be generalised concerning other similar manufacturers.

In this case, the employee represents a couple of users: The professional, the client, the customer and the owner. He was a professional user in the sense that he is a trained carpenter and a building engineer working as a consultant at Rockwool. Besides being a carpenter and building engineer, the employee has a wide knowledge of insulation and Rockwool's products via his job at Rockwool. He was a client, owner and customer in the sense that he was building the house for himself and his family. It is not exceptional in the construction sector that employees have both an education as a craftsman and a further and higher education such as for example building technician, architect or engineer. Further, it is not unusual that employees in the construction sector have or have had influence on the design and building of their own home. Therefore you can find the employee of this case again in many companies in the building sector. The critical aspect in the case is that the company actually chooses to involve the employee in the dual role in the company's innovation work. It must be expected that when it can happen here, it can also happen with other manufacturers, and this makes the dual role of employee/user especially interesting for the building sector compared with other industries.

This case focuses on an employee, who is also an end-user. Whether the same result could be reached by cooperating with external end-users in a similar project was not examined and should be examined. But it is evident that there is a relationship of trust between the company and the employee, which must be assumed to have an important relevance.

The research design of this study combines the reading of documents with qualitative interviews. Firstly general information like annual reports has formed the background of the case. Secondly the project has been followed at the company homepage during the building process, and written documents relating to the project have been analysed. Thirdly the employee who build his own house and an employee from the marketing department responsible for the communication through the homepage were interviewed. The final case report was discussed with Rockwool to validate the data.

4. RESEARCH RESULTS AND INDUSTRIAL IMPACT: CASE

4.1 Introduction

In 2006, the Danish Building Regulations introduced new requirements to the energy performance of buildings with the aim of reducing their energy consumption. Among other changes in the Danish Building Regulations (BR06) were the requirement to the tightness of new buildings, and a classification of low energy buildings in two classes (Aggerholm and Grau 2007:10). These new requirements have caused uncertainty among construction professionals on how to meet the new requirements in practice.

In 2007, an employee at Rockwool Denmark built his own house. The employee's ambition was to build a house for his family. He decided to build a low-energy house belonging to energy class 1 due the challenge of building one and the money he could save by reducing energy consumption. The employee designed the house himself. Based on his competencies as both a carpenter and a building engineer, he was capable of developing designs and practical solutions. But the challenge was to find solutions that made the house tight so that the house complied with the requirements in BR06. During the design phase, the employee chose the suppliers he wanted to use and used them as dialogue-partners. Apart from an architect and the suppliers, no other professionals were involved. As a carpenter, the employee could do much of the workmanship himself, which he did. What he could not do himself, he hired craftsmen to do.

As client, owner and customer, the employee visualised demands and wishes to the product and building process; aspects that would not have been visualised in traditionally developing projects. This was expressed for example through the employee's principle of using known methods and techniques in order to reduce uncertainty. It also became visible in the employee's interpretation of the situation where he wondered why there is not more information about the actual possibilities, and concluded that the advice you can get from consultants and suppliers are at best fragmentary and more rooted in the consultants' and suppliers' own needs than in the users' need. This made him identify the users' need for a more connected whole concerning information and more knowledge about the relations of the products.

Just prior to the employee's building project, Rockwool had developed an air tightness programme consisting of different products that can be used in the building process to ensure tightness of a building. The tightness programme was developed to meet the new requirements in BR06.

As the employee began to focus on tightness and energy in his building project, the product manager at Rockwool saw a possibility for testing the tightness programme in practise. Furthermore, Rockwool saw in the employee's project an opportunity of getting into contact with the users in a new and closer way. By following the project at Rockwool's homepage and describing the process as an ongoing story, they could give some practical instructions concerning the problems that occur when you build and have to integrate considerations of energy performance. This was new for many actors and received widespread attention. Rockwool therefore saw a great need for further development of solutions and information about the issue.

4.2 Process

The central actors in the building process are the employee, the suppliers and craftsmen. During the construction process the employee and the suppliers developed different practical technical building solutions of how the construction could be executed to ensure air tightness. And a subsequent test showed that the solutions were valid as the house was tight. The employee chose all the suppliers and craftsmen. When the employee had chosen the suppliers, he then told Rockwool, and afterwards Rockwool contacted the suppliers to ask them to prepare descriptions for use on the homepage. In this way Rockwool could 'borrow' the supply network of the employee. Concerning Rockwool's

development of the homepage, the product manager and employees from the marketing division participated. The product manager was responsible for coordinating the product aspects concerning the homepage, including contact to the suppliers, while the employees from the marketing division were responsible for the rest.

When it was decided that the project should be followed and described on Rockwool's homepage, the suppliers became very interested in participating in the project. The perspective shifted from just being an ordinary sales-situation to being a possibility of being participants in a public story, inscribed in a concept for a low-energy house, and a place on Rockwool's homepage. A place on Rockwool's homepage represents more than just free advertisement, and should be understood symbolically as a kind of network alliance between Rockwool and the suppliers, where the value is connected by trust, quality etc.

As the project was connected with Rockwool, a challenge emerged around Rockwool's relations with suppliers in general and how Rockwool could avoid favouring some over others. Rockwool cooperates with many suppliers and usually do not favour one over the others. To prevent favouring specific suppliers, the communication of the case has stressed that choices of suppliers are made by the employee, not Rockwool. Rockwool has not clarified how this dilemma can be solved in the future about on one hand the wish to participate in projects with other suppliers and on the other hand to treat all suppliers the same.

4.3 Innovation

In the present case the most important areas of innovation concerns a combined product and marketing innovation. It is also characteristic of the case that the project shows a lot of small single innovations that are woven into each other to form a technical, social and organisational reality.

Viewed from a product perspective, first the tightness programme was tested in real life in the building process and the programme demonstrated its functionality as the house built passed the tightness test required by BR06. Concurrently, the employee developed new technical solutions to tightness of houses through the building process. In this sense, the tightness programme had descriptions of use added that were anchored in use situations. Second, bringing the air tightness programme of Rockwool together with components of a number of other manufacturers created a cohesive concept of low-energy houses. At present, low-energy houses are not very common in Denmark. However, to ensure overview of the complex concept, each of the suppliers was asked to write informatively about the specific problem area at which their product was targeted and the solutions provided by the products. By giving the suppliers space on the homepage, the actor network becomes visible. By linking the homepages you also link information, and the user needs linked information in a complex system, as a guided way of finding his way around the homepages.

Viewed from an organisational perspective, the project has indicated the possibility of using employees in the dual role of employee and user in the innovation activities of a company. For the company it is an opportunity to combine professional skills and user perspectives in the same activity.

Viewed from a marketing perspective, the project resulted in a new marketing method in which the testing of new products, development of new technical building solutions and promotion of the products are integrated processes that take place in a public space on Rockwool's homepage. During the building process, newsletters have been published with descriptions of the different phases in the building project, the different situations of choice and problems and solutions have been highlighted in the continuing story. With this communication method Rockwool has both reached their traditional target groups (architects, consultants, contractors and 'do-it-yourself' (DIY) users) in new ways and also a new target group that they have identified as 'do it yourself – do it for me' users.

This new target group consists of consumers who want to have a more pronounced influence on their own buildings but do not want to construct the buildings themselves. The target group is characterised by being critical of the construction industry and that is one of the reasons why they want to ensure the quality of their buildings by qualifying themselves to be better by being in dialogue with the actors in the construction industry.

5. CONCLUSIONS

This case indicates that it has been an advantage for the manufacturer of building materials to involve the employee in the dual role of employee and end-user as a new source in their innovation work. The new user perspective can influence the innovation process concerning the product, the marketing and the organisation itself. Rockwool and the employee played different roles in the project. Where the employee was the driver of the building process, Rockwool was the driver of the development of the marketing method. The employee's house would be built, whether Rockwool participated or not, but on the other hand, Rockwool's development of their new marketing method depended on the employee's project – or a similar project. In that sense, involvement of user perspectives in innovation work of companies may be not so much a question of whether a user perspective exists in the construction sector, but rather a question of how the companies can recognise where and when the user perspective is visible and how they can organise themselves around the user perspective.

The dual role and the employee's alternating between the internal and external position vis-à-vis the company, made it possible for the employee firstly to get the end-users needs visible and secondly to establish a supplier network of manufacturers of building components, which Rockwool could borrow and use in their marketing. The case showed that user-perspectives influence both the internal and external structures of companies. Unintended, but as a consequence of the project, it seems that a new market segment of 'do it yourself – do it for me' users and a new business strategy with a closer strategic partnerships between the manufacturers of building components were co-shaped.

Apparently, a virtual network that links products, information and suppliers can shape the frame for the new market segment to relate to the whole and to the individual components. In the future, Rockwool estimates that more suppliers begin to have more links on their homepage in order to tie the products together in a context. A future challenge will be the development of strategies for project cooperation between suppliers that handle the dilemma with inclusion/exclusion. All in all, trends suggest the establishment of stronger supplier network and a stronger focus on the end-users. Obviously it is the company, which decides whether it will change its business strategy toward stronger strategic partnerships.

6. ACKNOWLEDGEMENT

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7. REFERENCES

Aggerholm, S. and Grau, K. (2007) *Bygningers energibehov: Beregningsvejledning* (SBi-anvisning 213). Hoersholm: Statens Byggeforskningsinstitut.

Bech-Danielsen, C. and Gram-Hanssen, K. (2004) Home-building and identity – the soul of a house and the personal touch, in Bech-Danielsen, C., Jensen, O. M., Kiib, H. and Marling, G. (eds.), *Urban Lifescape.* Aalborg: Aalborg Universitetsforlag, 140-58.

Barrett, P. and Sexton, M. (2006) Innovation in small project based constructions firms, *British Journal of Management*, **17**(4), 331-46.

Flyvbjerg, B. (1991) *Rationalitet og magt: **1***. Copenhagen: Akademisk Forlag, 49-153.

Gann, D.M. and Salter, A.J. (2000) Innovation in project-based, service-enhanced firms: The construction of complex products and systems, *Research Policy,* **29**(7-8), 955-72.

Haugbølle, K. and Forman, M. (2006) The co-construction of clients, concepts and companies, in *Proceeding of the Joint International CIB W055/W065/W086 Symposium Construction in the 21st century*. Napoli: Edizioni Scientifiche Italiane, 12pp.

Hippel, von E. (1986) Lead users: A source of novel product concepts*. Management Science*, **32**(7), 791-805.

Hippel, von E. (2005) *Democratizing innovation*. Massachusetts: MIT Press, 204pp.

Jeppesen, L.B. and Molin, M.J. (2003) Consumers as co-developers: Learning and innovation outside the firm, *Technology Analysis and Strategic Management*, **15**(3), 363-83.

Jones, M. and Saad, M. (2003) *Managing innovation in construction*. London: Thomas Telford Publishing, 314pp.

OECD. (2005) *Oslo Manual*: *Guidelines for collecting and interpreting innovation data*. Paris: OECD, 162pp.

Ozaki, R. (2003) Customer-focused approaches to innovation in housebuilding, *Construction Management and Economics*, **21**(6), 557-64.

Schot, J., and de La Bruheze, A.A. (2003) The mediated design of products, consumption, and consumers in the twentieth century, in Oudshoorn, N. and Pinch, T. (eds.) *How users matter: The co-construction of users and technologies*. London: The MIT Press, 228-45.