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INNOVATION IN THE KITCHEN LINE OF BUSINESS: USERS, CONFIGURATION AND CONTEXT

Peter Vogelius¹, Marianne Forman, Kim Haugbølle and Kresten Storgaard

Senior researchers at the Department of Construction and Health, Danish Building Research Institute, Aalborg University, Dr. Neergaards Vej 15, 2970 Hørsholm, Denmark

Buildings and the properties of specific rooms – the context - call for considerations on how user involvement in the design process has to be accommodated in the strategic company set-up. This case study focuses on the handling of kitchen layouts by a major supplier, which includes a need for a definition of the expert's role in the sales organisation on the one hand and different segments of users on the other. In industrialised construction, ICT-based configurators are often highly dependent on the non-fixed and fluid nature of the construction processes. Consequently, configurators call for considerations on how to adjust the boundaries for the users' decisions, the characteristics of the product and firm strategies e.g. how the sale is organised. In the present case, two main questions seem to be urgent. First, is users' room for action increased (empowerment) or will experts play a more pronounced role? Second, the configurator makes a strategic dilemma topical - should the 'do it yourself' market in the future have high priority, or should the existing model with its extensive service and a strong sales organisation (with a network of sales offices) remain untouched? The theoretical part will draw on discussions on user-driven innovation and on theories for innovation in construction. The empirical part of the research is based on a qualitative case study, where a major Scandinavian supplier of kitchen elements sets up an internet-based design configurator.

Keywords: user, innovation, market, configurator, design, inter-organisational relations.

INTRODUCTION

In several lines of business the combination of new opportunities for direct (end-)user involvement in design due to the Internet, raises new questions and dilemmas for the strategic development of companies. Also within the construction industry it is possible to observe examples where the internal organisation of the company is put under pressure, thus generating strategic considerations of how to address the market. Service related to the direct contact to customers in shops represents a considerable cost and can expose products to competition from new and cheaper products sold directly via the Internet.

As an integrated part of the web-based sales concept, several companies have implemented 'configurators' that can be used for the end-users' design of their own kitchen solutions.

'HTH kitchens' is a major Danish manufacturer depending upon a line of traditional sales shops with a high level of service. At the same time other up-coming

¹ pev@sbi.dk, maf@sbi.dk, khh@sbi.dk, krs@sbi.dk

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competitors have with great success placed their primary sale on a 'do-it-yourself' (DIY) approach facilitated by the Internet. One might ask if a streamlining of sales operations on one hand and changed user preferences on the other hand can outline a new and more competitive model for the DIY and almost-DIY market that can be difficult to accommodate in the contemporary organisation of HTH. In this way there seems to be an intimate relation between the use of new ICT on the one hand and the company's efforts to define and service particular customer groups on the other hand.

The case presented describes and analyses how a major supplier of kitchen elements makes use of a configurator as an instrument for user involvement in design and innovation. The focus is on the overall relationship between innovation, user preferences, technological opportunities and market relations.

Nevertheless, the future role of internet-based user design of kitchens can hardly be discussed without a more detailed understanding of both market and the contextual setting for installing kitchens as a refurbishing task in construction.

METHODOLOGY

The paper is based on research carried out in 2007 and 2008 in the project 'TRANS-USERS – Industrialising the construction sector through user-driven innovation' (documented in Forman *et al.* (forthcoming) at the Danish Building Research Institute, Aalborg University in cooperation with CSTB, Centre Scientifique et Technique du Bâtiment, France. In TRANS-USERS, five cases were chosen with the purpose of throwing light at the role of user-driven innovation in the construction sector. Furthermore it was one of the hypotheses that a deeper understanding required an analysis that took both production and consumption into consideration. In consequence, also business processes and market relations had to be taken into account.

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 dealing in depth with a single or few cases in order to extract the specifics, which can have a more general character and interest. By choosing the case method, the choice of case becomes an important methodological question.

The actual case study of HTH can be considered a paradigmatic case according to Flybjerg (1991). 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 the issue dealt with in this study. HTH's situation is not unique. From a general perspective we must assume that it resembles many other companies - also outside construction. New technology and shifts in user preferences generate a dynamism resulting in new challenging market relations and needs for adaptations in internal company structure.

Ordinary methodology for (qualitatively based) case studies was implemented. Interviews with central key persons in one of the major franchise sales shops and centrally at HTH were conducted and. Furthermore a minor survey of the kitchen line of business in Denmark was made. Moreover, the website of HTH was used as a documentary data source, and the configurator was tested.

Finally, the documentation report was approved by HTH to ensure that no misinterpretations had developed.

THEORETICAL FRAME

The construction management literature deals with various concepts of construction such as the complex product system (Gann and Salter 2000), the construction business system (Winch 2002) and construction economic sector system approach (Carassus 2004 eds.). However, since these different theories and concepts only include consumption to a minor extent, there does seem to be a need to include use and users more explicitly in the analysis. Thus, we turn our attention towards more consumption-oriented approaches. We use three main strains of theoretical perspectives on users, which contribute to a better understanding of the user as a driver for change.

Construction procurement regarding: development and privatisation, the role of culture (trust and institutions), classification and choice (procurement systems), contractual arrangements and forms of contract and environmental sustainability (Rowlinson and McDermott eds. 1999).

Science and technology studies (STS) that emphasise the mutual shaping of users and technologies. The point of departure is that technical objects and social relations are bounded together and that actors and technology are co-constructed (see e.g. Bijker, Hughes and Pinch eds. 1987; Bijker and Law eds. 1992 and Oudshoorn and Pinch eds. 2003). Focus was on how users and technologies interacted. Thus, the field of STS deals with the issue of 'agency', that is the dualism of actors and structures in relation to the roles of users, clients and stakeholders. Also from a STS position, Harty (2008) goes through a series of common (stereotype) assumptions about construction and innovation. The contribution was relevant for this article in pointing to analytical inclusion of the context (especially in construction) as relevant for how innovation should be understood.

Innovation management dealing with issues related to the nature of innovations, drivers of innovation, innovation process and innovation systems. Within the demand-pull model, von Hippel (1986) has been highly influential in showing the importance of lead users in the development of new technologies.

In a later contribution, von Hippel and Katz (2002) introduced the idea of 'toolkits for user-centred innovation'. They stressed that traditional product development, where manufacturers first uncover users' needs and then develop responsive products, is insufficient, because the user needs change rapidly. By using toolkits the manufacturers have given up the idea that they can understand the user needs in detail. To illustrate the toolkits von Hippel and Katz (2002: 5) use the pizza as an example:

'In the case of the pizza, many aspects of the design, such as the design of the dough and the sauce, have been made standard, and user choice has been restricted to a single task only – design of the topping'.

Von Hippel and Katz (2002) found that toolkits for user innovation are applicable to essentially all types of products and services facilitating many different user demands. Further they stressed that some conditions influence the use of the toolkit: It is important that the toolkit is designed in a way that leaves room for 'learning by doing via trial and error', there has to be an appropriate 'solution space', the toolkit should be 'user-friendly', there may be module libraries, and lastly there may be a problem in translating user designs into production specifications due to different user terminologies, context, elements etc. so the toolkits have to be convertible between user and production.

Our analyses and understanding of the internet-based kitchen configurator were in many ways influenced by the approach suggested by von Hippel and Katz (2002).

THE CASE OF HTH - A MAJOR KITCHEN SUPPLIER IN THE NORTHERN EUROPEAN MARKET

Background

HTH is situated in Jutland and is a leading kitchen manufacturer in the Nordic region (which is regarded as the domestic market). Since the 1970s, the company has played a significant role for regional development including the local labour market.

According to the company website (summer 2008) HTH is Northern Europe's largest kitchen manufacturer with an annual production of more than 1 million cupboards.

The company is represented in 11 countries and sales take place exclusively through a chain of 130 stores owned by independent franchisees. More than 1,000 people are employed at three factories in Denmark and the franchisees have a corresponding number of sales staff. HTH is part of the listed Swedish Nobia Group, which is the largest kitchen manufacturer in Europe.

It is estimated (by HTH) that HTH's market share in Denmark is more than 20 %. Number two is the fast-growing IKEA with approximately 10 %. The rest of the market is divided among a number of minor actors, both Danish and foreign.

Competitors of HTH typically have a much lower degree of industrialisation. The minor actors have different niches and brand identities. Some are importers of very fancy design brands from Southern Europe; others are representatives of high-quality handmade systems with expensive raw materials etc.

Basically HTH operates in two markets, the professional and the private. The professional market is directed at major housing estates and office buildings. It consists mostly of kitchens of fixed designs with a few standard deviations made in great quantities. The structure of the professional market is very different from the private one, and will not be dealt with in this case presentation.

Regarding the private customer market, HTH today defines it along two axes. The first is directed at the do-it-yourself (DIY) market and the second is the traditional 'kitchen-buyer' market. This divide is reflected accordingly in the structure of the company's website. The two submarkets share the same version of the product configurator but are otherwise differently organised.

The traditional 'kitchen-buyer' market is the important main market, which has played a major role for decades and still accounts for most of the sales in the private market. The DIY market is a strongly growing market, not only in Denmark but also in the rest of Scandinavia and for that matter in most of Europe. Price is a strong competition factor on the DIY market. The company has a specially dedicated part of the web directed towards this market.

Industrialisation

HTH is highly industrialised concerning all aspects of production. It is already over than 10 years ago since all kinds of stocks were abolished, and a fully just-in-time approach was adopted (both with regard to inputs and outputs). At specified times every day trucks arrive with tons of chipboards and on the output side production lines practically 'end' on the loading platforms with each order labelled with the address of the end-user (whether it is a big construction site or a single-family dwelling). The input of manpower compared with the volumes produced has steadily been reduced.

Today the emphasis within production is placed on continuing efforts for improving quality.

Today major strategic decisions are not primarily connected with the production side but with the market and the related demands for innovation and user engagement. This is not to say that the production task today is an easy one, but only to stress that the core of the business seems to be bound to developments outside production.

The development of the configurator - historical trends in technology and organisational bindings in company structure

In its original form the internet-based product generator - in fact the user will probably call it a drawing program - was developed as an instrument for production planning. The inspiration came from several concepts dominating the understanding of industrial production in the late 1980s and 1990s (among others Total Quality Management (TQM) and Business Process Reengineering (BPR)). They were internal production concepts facilitated by Enterprise Resource Planning (ERP) systems.

From the point of view of an enterprise, the main challenge in the late 1990s was to establish a smooth integration between the ordering function in the sale shops and the direct transfer to the production system. In the shops the configurator was used by the salesmen and gave a great advantage when discussing different designs alternatives with the customers. At that time it was a rather sophisticated and complicated tool .

Today's web-based configurator is very easy to use, and an interested user will be able to draw his own kitchen from scratch in a couple of hours or so (an internet connection is of course a precondition). The system can then present the kitchen vision at different angles, including 3D and with different layout etc. The drawing is saved on a server maintained by HTH. In practice the salesman visits the customer's kitchen to discuss alternative solutions and to make exact measurements that can serve as a basis for the professional drawing. This is a time-consuming task. Calculating the final price of the total solution and making the CAD drawing can often last as long as 6 – 10 hours. At the shop the drawing is drawn again in the comprehensive HTH system, which also generates the parts list, and finally sends the order including automatically generated files that correspond directly with production and stock systems centrally at the HTH factory.

A new company model adjusted for the DIY market?

In a situation where priorities in the market have changed in favour of DIY and the 'almost-DIY', the big sales organisation, as we know it today, will to some extent become superfluous. In that case a new sales model oriented more directly towards the customers and based on their active participation as users will replace the former model. Whether or not this potential will be fulfilled depends on how the ongoing strategic discussion at senior management level evaluates different strategies for the future development of the company. Factors such as risk assessment, product price, market estimates and consumer preferences will be in focus. In addition competitors' (e.g. IKEA) active use of internet-based user involvement on the web, can challenge HTH's position on the DIY market and push the company to further initiatives, if it wishes to defend its position in that market segment.

Compared with traditional private customers, the DIY customers are pretty much on their own. They have to design their future kitchen themselves including identification of correct modules and fittings. And more crucial, they have to go through all the measurements required for making the precise drawing suited for selecting (and in a

later phase also) mounting the kitchen elements. In spite of the big technical challenges facing the DIY costumer, the HTH web urges the DIY users to carry on and use both the web guides and the possibility of guidance in the shops.

The combination of a line of new opportunities for direct user involvement in design and a corresponding streamlining of sales operations (both due to the Internet) on the one hand and changed user preferences on the other hand can outline a new model for the DIY and near-DIY market that can be difficult to accommodate in the contemporary organisation of HTH. Thus, the role of internet-based user design of kitchens in the future can hardly be discussed without reference to a more detailed market understanding.

ANALYSIS: USERS AND ICT PRODUCING STRATEGIC DILEMMAS

Like in other lines of business, it can be expected that the gap between user groups may give rise to different ICT-based solutions that facilitate further user-driven design and innovation.

According to an experienced (both in the private and the professional market) salesman in one of the major HTH shops, there will be marked limits to the absolute share of the DIY market. He based his argument upon two points. Firstly the investment in a new kitchen represents a considerable expense that one would not like to play with in a hazardous way – (i.e. believing in your own amateur expertise). Secondly, it is very time consuming to make precise drawings not to mention the practical work of building the kitchen. The majority of users will simply back off from this kind of tasks.

The salesman acknowledged the (theoretical) argument that the elimination of his and his colleagues' support could lower the price of finished kitchen solutions, but doubted that a minor price lowering could shift the market segments – at least not for the great majority of customers.

A slightly different analysis is presented by the central marketing manager at HTH. He sees great opportunities in an internet-based configurator/drawing program in the future. It is the plan to make further steps towards a more fully fleshed internet-based product configurator/drawing solution where data is reused. The perspective for HTH is to assist and qualify the customers to enable them to select their kitchen solution at the web.

The forming of the configurator

OECD (2005) suggests to approach innovation from different angles; as product innovation, as market innovation and as innovation of the organisational structure of the company (additionally 'process innovation' is mentioned, though we omits it here due to problems with separating the category from the others).

Seen as an isolated product, the configurator is not a novel or spectacular innovation. The innovative idea, which is seen in many trades, is to provide every customer/user with the possibility of creating their own design solutions. The configurator is formed so that a simple and user-friendly interface has had priority, but as a product innovation it is not outstanding.

Seen in relation to the market, the configurator has the potential to be a major innovation. Provided that HTH should decide to reduce the service for traditional customers in the sales shops and develop their business towards the DIY market, it is

likely that the configurator could be a key instrument in the sales mechanism - this discussion is intimately connected with the potential of the configurator as an accelerator for organisational innovation.

The description of the configurator and the circumstances which over time have contributed to its specific forms cannot stand alone; it will be fruitful to consider how users' preferences interplay with development of the configurator.

Harty and Araujo (2009), draw our attention to Von Hippel's distinction between users and producers as an institutional distinction more than a technical ditto. This has the consequence that users and producers can be located in the same organisation and can change roles according to the context. With this in mind we can take a closer look at how the HTH configurator as an artefact was formed.

Initially it was specified and partly developed by the staff in production and accounting as a tool for refining production and for a more close management of production cost. The interface of the system was expert orientated and had no contact with end-users.

Regarding the sales shops all parties saw the system as a quicker and more precise way of defining kitchen solutions for the end-users, and not as a system with a potential for transforming the user role (and the sales function). As a contrast the later web-based configurator definitely involved a new part namely the end-user.

It is realised by the central marketing function at HTH that the range of facilities offered to end-users by the system can be of great importance for the revenue of the sales shops – e.g. the revenue can be reduced - accordingly it is being considered what facilities the system should offer. Thus it is obvious that the forming and definition of the configurator cannot be seen as a result of end-user requirements on the one hand and on the other hand the producer's fulfilling of compliance with these requirements.

The HTH competitor IKEA is not bound to a similar system of sales shops, directed towards end users; instead they handle the sale through existing warehouses and via the Internet. Accordingly the forming of the IKEA configurator can take other ways even though the configurator is meant to target the same end-users as HTH.

We therefore agree when Harty and Araujo (2009) state that "In organisational context, the boundaries between producers and users tend to be more fluid and contested, artefacts are seldom stabilised when they cross the boundary between producers and users, different kind of users proliferate and interaction among users may be significant."

It is difficult to separate and identify how (and to what extent) different innovative contributions have formed the configurator. The internet-based product generator is also an example of direct user involvement in the design process, although it is doubtful whether you could term it a user-driven innovation in a stricter understanding of the term.

The configurators' contemporary function and interface with the rest of HTH has to be seen as a result of a mediating process in the company, where market relations as well as the internal company structure have a major role to play.

HTH's internal understanding of the user role

Roughly speaking it seems as if HTH deals with two major user roles, the 'Traditional customer' and the 'DIY customer'. We suggest five central variables to differentiate them.

First in line is 'expert support'; DIY users have to rely on their capability - traditional users have professionals to handle problems. Secondly the price is nearly always an important variable; DIY users get a cheap solution. Thirdly the time input can be important; not all have the time, or prioritise to spend the time that a DIY solution requires. Fourthly the total influence at the design solution can be more easily achieved by the DIY user than by the traditional user – this is a matter of self-determination, and must be expected to have relevance for some users. As the fifth and last variable, it is obvious that your own capability in practical skills – here designated with the broader term 'competence' - is relevant for construction. This last variable is an issue that HTH (and competitors) are working hard to minimise. Different help utilities like detailed instruction videos are introduced on the web page and people are urged to start their own kitchen projects from scratch and not to worry.

It is known from other lines of business that the active user role is followed by a high demand for competence and time input; construction does not seem to be any different.

The design functions that the users can get access to at the HTH webpage are developing and become increasingly more advanced. But at the same time, it has to be noted that the interactive functions, which could potentially support the user's own complete solution, are still missing. It is not possible, for the time being, to combine a complete user-drawn kitchen design with an ordering function over the net, followed by delivery at the customer's address. One would suppose that at least a part of the DIY market would use those possibilities, if they were available.

It seems that there exist at least two principally different positions regarding how to evaluate the need for a more extended role for the customers.

The first concluded that further involvement by the customers is neither a customer wish nor is it practical. The argument is that further involvement is a time-consuming task which the average customer will certainly pay to avoid doing and that design, measurements and mounting of the kitchen on location is a job for trained people due to the complexity of construction.

The second position argues that the DIY market is increasingly important and that HTH cannot afford to fall behind in the competition on this market segment. The DIY market is dominated by customers who would like to take advantage of all kinds of utilities on the web, while expecting low prices at the same time. Nursing this group requires a strong development effort of the possibilities at the web.

A future perspective for HTH

The following reflections attempt to comment on some dilemmas and strategic choices that seem relevant in order to anticipate what HTH will be confronted with in the near future. The reflections are a continuation of the analysis based on comparisons between HTH and the rest of the industry (and more generally with trends in the market) and are to some extent speculative. Although controversial, one can imagine that trends in market development, including the role of the web, must trigger more fundamental analysis of future scenarios for organising sale. Hence the

discussion about the potential of net-based sale has shown that HTH has a very sensible way of dealing with it.

As mentioned, HTH sales are organised through a chain of shops. Changes will give rise to questions about HTH's contractual obligations for franchise takers. Also the obvious question will be unavoidable: should users doing their own business on the net without any contact with the shops be offered lower prices for the kitchen elements? In other words, considerations about the exact function and form of the future model for a new generation of the product generator will cause a re-evaluation of central business processes in the company.

It is quite clear that HTH sets much store by developing their website. But even the latest development reflects the limited interactivity of sales-related use of the web. It is an open question whether HTH can sustain such a restricted use of the web if competitors choose to facilitate the DIY users with full support and functionality on the web. Only time will show.

CONCLUSIONS

The internet-based product generator is an example of direct user involvement in the design process, although it is doubtful whether you can term it a user-driven innovation in a stricter understanding of the term. But at the same time forming of the configurator also has to be understood as a reflection of internal user - producer relations. Those relations are not directly related to the customers/end-users. In this way the configurators' contemporary function and interface with the rest of the HTH has to be seen as a result of a mediating process in the company, where market relations, internal company structure and historical traces in technology used in production and logistics management have a significant role to play.

Whether the introduction of the configurator is a sign of increased room for user action e.g. empowerment or not depends on a subjective interpretation made by the user. The high demands on competence connected with DIY solutions will for some users be regarded as a burden creating uncertainty, while others will take full advantage of the (new) possibilities. The problem for further development of user designed web solutions lies on the one hand in the conflicting match between the inherited handling of the sales task in the company and on the other hand a full-scale web-based sale which has the potential to undermine the existence sales shops.

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