

The Customer-Dominated Innovation Process: involving customers as designers and decision makers in developing new product

This paper aims to explore the mechanism of involving customers as designers and decision makers in developing new product. This study describes results from in-depth case studies with three companies; Tokyoflash, Threadless and Lego. Each of these firms is a pioneer in enabling customers to engage in product design and development as both designers and decision makers. This study is based on detailed in depth interviews with senior managers within these firms, as well as interviews with participating customer-designers. A new Customer-Dominated Innovation Process is described, which highlights the critical role played by customer-designers and customer communities. In addition, the methods and key factors needed to enable this engagement are discussed. This new phenomenon challenges standard models of product development in which internal resources retain authority and expertise.

Keywords: customer-dominated; new product development (NPD); customer-designer; innovation process

Introduction

Working closely with customers to obtain deep insights and to identify potential needs is one of successful factors for developing new product (Gruner and Homburg 2000; Cooper and Kleinschmidt 1994). The positive effect of customer involvement has been supported by many empirical studies and has been identified as a critical success factor (Poetz and Schreier 2012; Von Hippel 2005; Lilien et al. 2002; Hanna et al. 1995; Johne and Snelson 1988; Maidique and Zirger 1984; and Cooper 1979).

Listening to the 'voice of the customer' is viewed as a key imperative (Nishikawa et al. 2012; Roman 2010) in new product development (NPD). However, the process of constantly collecting and testing information about customer needs can be costly and time-consuming (Dahan and Srinivasan 2000). Increasingly, in highly competitive environments, firms must obtain customer knowledge, not merely

importing the customer's 'voice' through traditional market research approaches (Sawhney et al. 2005), but also through new online methods. Traditional means of collecting user insights tends to result in 'needs focused information', but when customer needs are heterogenous, complex and fast changing, firms may gain more benefit from collecting 'solutions focused information' (Thomke 2003).

There has recently been a significant growth in the range and richness of on-line interactions that are possible between a company and its customers. The Internet, as an open and ubiquitous network (Afuha 2003), has enabled new approaches and opportunities that stimulate customers to be more actively involved in NPD. Specifically, the Internet enhances the absorptive capacity of a company to obtain market knowledge (Prandelli et al. 2006) and provides easier access to the knowledge of customers (Füller et al. 2007) at a lower cost (Sawhney et al. 2005; Nambisan 2002). Hence, recent attention has been given to web-based mechanisms which enable firms to interact with customers more broadly, richly and efficiently (Füller 2010; Prandelli et al. 2006; Nambisan 2002).

The internet has enabled 'traditional' methods of collecting need focused information to be translated for use online (e.g. interviews, surveys and focus groups) (Ryzhkova 2012; Prandelli et al. 2006). A range of new tools and mechanisms has been introduced to support the customer-engaged NPD process, such as crowdsourcing (Howe 2006), virtual communities (Füller et al. 2007) and design toolkits (Janssen and Dankbaar 2008). As a result, customers may engage much more proactively with firms. This raises the possibility that customers are less passive in their relationship with the firm, and have the potential to be involved in the design of new products and solutions (Thomke 2003). Traditional approaches place the customer as the recipient of company judgments regarding what they need. In this model, the firm 'designs for customers'.

Internet platforms have the potential to change this relationship, enabling customers to engage more deeply, as ‘designers’, ‘judges’ and ‘developers’. This provides a distinct contrast to the previously ‘company-dominated’ world of product development (Füller 2010), where now, the firm might ‘design with customers’. For example, Eli Lilly, a pharmaceutical firm, has established an on-line innovation platform for the new drug discovery (Sawhney et al. 2005); Video game designers encourage customers to be co-developers of new gaming ideas and participate in the development and testing process (Jeppesen and Molin 2003); and Google Apps has stimulated collaborations with customers for cloud computing (Agcaoili 2012).

There is some evidence to suggest that ‘designing-with’ customers can have significant commercial benefits. Research of Nishikawa et al. (2012) revealed that at Muji, a Japanese consumer-goods brand, products designed with or by their customers generated approximately 16 million dollars more revenue than the sales of products designed by the company alone; a five-fold increase. They observed that customer-generated products were more likely to survive than company-generated products in a three-year observation period. They showed that the customer-generated products outperformed company-generated products on multiple key market performance metrics. In another study, Poetz and Schreier (2012) compared the quality of ideas for baby products generated by a company to those generated by customers in an idea contest. The result demonstrated a positive benefit of engaging the customer in idea generation. These promising cases suggest that a wide range of firms might also benefit from adopting similar approaches.

The ability to engage customers as both designers, evaluators, developers and decision makers is a very recent phenomenon, enabled specifically by developments in internet technology. As a result, it is a phenomenon which is little understood by a vast

majority of firms. Furthermore, its recent emergence as an approach in product development has had very little academic attention, especially regarding the way in which firms might transition from a traditional, 'design for' mind-set to a 'design-with' approach (Sawhney et al. 2005; Marion et al. 2014). The implications for firms in terms of how NPD might be managed are also poorly understood (Nishikawa et al. 2012; Greer and Lei 2012).

To address these gaps, this paper describes results from three in-depth case studies within Tokyoflash (Watch Manufacturer), Threadless (Apparel Manufacturer) and LEGO (Toys Manufacturer). Each of these firms has successfully introduced customer-designed products to the market, and are widely recognised as being at the forefront of these new approaches. By presenting a unique data set gathered from the companies, this research seeks to understand how these firms have implemented these new web-based mechanisms to enable customers to be incorporated into the entire new product development process as designers and decision makers, and the implications of this for NPD management.

The NPD process and customer involvement

Phase-review style processes for developing new products have been widely embraced by product developers and best-practice companies, such as Procter & Gamble, IBM, 3M, and General Motors (Griffin 1997; Cooper et al. 2002; Ebrahim et al. 2012).

Griffin, in 1997 estimated that around sixty percent of the product-developing firms use some form of phase-review process (Griffin 1997), and this may well be significantly higher today. The process, as a conceptual and operational map, aims to support management in the progression of new products from inception to launch (Cooper 2008). A typical phase-review process consists of a series stages where information is exchanged, design work is carried out and there are interactions between participants. In

between these phases are review points, to ensure that work is accomplished as planned and to approve the project for progression to the next stage. Thus, the process provides the management team with a decision making framework at a series of go/no-go review points, and provides a guide to activity in between.

However, deep involvement of customers as both designers and decision makers is potentially at odds with such standard management approaches. This paper explores whether a different model is needed to accommodate this emerging phenomenon and how traditional approaches might be adapted as a result.

Research Method

As a pre-cursor to this study, the authors conducted a pilot study, interviewing R&D directors in 6 world leading firms, each of which is independently an industry leader in their sector. Insights from this pilot study demonstrated that even in highly successful firms, traditional methods of engaging with customers still dominate. Web-based methods are gaining traction, but are in the main used to obtaining feedback on current products, or as a substitute for paper based methods of data collection (e.g. surveys) for validating ideas or collecting insights (AUTHORS REMOVED FOR REVIEW).

Creusen et al. (2013) produced similar results from a survey of 88 firms of Netherlands.

Ryzhkova (2012) also explored the extent to which web-based methods were implemented in NPD and identified similar patterns. These studies, along with our pilot study demonstrate that despite the potential of these methods to enable greater involvement from customers as designers, very few companies are currently adopting this new approach. Thus, to explore this phenomenon, firms must be purposefully selected based on clear criteria. A random sample would not suffice, as it is unlikely that any firms within this would be actively engaging customers as designers, unless the sample was extremely large. Furthermore, as this research is seeking to understand the

methods and implications involved in implementing these approaches, deeper insights are needed than can be gained through surveys with large sample sizes.

As a result, this study follows a case study approach, with three in-depth cases which were carefully and purposefully selected as exponents of the new ways of working which are being investigated. Three selection criteria were established to guide this selection: (1) the firm has been designing with customers in developing new products; (2) the firm was already produced and sold customer-designed products to the market; and (3) the firm was recognised as being a leading practitioner in designing with customers. The three case companies are summarised in table 1.

Table 1. Profile of participating firms

Tokyoflash, based in Japan, is a firm with over 15 years in producing LED/LCD watches. In 2010, the company took a decision to transform the business, from a traditional one in which in-house designers produce the next generation of products, to one in which they actively seek and develop customer-generated designs through an on-line platform. Tokyoflash has become a leading company in this niche market. Without any stores or agencies, it sells 20,000 to 40,000 watches per annum in over 65 countries on six continents.

Threadless, a Chicago-based apparel firm, is built around a business model of embracing designs from their customers and selling their designs as its products to the market since 2000. This mechanism brings Threadless 1500-2000 new designs per week and every week around 6 new designs get printed for sales being accessible to over 170 countries. Underpinning this approach is an on-line community with over 50,000 active customer-designers, enabling customers to play a key role in new design generation, decision-making, marketing and sales forecasting.

LEGO, a toy manufacturer from Denmark, launched a project titled LEGO Ideas in 2014, based on an internet platform, aiming to bring new product ideas to market by customers' designs. The pilot project of LEGO Ideas was named LEGO Cuusoo starting in 2008. The pilot proved to be successful, with strong customer engagement and positive sales results from the new products developed. Building on this promising pilot study, LEGO took ownership of the online platform and re-branded the service as LEGO Ideas, hoping to be able to further scale this business. LEGO Ideas so far has collected over 60, 000 ideas through the platform.

Data was primarily collected from the above three case firms through a series of in-depth interviews (Yin 2009) with senior members of staff in the firms, and in most cases with a small but representative sample of customer-designers. The interviewees were selected by a key informant approach (Kumar et al. 1993), and the relevant informants were all the core people involved in managing the New Product Development and customer experience activities. A list of key informants is summarised in table 2.

Table 2. Summary of interviewees

Each interview, using a semi-structured format, lasted between 60 to 100 minutes, which enabled the exploration on the perceptions regarding complex issues with a possible probe into further information and clarification (Barriball and While 1994). A pre-determined interview protocol was made, but the researcher allowed interviewees to pursue interest areas where relevant. During the interviews, interviewees were presented with a generic representation of a phase review process, in order to articulate who was involved at each stage and at each decision point (both customers and customers), how they were involved and what methods were used to

enable this involvement. During each interview, whilst creating these illustrations, respondents were encouraged to articulate the rationale and expand on the detail.

All interviews were recorded, transcribed and coded for common themes and issues, using the software MAXQDA. Over 225, 000 words of text based data was generated. In addition to evidence from interviews, supporting data was also collected, including publicly available information such as promotional material and data available on official websites over a six-month to a year period. The researcher was also able to include independent observations as a result of visits to company sites where possible. Finally, different types of data were subsequently analysed to identify key issues and patterns.

Research Findings

The NPD Process managed to achieve ‘design-with’

Tokyoflash adopt an on-line design blog, to which new designs can be submitted at any time. Submitted designs are initially evaluated by the firm for copyright and image quality and then published on the design blog with a period of 30 days for public votes and feedback. This design blog enables these external participants to play the role of ‘judge’ and ‘critic’, resulting in the ‘best’ designs being easily distinguished.

Independently, the company also screens the feedback and the voting, but they do not intervene. Designs with the highest score are selected by the firm for further evaluation to investigate their technological/production feasibility, and to independently verify whether positive customer feedback might also result in sufficient potential sales volumes. Any design which is successful at this stage is then passed to the ‘product team’, where the design is developed further. Meanwhile, the firm and the customer-designer remain in close communication to discuss potential changes to the product as a

result of the detailed design work. Most often, this communication serves to inform the customer-designer of design changes, rather than to negotiate them, as it is unlikely that these customer-designers are sufficiently knowledgeable about the watch technological details as the in-house engineering team. Finally, the modified design is moved to the full production stage.

Threadless typically set 'T-shirt challenges' to source customer-designs. For each challenge, clear guidelines in the form of both text and also video are provided. Once a design is submitted, it is first reviewed by the company to ensure that the content is of sufficiently high quality, but also that it is legal, not-derivative and morally suitable. At this point, a design may then be voted on by the wider, registered community, using a 1 to 5 point scale, supplemented by comments where appropriate. Normally, an individual design is opened for voting for just 7 days. After scoring, both the designs with highest scores and the designs independently selected by the company are transferred into a further, final selection process, during which Threadless use its internal expertise to make the final decision. At this point, candidate designs are made available to all employees, for them to vote for their preferences. Results from this vote go to a smaller core team who make the final judgements. All selected designs undergo a careful and strict analysis to ensure that they do not infringe any existing copyright. Following this, the customer-designer is notified and asked to sign an agreement for the design to be put into production. A 'product lead' in the team takes charge of design liaises with the production team to help create prototypes for evaluation and develop a detailed production plan. Throughout this process, customer-designers works closely with the firm to maintain ownership of their design and contribute to any refinement decisions that might be taken.

In LEGO, customer-designers are invited to upload new designs to the official platform, which can then be voted on and judged by other members in the community. Designers are constrained to using existing LEGO bricks and colours in their designs. To support the designers, there is an online design toolkit, developed by LEGO, called Digital Designers. This allows customer-designers to create virtual LEGO models, as well as producing the instructions necessary to build the model. Customers may also use other design approaches as long as they can submit high quality images of their designs. All designs submitted are initially screened by the company to ensure that they are 'appropriate' (e.g. not contravening copyright, not offensive etc.) and that images are of sufficiently high quality. Once the company accept a design proposal, it is uploaded to the website, where it might receive feedback from the online community. A submitted design will be available for feedback and voting for up to a year. If customer-designers wish to gain a high number of votes, then it is necessary for them to 'promote' their designs to community members. If a design receives 10,000 votes, then LEGO takes it to 'Review Board' for further evaluation on issues such as portfolio fit, technical feasibility and business development. These review boards operate on a rolling deadline of early January, May, and September. The responsibility for the final decision lies with the LEGO Ideas project team. Once a design is finally selected, the firm transfers it into the development and production phase. Here, internal designers work closely with the customer-designer to develop the original concept to a production ready state. This includes the creation of detailed building instructions, packaging and marketing assets.

In comparison to traditional phase-review management processes this new approach, enabled by internet technologies, radically changes both the importance of customers and also the ways in which they can be involved at all stages of development. Although the three firms use a 'design-with' mind-set in different industries and the

way that they design with customers varies, similarities and common patterns in the NPD process can still be observed and extracted. A generalised NPD process from the three cases is illustrated and presented in Figure 1.

Figure 1. A generalised NPD process from the three case studies

In all the cases, firms start the ‘design-with’ process by establishing protocols which demonstrate the strategic vision of the companies and define the product design tasks and rules for customer participation. The firms draw up plans for potential products, designs and ideas which they expect to obtain from further customers. These protocols can be seen as game plans to ensure an even playing field for all participants, steering the direction of value creation by customers.

Building an online platform for customer participation is the next step after the protocols have been established, from which the virtual community can be formed and then interactive activities can be held. The firm needs to provide necessary rewards, support and maintenance to enable the community to grow and prosper. Design toolkits may also be embedded for customer use if needed. In this study, all of the case firms have an advanced IT platform for customer involvement, maintaining and updating it to nurture the community. On the platform, some firms (e.g. LEGO and Tokyoflash) encourage participation by awarding a prize for the best design or participant contribution, while other firms (e.g. Threadless) promote collaboration by rewarding the best participants with access to privileged virtual events, such as the Alumni club allowing more interactions among the best ones. LEGO has also developed a design toolkit to aid customers in designing products, which is also a pre-standardised tool for managing customer designs easily, as LEGO needs to limit the design flexibility to achieve economic production. In contrast, Threadless and Tokyoflash may have less

pressure on production as the design are mostly in two-dimensional scale. It is reasonable that they do not offer self-developed design toolkits. They thus recommend preferred design software and clarify clear requirements on the submission file.

Helping to verify the design submissions, the firms need to establish procedures to filter weak solutions, remove potentially controversial solutions (e.g. contravening other's copyright) and review/select proposals. They have to narrow down the scope of the potential designs from huge amounts of submissions and decide the final designs to implement, relying on their virtual community to screen design submissions and their internal expert team to then finalise the design. The entire process not only helps firms to make wise decisions on selecting designs to implement but also enables customers to understand the pros and cons of their creations and consequently to improve their knowledge and skill through participation.

Once a design has been selected, the company and customer-designer agree commercial terms for further collaboration. All firms continue to involve customers in developing products to sustain originality of ideas. At the product launch stage, the firms continue to use their customers as a resource for either promoting the products or providing feedback. Monetary rewards based on sales performance are also regularly given to customer-designers.

The methods used for design with customers

In all three firms, methods used to involve customers in the NPD process are mostly web-based. Communication and creation mainly rely deeply on the online tools. This is an important feature of the 'design-with' approach. Table 3 shows the methods used in the case firms. Reasons for using the methods are described on the basis of empirical evidence collected in the case studies. Table 4 summarises the characteristics of the methods used at different stages of the product development process, which are split

into 3 phases for simplicity. Interviewees were asked to comment on the effectiveness of these methods in terms of the richness of interaction, timeliness of feedback, the group targeted and security of communication.

Table 3. Methods used for involving customers in NPD

Table 4. The characteristics of the methods used

The key factors enabling the process

Each firm has its own way of keeping the process working effectively, as different industry sectors, company sizes or organisation structures may have a huge influence on the management approach of the process. For example, top management involvement in the new 'design-with' project is significantly important in big company LEGO, as strong leadership of the new project can ensure efficient staff support and resource relocation in a mature organisation structure; and product quality control and production is quite challenging for the small business Tokyoflash as they do not have the mature production base, broad supplier network and strong bargaining power of the big companies. Although differences exist in the ways that firms manage the process, the major factors needed in designing with customers share similarities across the three case firms.

Central to the process in all the firms is the virtual community. By building a community, the company can create a lasting relationship with people who may be customers, fans or potential users, who all share an interest in or even a passion for the company's products. This fuels further interactions and the development of the community. To maintain this community, participants must have a positive user experience during interactions, which in turn means that the firm must provide close monitoring, steering, observation, maintenance and control during the engagement

process. For instance, it is possible for a firm to reject a design, despite it having a high score from voting community members. In both Lego and Threadless, potential designs have been rejected by the firm due to the risk of contravening another firm's intellectual property (e.g. copyright on pictures or characters). Careful management in these circumstances is essential if goodwill is to be maintained. In Threadless and Tokyoflash, several of the participating customer-designers were engaged in very deeply, and had submitted multiple designs to the different firms. As they submit more designs and gain more feedback, they become more knowledgeable about what might or might not be successful.

Rewards and acknowledgements are essential to encourage participation and maintain the prosperity of the community. It is necessary to establish a rewards system to acknowledge positive participants in both design challenges and community events. In Tokyoflash, the customer-designer can earn a commission on sales and are able to directly track watch sales everyday through an on-line interface. The customer-designer receives a quarterly commission payment; in Threadless, the customer-designer can track the sales of the product in a personal dashboard and receive 20% royalties based on net profits, paid on a monthly; and in LEGO, customer-designer receives 1% of the total net sales of the product, which is paid twice a year. In addition, 'senior' or more experienced customer-designers are seen to be providing help and advice to newcomers. In some instances, the firm might also 'reward' community members who make effective contributions in order to maintain their interest and passion; in Lego for example, the firm elevates the status of some customer-designers amongst their peers by giving them 'points'. Typically, customer-designers who are successful are widely followed within the community, and achieve 'elite' status.

Customer-designers and the virtual community

Interviews with customer-designers revealed that they have an extremely diversified profile, from a range of occupations, such as engineer, designer, medical researcher, port authority officer, gardener and even maths teacher. However, they all had sufficient expertise to deliver 3D or 2D renderings of their design and were able to use professional design software, such as Blender, Inkscape, Photoshop, 3D Max, etc. Some customer-designers were professional designers, but others were self-taught. One customer-designer interviewee of Tokyoflash noted,

“I was not familiar with the 3D software at the beginning, but I spent time to learn them for delivering my ideas as I really like to wear a unique watch of my own creation.”

In addition, the virtual community also places participants in contact and might enable a customer with ideas, but not sufficient design skill to form a relationship with a more experienced designer. As a Threadless customer-designer investigated revealed,

“I am a writer and cannot design anything, but I learned about a designer through this community and cooperated with him by telling him my idea. He translated my idea into design. Finally we won the challenge....we cooperated many times and are happy for working together.”

Thus, the on-line platform enables collaborations amongst customers, leading to a genuine sense of community which helps each other, comments professionally and is appreciative of each other's work.

The motivation of customer-designers for submitting designs varied. For some, as mentioned in the interviews, it is a 'hobby' or a 'passion'. Others are more financially motivated. One participant from Threadless noted,

“Threadless indirectly creates a job for me...I can participate in the design challenges for fun but at the same time earning money for my life.”

Some use the design work as a training exercise or to gain peer recognition. Others might be motivated by genuine dissatisfaction with current products. Moreover, the firms supports the creation of an engaged community, and in some cases, friendships. One customer from LEGO noted,

“It is like my family...I check the website as a part of my daily life.”

Discussion

Firms begin to involve customers into design activities as they consider customers as a critical source of creative ideas, enhancing their creativity capability and product development efficiency. Within two years, more than 1000 unique customer-designs had been submitted to Tokyoflash. This would be even more, had some not been rejected due to images having low resolution. Those submitted designs have been enabled this micro-firm to become one of the most innovative in its sector, with a far greater variety of concepts than would have been possible with just the in-house team. As the CEO of Tokyoflash commented,

“Once our business was slow due to lack of creative ideas and inspirations and at that time we had a large pool of fans on the virtual community. So why we didn’t invite our fans and customers to design their own staffs. It would be a mutual benefit.”

LEGO Ideas’ on-line platform has on average about 450,000 per month, each with different backgrounds and occupations. The platform receives around 50 to 60 design submissions per day. The head of LEGO Ideas noted,

“The NPD process of this project decreases the standard time of developing a new product from around 2-3 years to 6 months, while product performance are equally excellent when we measure them in our company...”

And the senior directors revealed,

“We find in our community demographic data that lots of Ph.D degree owners and professionals actively participate into community activities, who are absolutely our potential intelligent tank for our company.”

Similarly, Threadless attracts a large amount of new design submissions, over 2000 designs per week, only the best and most innovative of which therefore can be produced.

The NPD processes to achieve ‘design-with’ approach in the case firms are highly social exchange processes and initiated by customers, the basic idea of which is that people participate in an exchange relationship under certain exchange rules (Cropanzano and Mitchell 2005) for achieving valued outcomes (March and Simon 1958). The social exchanges are supported by virtual communities, design activities and toolkits, and coordinated by the efforts of the firms. Customers participated in this approach contribute their knowledge and experience through virtual space as they expect to be rewarded through engagement. The firms therefore use certain resources such as money in all case firms, goods (final products) in LEGO, and status (recognition) in all case firms, to make the exchange and foster their contributions. The reward mechanisms and virtual activities defined by the exchange rules motive the customers to participate into the entire process.

In contrast to the traditional phase-review processes primarily developed by Cooper (1993, 1994, 2002a, 2008), which are dominated by firms, the new mechanism generated in this research for managing the ‘design-with’ approach emphasises

customer domination over the NPD process. The main differences can be summarised in the following aspects.

Firstly, although firms develop blueprint on the potential products designed with customers, the start of the NPD process is actually triggered by customers who are willing to involve into the collaboration, not firms which initiate and dominate the process in Cooper's work (1993, 1994, 2002a, 2008). The absorption of customer knowledge and experience is a major task throughout the NPD process, where cooperation between a customer and a firm is no longer a one-off event, but instead is a long-term collaborative activity. Consequently, a key conceptual change in the new process is that the company is a facilitator of customer engagement and customers are involved as designers, decision-makers and developers.

Secondly, the power of decision makings at gates is shared with customers in the new mechanism. In the traditional phase-review processes, the gatekeepers who form a decision-making team are the senior executives and management team who own the resources and authorities required and therefore seek to assess the ongoing business viability in the light of technology developments as the project progresses (Cooper 2008, 2009; Grönlund et al. 2010). This review process relies upon the capabilities of the gatekeepers, including technological expertise, intimate knowledge of the market place and a broad understanding of the strategic goals of the business. In addition, the senior management team also accepts accountability for these decisions being in the best interests of the firm (Cooper 2008). However, in the new process, customers have the opportunities of being gatekeepers and together with firms make decisions at a series of go/no-go review points. The new mechanism not only unleashes the potential for customers to make insightful decisions when developing products, but also gives customers the opportunities to infuse their interests and benefits into the development

process. This involvement of customers in the critical review activities is summarised in figure 2.

Figure 2. Intensity degree of customer engagement at decision-making points of NPD process in the three firms

The manager's role in this new paradigm might be not to test the vitality or efficacy of individual ideas, as that is better done by the broader customer and customer-designer community. The specific role of customers as gate-keepers varies however, with greater internal input required for some factors such as technical feasibility (e.g. TokyoFlash), production capability (e.g. Lego, Threadless) and service maturity (e.g. Threadless). Thus, customers might have deep knowledge of their own preferences, and they are not necessarily best placed to provide insight demanding domain specific knowledge or expertise.

Thirdly, the role of internal staff has changed from process-dominator to process-facilitator. Instead of originating designs, the internal staff in the 'design-with' approach is to ensure consistency with company direction, to test legal or copyright issues and to reflect on detailed implementation issues, behaving as facilitators to ensure the customers' wisdom integrated into the firms' knowledge properly and support to realise a promising idea. The capabilities of staff involved in new product development are strikingly different from the capabilities needed for a more traditional in-house approach. In the latter model, NPD staffs are typically technical experts, knowledgeable about the market and the solutions which they believe will be acceptable to this market. In this new approach, internal staffs require a different set of attributes, to work with the community of customer-designers and facilitate their engagement in design and decision making. All three firms work pro-actively to nurture and develop the

community of customers and customer-designers and as a result have a highly productive source of potential new product ideas. The resulting plethora of product ideas places new burdens on the in-house teams. Instead of being the originator of the idea, the in-house design, engineering and business teams might instead act as 'judges' to evaluate ideas, 'facilitators' to help progress a promising idea or 'developers' to provide detailed technical competences.

A customer-dominated innovation process

Synthesising the NPD process in all case companies, four high-level key stages can be identified: *vision & steerage, facilitation, development* and *commercialisation*. The corresponding customer activities at each stage are: *buy-in, design, consult* and *promote*. Figure 3 proposes a new model named Customer-Dominated Innovation Process (CDIP), which demonstrates the central concepts of managing the 'design-with' NPD process.

Figure 3. A new model: The Customer-Dominated Innovation Process

At the *Vision & Steerage* phase, firms develop product strategy and select the specific product to design with customers. Clear 'game rules' such as design tasks, rewards rules and IP protection should be defined at this phase to steer the actions of participating customers. Firms have to establish detailed plans and consider unexpected issues (e.g. third parties copying the submissions which do not yet have IP protection or submissions contravening copyrights of third parties which are not found on initial screening) to control the game in order to ensure the following phases are feasible. At the *Facilitation* phase, the major aims are to maintain a flourish virtual community and to aid participants in delivering designs. A state-of-art IT platform is essential, through

which firms nurture the virtual community and arrange creation activities. Also, companies should assign staff or a team to monitor and update the platform from time to time to create a good user experience, which stimulates broader participation. The evaluation of design submissions needs to be facilitated and monitored by firms as well, no matter who makes the decisions, as required by the established selection rule. Companies should help participants whose designs are selected to understand the value embedded in their designs and achieve agreements for further development and collaboration. At the *Development* phase, firms need to use their internal expertise and resources to further develop the design into a standard product that can fit in with the existing production system. An effectively cross-functional team should be set up to take charge of product development. Customer-designers could also be invited to participate in development stage to continue contributing their knowledge. At the *Commercialisation* phase, the final product is launched on the market. Rewards and acknowledgement should be given to the contributors who stand out as promoters and representatives of their products and thereby help firms to promote their products.

Conclusion

For companies involved in product development, there is little doubt that these internet enabled management approaches are becoming increasingly important. This is especially the case in sectors where there are a large number of customers who are highly engaged with the products and services that they purchase. Customers can play a much stronger role in both the design of new products and the decision making process. Whilst currently there are few prime examples of such intense engagement of customers as designers and decision makers, we predict that in the future, this type of approach will become much more ubiquitous. This has profound implications for how product development will and should be managed. Senior managers may not remain the entire

decision making authority, with privileged access to detailed market intelligence and instead act as brokers and enablers of community engagement and feedback. Internal design teams may no longer be required to conceive future products, in isolation from the market and instead will be required to act as the coordinator and implementer of designs submitted by the customer community. This fundamentally challenges the logic of a phase-review process, where the gate meeting is expected to bring the experience and judgement of senior management to make critical decisions. Individual judgement will give way to input sourced from a broad sample of customers and as a result, gate meetings as they are currently running will become less important. Even in markets where technology is advancing quickly, it is still possible to engage customer communities in this way, even if individual customer-designers are less able to submit designs which exploit next generation technology. With companies such as Threadless, Lego and Tokyoflash leading the way, many more firms are expected to embrace this new “Customer-Dominated Innovation Process” model.

References

- Afuha, A. 2003. Redefining Firm Boundaries in the Face of the Internet: Are Firms Really Shrinking?. *Academy of Management Review*, 28(1), 34–53.
- Agcaoili, K. 2012. *Google Apps: An opportunity to collaborate*. University of Southern California.
- Akao, Y. 1997. QFD: Past, present, and future. *In International Symposium on QFD* (Vol. 97, pp. 1-12).
- Akao, Y. 2004. *Quality function deployment*. Productivity Press.
- Antorini, Y. M., Muniz, A. M., and Askildsen, T. 2012. Collaborating with customer communities: lessons from the Lego Group. *MIT Sloan Management Review*, 53(3), 73-79.
- Barriball, KL., and While, A. 1994. Collecting Data using a semi - structured interview: a discussion paper. *Journal of advanced nursing*, 19(2), 328-335.
- Cooper, R. G. 1979. The dimensions of industrial new product success and failure. *The Journal of Marketing*, 93-103.
- Cooper, R. G. 2008. Perspective: The Stage - Gate® Idea - to - Launch Process—Update, What's New, and NexGen Systems*. *Journal of Product Innovation Management*, 25(3), 213-232.
- Cooper, R. G., and Edgett, S. J. 2008. Maximizing productivity in product innovation. *Research-Technology Management*, 51(2), 47-58.
- Cooper, R. G., Edgett, S. J., and Kleinschmidt, E. J. 2002. Optimizing the stage-gate process: what best-practice companies do—I. *Research-Technology Management*, 45(5), 21-27.
- Cooper, R. G., and Kleinschmidt, E. J. 1994. Determinants of timeliness in product development. *Journal of Product Innovation Management*, 11(5), 381-396.

- Creusen, M. E. H., Hultink, E. J., and Eling, K. K. 2013. Choice of consumer research methods in the front end of new product development. *International Journal of Market Research*, 55(1), 81.
- Dahan, E., and Srinivasan, V. 2000. The predictive power of internet - based product concept testing using visual depiction and animation. *Journal of Product Innovation Management*, 17(2), 99-109.
- Eason, K. D. 1995. User-centred design: for users or by users?. *Ergonomics*, 38(8), 1667-1673.
- Ebrahim, N. A., Ahmed, S., and Taha, Z. 2012. Modified stage-gate: A conceptual model of virtual product development process. *arXiv preprint arXiv:1210.7482*.
- Füller, J., Jawecki, G., and Mühlbacher, H. 2007. Innovation creation by online basketball communities. *Journal of Business Research*, 60(1), 60-71.
- Füller, J. 2010. Refining virtual co-creation from a consumer perspective. *California Management Review*, 52(2), 98-122.
- Greer, C. R., and Lei, D. 2012. Collaborative Innovation with Customers: A Review of the Literature and Suggestions for Future Research*. *International Journal of Management Reviews*, 14(1), 63-84.
- Griffin, A. 1997. PDMA research on new product development practices: updating trends and benchmarking best practices. *Journal of Product Innovation Management*, 14(6), 429-458.
- Griffin, A., and Hauser, J. R. 1993. The voice of the customer. *Marketing science*, 12(1), 1-27.
- Grönlund, J., Sjödin, D. R., and Frishammar, J. 2010. Open innovation and the stage-gate process: A revised model for new product development. *California management review*, (52), 106-131.
- Gruner, K. E., and Homburg, C. 2000. Does customer interaction enhance new product success?. *Journal of business research*, 49(1), 1-14.

- Hanna, N., Ayers, D. J., Ridnour, R. E., and Gordon, G. L. 1995. New product development practices in consumer versus business products organizations. *Journal of Product and Brand Management*, 4(1), 33-55.
- Hauser, J. R., and Clausing, D. 1988. The house of quality. *Harvard Business Review* 66 (3): 63–73.
- Howe, J. 2006. The rise of crowdsourcing. *Wired magazine*, 14(6), 1-4.
- Janssen, K. L., and Dankbaar, B. 2008. Proactive involvement of consumers in innovation: Selecting appropriate techniques. *International Journal of Innovation Management*, 12(03), 511-541.
- 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), 363-383.
- Johne, F., and Snelson, P. 1988. Success factors in product innovation: a selective review of the literature. *Journal of Product Innovation Management*, 5 (2), 114–129.
- Kaulio, M. A. 1998. Customer, consumer and user involvement in product development: A framework and a review of selected methods. *Total Quality Management*, 9(1), 141-149.
- Koomsap, P. 2013. Design by customer: Concept and applications. *Journal of Intelligent Manufacturing*, 24(2), 295-311.
- Kumar, N., Stern, L. W., and Anderson, J. C. 1993. Conducting interorganizational research using key informants. *Academy of management journal*, 36(6), 1633-1651.
- Leonard, D., and Rayport, J. F. 1997. Spark innovation through empathic design. *Harvard business review*, 75, 102-115.
- Lilien, G. L., Morrison, P. D., Searls, K., Sonnack, M., and Von Hippel, E. 2002. Performance assessment of the lead user idea-generation process for new product development. *Management science*, 48(8), 1042-1059.

- Mahajan, V . and Wind, J . 1992 New product models: practice, shortcomings and desired improvements . *Journal of Product Innovation Management*, 9, pp . 128–139 .
- Maidique, M.A., and Zirger, B.J. 1984. A study of success and failure in product innovation: the case of the US electronics industry. *IEEE Trans. Eng. Manage.* 31 (4), 192–203.
- Marion, T. J., Barczak, G., and Hultink, E. J. 2014. Do Social Media Tools Impact the Development Phase? An Exploratory Study. *Journal of Product Innovation Management*, 31(S1), 18-29.
- Merton, R. K. 1968. The Matthew effect in science. *Science*, 159(3810), 56-63.
- Nambisan, S. 2002. Designing virtual customer environments for new product development: Toward a theory. *Academy of Management Review*, 27(3), 392-413.
- Nishikawa, H., Schreier, M., and Ogawa, S. 2012. User-generated versus designer-generated products: A performance assessment at Muji. *International Journal of Research in Marketing*, 30(2), 160-167
- Poetz, M. K., and Schreier, M. 2012. The value of crowdsourcing: can users really compete with professionals in generating new product ideas?. *Journal of Product Innovation Management*, 29(2), 245-256.
- Prandelli, E., Verona, G., and Raccagni, D. 2006. Diffusion of web-based product innovation. *California Management Review*, 48(4), 109-135.
- Reichheld, F. F. 2003. The one number you need to grow. *Harvard business review*, 81(12), 46-55.
- Roman, E. 2010. *Voice-of-the-customer marketing: A revolutionary 5-step process to create customers who care, spend, and stay*. McGraw Hill Professional.
- Ryzhkova, N. 2012. Web-based customer innovation: A replication with extension. *Innovation: Management, Policy and Practice*, 14(3), 416-430.

Sawhney, M., Verona, G., and Prandelli, E. 2005. Collaborating to create: The Internet as a platform for customer engagement in product innovation. *Journal of interactive marketing*, 19(4), 4-17.

Thomke, S. H. 2003. *Experimentation matters: unlocking the potential of new technologies for innovation*. Harvard Business Press.

Ulrich, K. T., and S. D. Eppinger. 2008. *Product design and development (4th ed.)*. New York: McGraw-Hill.

Von Hippel, E. 2005. Democratizing innovation: The evolving phenomenon of user innovation. *Journal für Betriebswirtschaft*, 55(1), 63-78.

Wind, J., and Rangaswamy, A. 2001. Customerization: the next revolution in mass customization. *Journal of interactive marketing*, 15(1), 13-32.

Yin, R. K. 2009. *Case study research: Design and methods (4th Ed.)*. Thousand Oaks, CA: Sage.

| | Tokyoflash | Threadless | LEGO Ideas (Previously known as LEGO Cuusoo) |
|---------------------|----------------------|-------------------|---|
| Industry | Electronics Industry | Apparel Industry | Toys & Games Industry |
| Company Size | Micro small | Middle | Large |
| Est. Year | 2000 | 2000 | Project started from 2014 Pilot LEGO Cuusoo from 2008 (Company founded in 1932) |
| Employees | 7 | 50+ | Around 7 key members (Employees in the company about 11,755) |
| Headquarter | Yokohama, Japan | Chicago, USA | Billund, Denmark |
| Main Product | Electronic Watches | T-shirts | Construction Toys |
| Type | Private | Private | Private |

| Tokyoflash | | Threadless | | LEGO Ideas | |
|----------------------------------|---------------------|---|---------------------|----------------------------|---------------------|
| Key Informants | Years of employment | Key Informants | Years of employment | Key Informants | Years of employment |
| CEO (Founder) | 15+ | Vice President | 3+ | Head of LEGO Ideas | 30+ |
| Director of Marketing & Sales | 7+ | Head of Production | 10+ | Senior Director | 30+ |
| Director of Design & Development | 7+ | Design and Artists Manager | 10+ | Head of On-line Community | 5+ |
| Customer Support | 1+ | Human Resource Manager | 3+ | Associate Business Manager | 4+ |
| 5 Customer-designers | | Community Manager | 10+ | Senior Designer | 30+ |
| | | Wholesale Manager | 1+ | 3 Customer-designers | |
| | | Director of Customer Support & Experience | 10+ | | |
| | | Creative Director | 10+ | | |
| | | Director of User Experience | 3+ | | |
| | | 3 Customer-designers | | | |

| Methods used for involving customers in NPD | Purposes | Tokyoflash | Threadless | LEGO |
|---|--|------------|------------|------|
| <i>Emails</i> | For enquiries, idea and information exchange, announcements, etc. | √ | √ | √ |
| <i>Instant Communication Tools (Skype/iChat/Wechat/QQ/On-line customer service)</i> | For discussing complicated and urgent issues and inquiries | √ | √ | √ |
| <i>Virtual Community (on-line platform)</i> | For steering customers and maintaining primary interactions | √ | √ | √ |
| <i>Design Toolkits</i> | For supporting and standardising product design process | | | √ |
| <i>Survey (e.g. On-line questionnaire)</i> | For customer research and feedback | √ | √ | √ |
| <i>Social Media</i> | For publicity and customer feedback | √ | √ | √ |
| <i>Blog</i> | For idea and information exchange, public announcements, customer feedback, etc. | √ | √ | √ |
| <i>Forum/BBS</i> | For idea and information exchange, public announcements, customer feedback, etc. | | √ | |
| <i>Message/Inquiry Box in website</i> | For customer inquiry and feedback | √ | √ | √ |
| <i>On-site visiting</i> | For discussing very complicated issues and inquiries | | | √ |

| Methods used for involving customers in NPD | <i>Emails</i> | <i>Instant Communication Tools</i> | <i>Virtual Community</i> | <i>Design Toolkits</i> | <i>Survey</i> | <i>Social Media</i> | <i>Blog</i> | <i>Forum/BBS</i> | <i>Message/Inquiry Box</i> | <i>On-site Visiting</i> |
|---|---|---|---|--|---|---|---|---|---|---|
| Need info | √ | √ | √ | | √ | √ | √ | √ | √ | √ |
| Solution info | √ | √ | √ | √ | | | | | | √ |
| NPD Stage |  |  |  |  |  |  |  |  |  |  |
| Richness of Interaction | L | H | M | H | L | M | M | M | L | H |
| Timeliness of Feedback | M | H | | | M | L | L | L | L | H |
| Target Group | I | I | I/P | I | I/P | P | P | P | I | I |
| Security | H | H | L/H | H | M | L | L | L | H | H |

L = Low, M = Mediate, H = High; I = Individual, P = Public

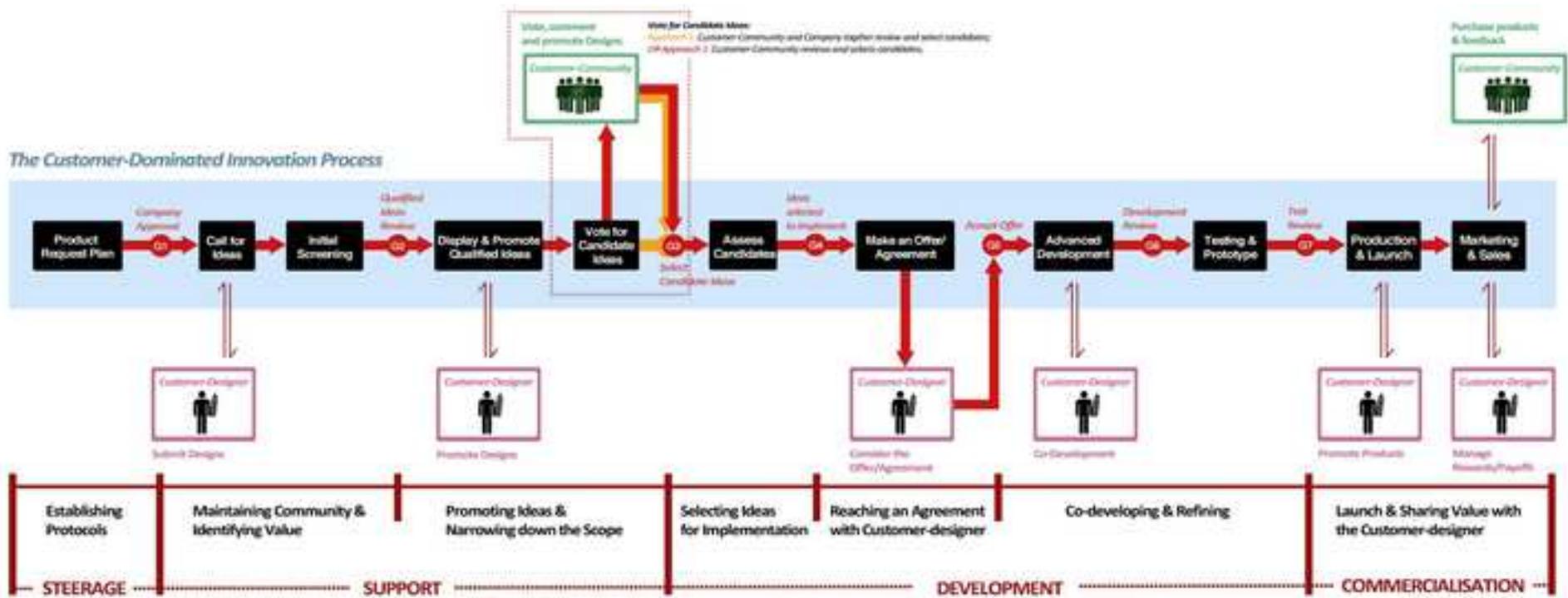


Figure 2

[Click here to download Figure 2-Intensity degree of customer engagement.jpg](#)

