Understanding User-Driven Innovation

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Nordic co-operation

Nordic co-operation, one of the oldest and most wide-ranging regional partnerships in the world, involves Denmark, Finland, Iceland, Norway, Sweden, the Faroe Islands, Greenland and Åland. Co-operation reinforces the sense of Nordic community while respecting national differences and similarities, makes it possible to uphold Nordic interests in the world at large and promotes positive relations between neighbouring peoples.

Co-operation was formalised in 1952 when *the Nordic Council* was set up as a forum for parliamentarians and governments. The Helsinki Treaty of 1962 has formed the framework for Nordic partnership ever since. The *Nordic Council of Ministers* was set up in 1971 as the formal forum for co-operation between the governments of the Nordic countries and the political leadership of the autonomous areas, i.e. the Faroe Islands, Greenland and Åland.

Preface

The following paper is excerpted from a briefing paper which was prepared for the first meeting of the Northern Dimension Learning Forum on User-Driven Innovation (NDLF-UDI) – a project initiative of the Nordic Council of Ministers. This project, which was approved by the Nordic Council of Ministers' Committee for Industry and Trade in November 2005, involves the participation of a number of other countries in the Baltic Sea Region (Estonia, Poland and Russia), as well as the Nordic Innovation Centre, NordForsk and the European Commission.

The project aims to facilitate policymakers in the region to develop increased competencies in this field of innovation policy, as well as to support and inspire each other in defining the policy rationale and possible mechanisms to catalyze user-driven innovation.

The first meeting of the NDLF-UDI was held in Copenhagen on March 22-23rd, with two primary objectives: 1) to establish a common understanding (and vocabulary) on the topic of user-driven innovation; and 2) to establish a policy rationale (e.g. agree on reasons for policy support to this area). A briefing paper was prepared to provide a general overview on the area of user-driven innovation, and to provide a basis for discussion of the policy rationale.

The paper was geared toward a policymaking audience and is meant to serve only as a briefing on the topic, and therefore does not provide the level of depth, analysis or academic rigor that would be expected from a research document. Much more time would need to be devoted to understanding and presenting a "proper" overview of the topic. The basis for the paper comes from various interviews, overviews of literature, case reviews and other bench-learning activities. The views and frameworks presented in this paper represent the author's perspective and are meant as a basis for discussion only.

I would like to thank all those who openly shared their views, experiences and visions for user-driven innovation and hope that this paper serves to develop the interest and engagement of others. I would also like to thank the Forum for Innovation Management (FIM) in Sweden for taking the initiative to co-organize this event – providing an opportunity for a broader audience to engage themselves in this topic.

Emily Wise Hansson
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Lund University
April 2006

Contents

1. An Introduction to User-Driven Innovation

What is it? And where did it come from?

Over the past two decades, all economic sectors have experienced a shift from competition based on price to competition based on knowledge (see below).

New ideas – or innovation – have become the focus of companies, academics and policymakers alike. Innovation refers to something new or renewed: products or services, processes, organizational forms, financial models, education and training, working space, etc. Innovation does not occur solely in high-tech sectors, nor does it always lead to an economic benefit. Innovation refers to the continuous improvements and changes that all entities (companies, academic institutions, research facilities…and even the public sector) must make in order to remain competitive. The field of innovation is broad.

In 2003, FORA introduced a useful typology of innovation forms[1], presenting three main categories of innovation: price-driven, research-driven and user-driven. A modified presentation of these three innovation forms is presented in the table below, and is helpful in "structuring the field".

[1] See Nyholm, Jens and Lotte Langkilde (2003), p.25

Table 1: Innovation Drivers

Driver:	Focus areas for action:	Examples:
Price	cost efficiency	Implementation of ERP or logistical systems Outsourcing
Research/ Technology	knowledge-intensity, linkages between research and industry, commercialization of research	Ericsson mobile systems New pharmaceuticals
User/Consumer Needs	better understanding and meeting both explicit and latent consumer demands; strategic usage of design processes; commercializing solutions already developed by users	Swiffer mop (P&G) Lego Mindstorms

Companies may employ one or several different innovation processes. Companies in higher-cost countries have generally focused on research/technology-driven innovation (rather than price-driven innovation). Innovation policies, also, have tended to focus on supporting research-driven innovation (through, for example, grants and tax incentives for R&D, incubator and university spin-off programs, and investments in technical education). Yet, over time, it has become evident that high R&D investment and lots of scientists, engineers and other knowledge-intensive professionals does not lead directly to high innovation performance. Other aspects must also be considered.

The CEO of Electrolux, Hans Stråberg, has stated it well:

> We have returned to a consumer focus – meaning that rather than selling what we produce, we produce what sells. There is an important distinction.

If innovation investments are to yield desired results, they need to respond to consumer needs. And this is getting more difficult. With the rise of the internet and increasingly global markets, consumers are met with seemingly unlimited choices. We no longer buy what we see, but rather seek out what we want to buy. And, increasingly, companies are providing ways for us to "do it ourselves". Sophisticated consumer demand is an important driver of innovation. [The latest European Innovation Scoreboard introduces this thesis, and even presents a measure of innovation demand (European Commission (2005), p.27-28).]

To sustain a competitive edge, more focus must be given to meeting users' needs…and not simply those explicitly stated in market research – but rather those latent user needs which can be revealed by alternative analytical methods, and by the users themselves. This is what user-driven innovation is all about – determining a more systematic way to understand and develop solutions that respond to user needs.

Why care about it?

In years past, companies and policymakers alike viewed innovation in linear terms. More and better R&D led to better and more profitable products and services. Today, it is broadly understood that innovation is NOT a linear process, but rather a product of interactions between various stakeholders. Increasingly, innovation policy is focusing on facilitating and strengthening these linkages between stakeholder groups (e.g. public-private partnerships and cluster promotion programmes, university-industry linkages through technology parks and spin-off programmes, match-making initiatives, etc.).

Much policy focus has been given to supporting science and engineering education, and research related to high-tech sectors. But it is increasingly apparent that focusing solely on research-driven innovation will not secure a competitive advantage in the longer-term. Considering the incredibly large pool of talented scientists and engineers in lower-cost countries (e.g. China and India), it appears that technology is quickly turning into a commodity.

Countries understand that international competitiveness cannot solely rely on large numbers of technically-skilled human resources and global prominence in high-tech sectors. There is an increasing understanding of the importance of creative/design skills[2], business/marketing skills…and the ability to mix these competencies to better meet consumers' needs.

Furthermore, companies are seeking new ways of increasing innovation "hit rates". R&D is expensive, and many innovation investments fail to reap envisaged rewards. For small companies, in particular, high risk and financial investment are primary barriers to innovation. In this region, where SMEs represent between 95 and 99% of all companies, it is especially important not only to help these companies undertake innovation investments, but also to help them realize their innovation potential. User-driven innovation methods can be employed to do this.

[2] Richard Florida has published two books on the importance of the 'creative class' and has developed the Creativity Index to rank cities according to their performance on the 3 T's (tolerance, talent and technology).

2. Different Perspectives on User-Driven Innovation

> To sustain a competitive edge, more focus must be given to meeting users' needs…and not simply those explicitly stated in market research – but rather those latent user needs which can be revealed by alternative analytical methods, and by the users themselves. This is what user-driven innovation is all about – determining a more systematic way to understand and develop solutions that respond to user needs.

Although there are different theoretical perspectives on user-driven innovation, as well as varying methods which are employed in user-driven innovation processes, there are several common features of this type of innovation which differentiate it from other types of innovation, as well as from traditional product development methods. These features include:

- *a strategic focus on consumer pull (vs. technology push)* – producing what sells, rather than selling what is produced
- *revenue-enhancing activities (vs. cost-cutting activities) by developing solutions that better meet consumer needs* – investing more skills, energy and resources on understanding consumer needs and developing solutions that are more specifically targeted to meeting these needs (often resulting in increased product introductions)
- *use of multiple skills and perspectives in the innovation process (e.g. adding ethnologists, anthropologists and designers to the scientists, engineers and business specialists)* – combining not just the technical and business skills, but also incorporating competencies in a wide range of other disciplines (and knowledge from users in related industries)
- *more direct involvement of the user/consumer in the innovation process* – either through observation processes, toolkits, user panels, or letting them do it themselves
- *requirements for an open and collaborative business environment* – countries where there is no tradition of openness and collaboration would likely not be fertile ground for these innovation methods; companies and national framework conditions (including education and IPR) also need to be more flexibly-structured to allow for increased usage of 'open-source' and multi-disciplinary methods

It is important to understand the over-arching characteristics of user-driven innovation and the shared views, before one can begin to appreciate the different perspectives on this area.

In general, there are two main perspectives on user-driven innovation: the voice of the customer perspective, and the lead-user innovation perspective (see below). These two 'schools of thought' are borne out of the academic research and practical experiences of David Kelley, Tim Brown and Eric von Hippel (among MANY others).

Table 2: Various Perspectives on Innovation

		User-driven Innovation Methods			
	"Traditional" Product Development and Marketing Methods	**Voice of the Customer ("design thinking") Methods**		**Lead-User Methods**	
Aim of the process	Identify consumer needs	Identify consumer needs		Identify solutions	
Where innovation takes place	In the company	In the company (often with external/consulting support)		Outside of the company	
Method/process	- segmentation, statistics and surveys (*asking consumers what they need*) - prototypes - test groups	***Product-Focused*** - observation (*discovering consumers identified and latent needs*) - brainstorming to define consumer needs - multiple alternative prototypes/solutions - reiterative testing and implementation	***Strategic Usage*** organizations work in new ways: -deliver new experiences for their customers and employees, while - developing the infrastructure and capabilities needed to grow and sustain a culture of innovation	***Co-invention; Mass Customization*** - company develops product/service "platform" - company develops toolkits and provides to users (with open access) OR company initiates an open process for users to propose solutions	***Lead-user drives Innovation*** Either lead-users do the prototyping and testing spontaneously, OR -companies identify lead-users (searching different domains) - lead-user networks create and test solutions
Case Examples		P&G, HP	Intel, Electrolux	Adidas, Lego	Microsoft, 3M
Comment		- higher innovation "hit rate" - faster and less expensive than traditional innovation methods (although not yet "scientifically" proven) - (strategic usage) requires new skill sets, shifts in resources and investment in organizational changes		- high innovation "hit rate" (as commericalizing solutions developed by lead users themselves) - fast and inexpensive innovation process - requires investment in identifying lead users in own AND related customer bases - "democratizing innovation" means that the company partner with users...and needs to accept relinquishing control	

Both of the perspectives on user-driven innovation are differentiated from "traditional" product development routines in two main areas:

1. the use of different methods to understand not only stated but also latent consumer needs; and
2. a different "structure of investments" and more strategic focus on understanding and developing solutions to meet consumer needs

A general description of the two main UDI perspectives, and the characteristics or methods which differentiate them from each other, is presented in the following sections.

Voice of the Consumer Methods

Voice of the consumer mthods focus on identifying (latent) consumer needs, and employ what can be generally-termed "design thinking". The term "design thinking" (as it is used in this paper) embodies two main elements:

- *the combination of different skill sets* – using people with "T profiles" (depth in one area; breadth in many)
- the use of cross-disciplinary teams in a *structured process* of *observation* (to identify consumer needs), *brainstorming*, *prototyping*, and *reiterative testing* and *implementation*.

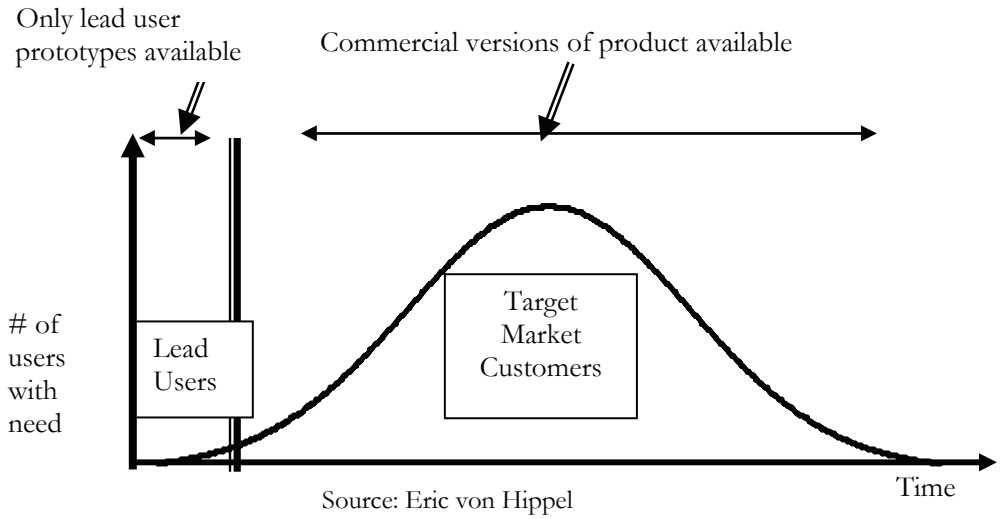
This method is most-often associated with a pure product development focus, but has also been used in a more strategic manner to transform organizations (their strategies, structures, processes, etc.).

Lead-User Methods

The main difference between the 'voice of the consumer' and 'lead-user' innovation methods is the source of innovation. In 'voice of the consumer' methods, the *manufacturer* focuses on identifying consumer needs and *develops solutions themselves*. In 'lead-user' methods, the manufacturer works with *lead-users* who *develop solutions*, or identifies (and commercializes) solutions which have already been developed by lead-users. A couple of the described benefits of this method include:

- higher 'hit rates' – as the products/services are already in use by lead-users, who are generally a predictor of the broader market (see figure below)

Figure 1: Lead-users are early adopters



- shortened development times (and potential for less expensive product development)

Some specific tools employed in lead-user methods include lead user search methods, user toolkits to assist and channel user innovation, and structured work with user innovation communities.

3. User-Driven Innovation in Action

Schools who teach it[3]

d.School at Stanford[4]

The Hasso Plattner Institute of Design (nick-named the d.School) at Stanford was founded by David Kelley[5] in 2005 with the support of a $35 million grant from German patron and SAP co-founder, Hasso Plattner. Although the institute officially launched in October 2005, coursework has been developed since 2002. The d.School operates out of the School of Engineering as a separate entity from the Product Design Program. The institute gathers an eclectic mix of graduate students – spanning engineering, medicine, business, the humanities, education – to 'take a sabbatical' from their home schools and participate in multidisciplinary, 'learning by doing' coursework (earning a Certificate of Design Thinking). The vision of the institute, says David Kelley, "…is to bring faculty and students from different departments together to tackle interesting needs and innovations. These collaborations will enable us to mine deeper than individual disciplines can alone."

The d.School's curriculum is continuously developed, but consists of two main components: coursework and studios (projects). Some courses titles are: *Experiences in Innovation and Design Thinking* and *Entrepreneurial Design for Extreme Affordability*. Courses are taught in collaborative style – mixing professors from different disciplines – and incorporate cases, interactive discussions and hands-on projects (for companies). The goal is to develop students with a "T profile" – depth in a specific field (from their 'home school' where they receive their degree) and breadth from the d.School (where they learn to combine skills in technology, business and human values in order to better understand and meet consumer needs).

The "design thinking" process that is taught and employed at the d.School has been an important fundament to IDEO methods. (Both

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[3] The International Design Business Management Program in Helsinki is another example of cross-disciplinary education. Information about this program can be found in chapter 4, under 'What's Happening in Finland?'

[4] The section below is a summary of internet texts and interviews with Alex Kazaks, Adam French and Meg Lee (at the d.School).

[5] professor of mechanical engineering and founder/chairman of IDEO (an industrial design firm headquartered in Palo Alto – see description in following sections)

methodologies were borne out of ideas from the same core group of Stanford Engineering School graduates, including David Kelley.) The process aims at need-finding rather than problem-solving, and includes the following components: *accept* (the process), *understand* (the consumer), *define* (needs), *express* (alternative solutions), *test* and *cycle*/repeat.

The d.School currently occupies the Birch building (a 3000 square feet facility), but renovation plans are in the works for a new home base (40.000 square feet in the Petersen Building). Future plans also include the development of cooperation with Germany – involving German companies in common projects, distance learning and teaching exchanges.

Sloan/MIT[6]

MIT is one of the most well-known technical universities in the world. Its mission is *to educate students in science, technology and other areas of scholarship that will best serve the nation and the world in the 21st century.* Eric von Hippel is a professor of Innovation Management at the Sloan Graduate School of Management at MIT. Professor von Hippel started conducting research on user-driven innovation and lead-user innovation methods in the late 70's. Current research topics and projects focus on the nature and economics of distributed and open innovation. He also develops and teaches practical methods that firms can use to improve their product and service development processes. These methods are presented as part of the business school curriculum on innovation and entrepreneurship.

His books *Democratizing Innovation (2005) and Sources of Innovation* (1998) are available for free download at http://web.mit.edu/evhippel/www/books.htm. Free video tutorials explaining his lead-user studies at 3M are also available.

Companies/research institutes who do it[7]

PARC (Xerox->PARC)

The Palo Alto Research Center (PARC) is an interdisciplinary research facility, working in the fields of physical, computational and social sciences. PARC was founded in 1970 as Xerox's in-house center for long-range scientific research and was incorporated as an independent research business in 2002.

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[6] An interesting aside is that Tim Brown, CEO of IDEO (see next section), spoke at Sloan on March 16th as part of the Dean's Innovative Leader Series.

[7] In addition to those mentioned here, other research institutes include SRI (Stanford Research Institute); other companies include Microsoft, 3M, Hasselblad, etc.

PARC's own inventions include the graphical user interface (GUI), the first commercial mouse, object-oriented programming, laser printing, Ethernet, digital property rights, and many more. PARC not only functions as an independent research institute, but also as a collaborative research partner and works with corporate, government, and other strategic clients.

PARC employs a multidisciplinary approach to its research. Leading scientist and inventors from a diverse array of disciplines – including anthropology, cognitive science, computer science, electrical engineering, human factors, materials science, mathematics, physics, psychology, sociology (and more) – regularly exchange insights and knowledge. These intersections between disciplines create new ideas, discoveries, perspectives and solutions. PARC deems itself as having a "fieldwork-driven innovation process" – following steps similar to those taught at the d.School (observation→surveys→ interviews→brainstorming→prototypes).

These unique capabilities allow PARC to offer companies and other clients the opportunity of partnering with, or outsourcing research and innovation to them – providing fresh perspectives and solutions, reducing the risk of internal R&D investment, and providing new insights to leading technologies. In addition, PARC offers services in customer-and-opportunity studies, technology licensing & commercialization, and short-term innovation workshops.

PARC provides perhaps the only example of an independent research institute that integrates a user-driven approach with very high-tech R&D – and even sells its user-driven research approach to others. PARC is working to develop the field, having witnessed increasing interest in the field of human-centered computing and design.[8]

Intel

> Intel describes the difference between traditional market research and people-centered design as the difference between incremental and radical innovation. The former uses design research to refine and develop existing products for existing markets; the latter focuses on 'new users, new uses', i.e. disruptive technologies that might address new markets and create entirely new products and business models. *(DTI Global Watch Mission, 2004)*

Intel has been working with people-centered innovation methods since 1998 when the Peoples and Practices Research Group was formed. Recently, the company has adopted the people-centered approach as a key to

[8] Ame Elliott, a design ethnographer and member of the Socio-Technical & Interaction Research Team, made the observation that there was a strong student pull on user-research and ethnography, and that industry was increasingly active in the sphere; however academic/education spheres were much slower to move. When asked what role the public sector could play, she offered several suggestions: serving as a repository for best practices/building a core of knowledge; suggesting formats for output; funding or sponsoring workshops and conferences; and developing training in the field.

innovation. The transformation towards a people-centered approach to innovation has involved not only changes to the innovation process, but also to the organizational structure. One of the organizational changes has been the initiation of groups like the Peoples and Practices Research group in all of the product divisions within the company.

The People and Practices Research group originally established a unique capability within Intel's research organization, namely the ability to engage the techniques of social science and design in order to develop a deep understanding of how people live, play and work. This knowledge is then translated into insights for guiding corporate strategy and technology development.

As Intel grows in its global reach, understanding human values in all their geographic diversity becomes even more vital to the company's success. Therefore, Intel's research perspective is human-centered – and considers technology (as one aspect of human systems), as well as social, emotional, economic, political, symbolic and physical dimensions. The research methods include a wide range of ethnographic techniques (from in-depth interviews to participant observation in the field), along with analysis of data for significant patterns and key insights. These insights are then translated into technology implications – strategies, applications, form factors, user experiences – which are often then tested with real people to provide additional feedback.[9]

The results of such activities allow Intel the ability to refine their own concepts, affect product development…and the industry more generally.

Electrolux and The Spark Process (Gnistan)

> We have returned to a consumer focus – meaning that rather than selling what we produce, we produce what sells. There is an important distinction.
>
> *Hans Stråberg, CEO Electrolux[10]*

With Hans Stråberg at the helm since 2002, Electrolux has adopted a strategy of selling products that consumers pay for, have a strong brand, and invest heavily in the innovation process. Electrolux has adopted a user-driven approach to innovation, with its own "home-grown" developments, and calls it *Gnistan* (the spark process).

Gnistan was initiated in 2002. The process focuses on identifying the true consumer needs and developing solutions for a broader range of consumer segments. Electrolux provides an example of strategic usage of voice of the customer innovation methods. The Customer Insight Group, led by Martin Hörnqvist, is a 15-person team who works closely with

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[9] Each of the product groups handles design and testing differently, but the basic structure is: human values, behaviors, beliefs, emotions → desired experiences → product concepts → development and testing

[10] In an interview with *Teknikföretagen*, issue #8, December 2005.

Stråberg. The group has responsibility for helping the whole organization learn about customer insight methods…and adopt new structures and processes for innovation.

The innovation process at Electrolux includes observation (home visits, video filming, etc.) to determine latent consumer needs, mapping and classification of the different consumer needs (identifying various customer types and defining contextual trends or themes), and finally brainstorming and prototyping solutions to meet the needs of each specific segment (meeting the 268 laundry problems and the 342 food storage problems of Electrolux consumers).

Results have been remarkable. Electrolux has nearly doubled the number of product introductions since 2002. Profits for the 3rd quarter of 2005 rose by 20 percent. All divisions are showing are "in the green", increasingly due to introductions of new, innovative products. And all of this has occurred during the same period that Electrolux has incurred increased costs associated with moving approximately 20 factories to low-cost countries. And although production has been moved out, product development and design resources have been moving in. For example: five years ago, product development for vacuum cleaners was located in Germany, Italy, England and Västervik. Today, all product development for vacuum cleaners is located in Stockholm. (Product development will always be located closest to the biggest consumer markets, in order to be close to the consumers and have the ability to understand and meet their needs.)

The consumer insight group at Electrolux has invited those NDLF-UDI members who are interested to come for a "field study" visit in Stockholm.

Lego

> In Billund, Denmark, not only is the customer always right, he's also a candidate for the R&D team. And he'll work for small plastic blocks.
>
> *(Wired News, January 4, 2006)*

In early 2004, Lego was reeling from a $238 million loss is fiscal 2003. They needed focus on core competencies (getting rid of the software division), half development times, cut product lines and reduce the number of unique pieces being manufactured. Mindstorms, Lego's programmable robotics kit, were expensive to manufacture – and not part of their core competence area (considered an electronic product, rather than a toy). Their primary users were adults (70% in 1999), and their programming language was complex. Yet, Mindstorms' sales were strong, and Lego was receiving good publicity from the First Lego League – a program in which teams of school children compete to build the best robot. So Søren

Lund (Mindstorms product director) was asked to come up with a new version.

Lund's goal was not to release a 'slightly improved' model, but to create something completely different. One of the main focus areas was the complexity of the product – Lund wanted novice users to be able to construct and program a robot in 20 minutes. Lego didn't have the expertise to write the software in-house, so the job of programming was outsourced to National Instruments. A prototype was developed and tested in-house, and introduced to Mindstorms users in September 2004. Within weeks, a Standford graduate student had reverse-engineered the key component and software, and posted his findings. Soon, several other engineers designed their own tools, including an open source operating system.

Lego was presented with a choice: protect its IP (and sue the hackers) or follow its mission and encourage exploration and ingenuity. They chose the latter and pursued efforts to connect customers to the company. So, in early 2005, Lego contacted a few lead users of Mindstorms (identified at Brickfest, the annual conference where Lego zealots show off their creations) and formed the Mindstorms User Panel (MUP). At first, the group thought they were selected for a test panel, but then Lund asked that they help with the design of the product. The group worked very confidentially, exchanging emails and providing input, over the next 11 months. The MUP team were de facto employees, with one key difference – they didn't get paid. (They even paid their own airfares to Denmark.) Yet group members were such extreme loyal customers, their reaction was "They're gong to talk to us about Legos, and they're going to pay us with Legos? They actually want our opinion? It doesn't get much better than that." (Wired News, 2006)

The new Mindstorms NXT was launched at the Consumer Electronic Show in Las Vegas, in January 2006. Later in January, Lego put the word out that it was looking for new citizen developers. If NXT is a hit, the user-driven strategy could be extended to the full range of Lego products.

Until recently, Lego was among the companies who were skeptical about user-driven innovation, fearing that outsiders might leak trade secrets or that they lacked technical skills. But Lego executives have warmed to the process, discovering that "Inviting customers to innovate isn't just about building better products. Opening the process engenders goodwill and creates a buzz among the zealots…and a critical asset is 'word-of-month envangelism'."

Consulting companies who facilitate it[11]

IDEO

> IDEO helps companies innovate. (IDEO) designs products, services, environments and digital experiences.[12]

IDEO began in 1991 as a merger between David Kelley Design and ID Two. Today, CEO Tim Brown leads the (approximately) 400 person-firm in seven offices around the world (Palo Alto, London, San Francisco, Munich, Chicago, Shanghai and Boston). IDEO is structured around 11 practice groups (human factors, business factors, industrial design, interaction design, mechanical engineering, electrical engineering, mechanical design, software engineering, healthcare, kid-centric design, and environments). Specialists in these areas are combined into multi-disciplinary teams – able to work with a range of people and problems – by employing the 'IDEO methodology' (see below).

Since its inception, IDEO has designed hundreds of products and won more design awards over the past decade than any other firm. In the 90s, it was best known for designing user-friendly computers, PDAs and other high-tech products. IDEO has also been responsible for the first no-squeeze, stand-up toothpaste tube (for P&G), and Oral B's toothbrushes for kids. Now, IDEO is transferring its ability to create consumer products into designing consumer experiences in services – and even transforming entire organizations (helping catalyze, develop and sustain innovation through various programs).

Innovation at IDEO is grounded in a collaborative methodology that simultaneously examines user desirability, technical feasibility, and business viability. IDEO's employs a range of techniques to visualize, evaluate, and refine opportunities for design and development. Among these are: observation, brainstorming, prototyping and implementation (see figure below[13]).

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[11] In addition to the two companies mentioned here, other well-known consultancies include Sonic Rim, Jump Associates, and Frog Design.

[12] www.ideo.com

[13] A more detailed explanation can be found in Bruce Nussbaum's 2004 article in *Business Week*, or on the IDEO home page.

Figure 2: IDEO Method

Source: www.ideo.com

IDEO has become a competitor of management consulting companies (e.g. McKinsey, BCG and Bain), as well as a favorite 'discussion topic' of its clients and the media alike. P&G's CEO Alan Lafley has established a strategic partnership with IDEO, sending his Global Leadership Council to training at IDEO, building an innovation center (called "the gym", and inviting CEO Tim Brown to sit on P&G's Board. Tim Kelley (David's brother) has published two books about IDEO methods and experiences, and CEO Tim Brown is a highly-demanded interview candidate and speaker.[14]

The firm has had an immeasurable impact on a long list of companies…and has affected a transformation not only in the consulting world and its client companies, but also in education[15] and the methods/processes used to meet consumer needs more generally.

R&D

R&D is a Danish design firm, formed just over a year ago (on January 1, 2005) as a spin-off of Kontrapunkt (the oldest and largest Danish design agency). R&D has 18 employees (of which four are founding partners) – an increase of 360% from the original 5 employees it started with. R&D employees have varying backgrounds (economics, innovation, design, branding, and sociology), and employ 'voice of the consumer' methods in their project work. They term this as *applied business anthropology*.

R&D has two main product offerings: development of product and service concepts, and facilitating the development of strategies for innovation. In addition, R&D has worked with a number of innovation research projects. In its first year, R&D's clients were comprised of approximately 45% public-sector and 55% private-sector customers…with some foreign clients. In 2006, the project portfolio will be almost two-

[14] with multiple articles in *Business Week* and presentations at the latest annual meeting of the World Economic Forum in Davos, among others

[15] David Kelley is a founder of Stanford's d.School.

thirds from the private sector (divided almost equally between domestic and foreign clients) and one-third from the public sector. (An interesting assignment that R&D has is working with one of the Danish ministries to design policies using UDI concepts and approaches.)

Whether working on product/service development or innovation strategies, the methods that R&D employs consider the users, the full effect on the company (strategy, finance, development, production, etc.), industry trends, and the broader national/international context. In interviews, R&D has mentioned that their methods have been developed with inspiration from many sources including Eric von Hippel, the Kelley brothers, the Doblin Group and the Cooper Stage-Gate Model.

4. The Implication for Policymakers

The user-driven approach to innovation has grown (in terms of number of companies applying this strategy) over the years, and has "left a trail" of success stories. It is only natural that other actors in the innovation system take notice and deliberate over their role in supporting this successful approach. In addition to the rise of consultancies offering facilitating services to these companies, business schools have begun offering courses featuring user-driven innovation. Masters' programs at technical universities feature summer internships working with human-centered innovation and user-centered solutions laboratories.[16] And certain national governments have begun taking action to support user-driven innovation. But what is the rationale for public-sector action? Is there a role that government can play to support or catalyze user-driven innovation in their economies? What realms of action are within the sphere of the public sector? These are some of the questions that will be discussed at the upcoming meeting.

The Policy Rationale[17]

One of the main objectives with the first meeting is to discuss and define the rationale for public-sector action in the field of user-driven innovation. The policy rationale for user-driven innovation may differ between countries, but some of the reasons for public-sector action in this area may include:

- *the opportunity to lead in the development of cross-competency educational programs*

Current educational programs are generally structured around one discipline, with the opportunity to take classes in other faculties. With an increasing demand from the private sector for "T profiles" – and experience in working in cross-disciplinary teams – more flexible educational programs should be developed.

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[16] See Georgia Tech's student employment page: www.cc.gatech.edu/gvu/connections/-internship.html

[17] The November 2005 report from DTI has a very useful chapter on the role of government – structuring the policy rationale in three areas: correction of market failures, the formal education system, and through broader framework conditions.

- *the need to address companies' demands for knowledge-building, exchange of experience and cooperation on innovation*

There are not a large number of companies who pursue user-driven innovation strategies or employ user-driven innovation methods. Nor is there a large pool of academic research on user-driven innovation or experience with the various methods. Government can play a role in sponsoring research and developing methods, raising awareness and disseminating information on this, as well as supporting forums for knowledge exchange between companies.

- *the desire to encourage innovation in a broader base of companies*

Surveys conducted in Denmark indicate that innovation is most often a product of the combination of user-driven, rather than research-driven approaches (see Table 3 below). Whereas only 0,6% of Danish companies rely solely on research-driven innovation, close to 23% of companies focus solely on market-driven innovation (see Table 3).

Table 3: Research- and Market-driven innovation in Danish companies (percent of all companies)

Research-driven, but not market-driven	0,6 pct.
Research- and market-driven	6,8 pct.
Market-driven, but not research driven	22,5 pct.

Source: Inside Consulting and Oxford Research (2004)

Current policies are, however, generally focused on supporting research-driven innovation. Policies to support user-driven innovation would affect a larger base of companies.

- *the need to "level the playing field" – making it easier for companies to employ their users in the innovation process*

Current intellectual property regulations are not be flexible enough to encourage companies to seek the involvement of their users in the innovation process. Those companies who are successful in both protecting IPR *and* involving users in the innovation process generally seek patents for a specific base concept, but leave the "add-on" innovations open for user development. The creation of a "modular concept" to intellectual property rights could have a catalyzing effect on user-driven innovation.

Existing Cases of Policy Action

What's Happening in Denmark

Spurred by the 2003 FORA report[18] which highlighted the three innovation typologies (price, research, technology) and an overview of user-driven innovation in Denmark[19], the Danish government requested additional analysis of user-driven innovation in three branches: fashion, medical and electronics[20]. These studies were then summarized in *Brugerdreven innovation – resultater og anbefalinger*, published in October 2005 – a report which also presented seven key recommendations in three areas: education, research and network-building. At the same time, the Danish Council for Trade and Industry presented their action plan[21] for user-driven innovation, recommending activities in research and education, broadening the use of user-driven innovation methods (in both the private and public sectors), and network-building.

In February 2005, the Danish government established the goal of developing a national program for user-driven innovation. The program should secure systematic knowledge-building and development of user-driven innovation. In January, a proposal for discussion was presented in the Danish Globalization Council.[22] This proposal recommended three main action areas: research in the field of user-driven innovation, development of tools and project to support user-driven innovation methods in SMEs, and more concrete cooperation between businesses and higher education (through, for example, specific innovation projects). A decision on financing for this program proposal will be made in the fiscal budget for 2007. In the interim, several activities are underway:

- a collaborative effort between Copenhagen Business School (CBS) and Massachusetts Institute of Technology (MIT) to develop a Danish Innovation Laboratory – where firm experts and academics present their best practice and experiments within user-centered innovation in an effort to develop and improve methods, and then share this knowledge more broadly
- a conference on user-driven innovation (planned for June 6th), gathering international experts, Danish governmental leaders and

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[18] Jørgen Rosted (2003), *Tre former for innovation*, FORA, Copenhagen.

[19] Inside Consulting and Oxford Research (2004), *Brugerdreven innovation i dansk erhvervsliv*, Danish Council for Trade and Industry, Copenhagen.

[20] *Brugerdreven innovation i dansk mode* (March 2005), *Brugerdreven innovation i medicobranchen* (September 2005) and *Brugerdreven innovation i elektronikbranchen* (October 2005), available at www.danmarkserhvervsraad.dk/rapporter or www.foranet.dk

[21] *Danmarks Erhvervsråds Handlingsplan for Brugerdreven Innovation* (October 2005), downloadable at http://www.ebst.dk/file/3600/brugerdreveninnovation.pdf

[22] See http://www.globalisering.dk/multimedia/Debatopl_g_om_konkurrencekraft_og_innovation1.pdf, p.23-25.

CEOs to discuss Denmark's strategy for strengthening user-driven innovation

What's Happening in Finland

Following a government resolution on design policy in June 2000, TEKES initiated its Industrial Design Technology Programme (Design 2005) in 2002, together with The Academy of Finland's Research programme for Industrial Design.[23] The aim of the programme was to increase the competitiveness of industry, especially in international markets, by utilizing expertise in industrial design. The programme focused on four main themes: the strategic use of design within companies, the development of design processes, strengthening research on basic design phenomena, and reinforcing the expertise of design firms and the services they offer. The programme ran until the end of 2005, with a budget of EUR 27 million (half of which was provided by TEKES, and half of which came from participating companies, research institutions and other organizations).

The research projects have both identified new opportunities (including the development of an innovation network for art and design in the Baltic Sea Region[24]) and new findings (including the economic impact of design[25]). In addition to the research projects conducted within the framework of this project[26], approximately 40 company projects were funded – giving special attention to small and medium-sized companies (SMEs). Furthermore, the program addressed the need to develop education and network-building.

The International Design Business Management Program (IDBM), was launched in 1995 as a joint teaching and research program between three leading universities in Finland: the Helsinki School of Economics, the University of Art and Design in Helsinki, and the Helsinki University of Technology. This multidisciplinary education program has continued to be developed through the Design 2005 initiative.

Designium, the New Centre of Innovation in Design, was established to build networks domestically and internationally, building knowledge and providing the opportunity for young designers to gain international experience.

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[23] See http://websrv2.tekes.fi/opencms/opencms/OhjelmaPortaali/Kaynnissa/MUOTO_2005/en/etusivu.html. In addition, a detailed description of these two programmes can be found in electronic form at: http://websrv2.tekes.fi/opencms/opencms/OhjelmaPortaali/Kaynnissa/MUOTO_2005/en/Dokumenttiarkisto/Viestinta_ja_aktivointi/Julkaisut/Tekes_MUOTOes_eng.pdf

[24] Juha Järvinen, *et.al.* (Designium/UIAH): Nordic-Baltic Creative Innovation Platform Project, Nordic Innovation Centre (NICe). The report will be published and posted at www.uiah.fi/designium/publications

[25] Maarit Lindström and Martti Nyberg (ETLA) have published a report *The Impact of Design on Economic Performance* earlier this month. The report is only available in Finnish.

[26] For a summary of a selection of design research projects funded under this programme, see http://websrv2.tekes.fi/opencms/opencms/OhjelmaPortaali/Kaynnissa/MUOTO_2005/fi/Dokumenttiarkisto/Viestinta_ja_aktivointi/Julkaisut/DF2v.e.pdf

Finland is in the process of evaluating the Design 2005 initiative, and deciding on its strategy and investments in a proposed Design 2010 program.[27] The newly-formed department for industrial design at TEKES (led by Janne Viemerö) is considering its involvement in this program.

What's Happening in the U.K.

In 2004, the British Department of Trade and Industry's (DTI) Global Watch Mission conducted an investigation of the impact of user-centered research in the design process in order to identify the ways in which user-centered research becomes [1)]integrated into both the product design and development process, and [2)]embedded within organizational culture and long-term strategic thinking. Findings and recommendations are summarized in the report *Innovation through people-centred design – lessons from the USA* (DTI Global Watch Mission, 2004). Some of the key recommendations included:

- a call for UK companies to recognize their technology-led culture and the limitations to innovation that this presents, to adopt people-centered innovation techniques at an early stage of their innovation programs, to move towards building multidisciplinary product teams – linked throughout the design cycle;
- a call of UK higher education institutions to develop mechanisms so that research on people-centered design could be used for technology innovation; and
- a call for UK policy to encourage the uptake of people-centered design within R&D (e.g. within the research grant and tax credit systems), and to encourage a funding base (particularly for SMEs) to be involved in collaborative research with the UK university sector.

In 2005, the government commissioned studies to better understand the economics of creativity and design and their role in driving business performance and productivity. The DTI undertook a study on the value and productivity impact of creativity and design on businesses. At the same time, Sir George Cox was asked to review how best to support and develop the creativity of SMEs in the UK. The resulting reports (DTI, 2005 and Cox, 2005) highlighted the importance of design, as a structured creative process, as a competitive tool for firms and an under-utilized source of competitive advantage.

The DTI report introduced several key roles for government:

- *correction of market failures* – providing support where the benefits of creativity and design are wider than those for the firm itself or where there are gaps in the efficient supply of finance by the market;

[27] Further details on this programme will be presented at the upcoming meeting.

facilitating networks between creative services such as design and other sectors
- *the formal education system* – enhancing the supply of creativity and design skills, and management and business skills more generally
- *ensuring appropriate framework conditions* (including the regulatory framework, intellectual property rights and the competitive environment), *supporting the cultural environment* (supporting the Design Council, Arts Council, etc.), and *playing a role as a purchaser* of goods and services
- *developing measurements and statistics* on the impact of design on economic performance

The Cox Review also identified a number of policy recommendations, including:

- *raising business understanding* of the contribution of creativity and design;
- improving the effectiveness of *Government support and incentives* in relation to creativity and design, including further development of the R&D Tax Credits system;
- equipping tomorrow's business leaders, technologists, engineers and creative specialists, through *higher education*, with a greater appreciation of the context in which their different skills will be applied;
- government using the power of *public procurement* to demand creative solutions to problems; and
- raising the profile of the UK's creative capabilities by way of a *network of centers of creativity and innovation* across the UK.

Details on how the British government will act on these recommendations are not known.

What's Happening in the U.S.

On February 2 this year, George Bush announced the *American Competitiveness Initiative* – committing $5,9 billion in FY2007 to increase investments in research and development, strengthen education, and encourage entrepreneurship. The goal of the initiative is to build on America's leadership in science and technology, encouraging its continued capacity to innovate. Investments and policies are focused on encouraging basic research, strengthening education and workforce training, developing immigration policies to attract the best and brightest scientific minds, protecting public and private sector investments in research, and developing a business environment that stimulates and encourages entrepreneurship.

Reactions to this initiative, as well as the National Innovation Strategy (*Innovate America*), have been very mixed. One comment[28] to the plan was that:

> On the surface, a national innovation strategy based on allocating more government funding to R&D while, at the same time, spending additional money on education in order to produce more math, science and engineering students might sound like a good idea…but a tit-for-tat strategy based on boosting R&D spending and producing more math and engineering graduates may not be the best approach (to compete with China, who plans to produce 1 million engineering graduates by 2010)…For the U.S., one key aspect of any strategy to compete with China and India should be *overhauling the educational system to put more emphasis on innovation, creativity and design…*While the Chinese and Indians are busy cranking out left-brain engineers and accountants, the U.S. should be adopting the opposite strategy – cranking out right-brain creative thinkers. *Our best thinkers would become experts in areas like design, creative problem-solving and rapid prototyping.* Since new innovation models place a premium on wide-scale collaboration and the ability to tap into knowledge at the edges of networks, *the government should reward research institutions that are actively collaborating with others in a multi-disciplinary approach to problem solving.*
>
> *(Dominic Basulto, 2005)*

Although individual companies, research institutes and universities in the U.S. are already noticing very positive results from implementing user-driven processes, there is not yet support for this "movement" from the national government.

[28] appearing in TCS Daily on December 19th, 2005

5. Conclusions

Innovation occurs in many different forms. Yet regardless of whether innovation is driven by price, technology or user needs, the end goal is the same: that consumers pay for it, companies make a profit, national welfare and competitive strength increases. So the common denominator is the same – a focus on meeting consumer needs.

As summarized in this report, various methods for identifying and more effectively meeting consumer needs have been developed. These user-driven innovation methods are being taught and implemented – with very successful results.

This paper has presented an overview of user-driven innovation – what it is, where it came from, the two over-arching perspectives and approaches, and examples of how it is being implemented around the world. This paper has also introduced several reasons for public-sector engagement, and provided examples of public sector activities in several countries.

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Other Suggested Reading

Doblin Group concepts (ten types of innovation, design in the innovation process, etc.): http://www.doblin.com/IdeasIndexFlashFS.htm

The Art of Innovation and *The Ten Faces of Innovation*, by Tom Kelley

The Rise of the Creative Class and *The Flight of the Creative Class*, by Richard Florida

Competing for the Future, by Gary Hamel and C. K. Prahalad