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## **Crafting UX – designing the user experience beyond the interface**

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# Designing the user experience beyond the interface

There is more to a good user experience than attractive products and services that solve problems a user may have, and which function according to a given set of requirements. Creating products and services that provide compelling experiences for users requires planning, resources and processes for monitoring progress and measuring quality.

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**Modern users are savvy and demanding, and their expectations are high. They want products and services that provide some level of value. They want them to be aesthetically pleasing, emotionally satisfying, as well as easy to learn, use, install, maintain and upgrade. The need to attract new customers and retain existing ones in a competitive business environment is pushing telecom operators towards the creation of products and services that deliver intuitive and tailored experiences. Similarly, Ericsson is shifting from being driven by technology to being driven by needs and experiences. This shift has manifested itself in the development of a design approach that gets close to the user – a user experience (UX) framework including roles, responsibilities and guidelines that help to better understand, define and meet users' needs.**

## What is UX?

The ISO 9241-210 standard<sup>1</sup> covering the ergonomics of human-system

interaction defines UX as: a person's perceptions and responses that result from the use or anticipated use of a product, system or service.

At Ericsson, we believe that UX is not just a synonym for usability or interaction design, and that the definition of UX is not just semantics. UX is a complex field that brings together expertise from many different disciplines, including technology, psychology, the arts as well as business.

The field spans graphical design, how users interact with a service, and how effectively and accurately the interface helps users to carry out tasks. In this field, emphasis is placed on meaningful and emotional experiences, with defined targets for attributes, such as usefulness, usability, efficiency, privacy, security, aesthetics, reliability, charging, playability and costs.

Users' feelings are dynamic and change over time as their physical, temporal, mental and social contexts change. Users can be traditional consumers or subscribers; they differ with varying roles, ranging from basic users, to system operators, to business administrators. And so, different people will experience the same system in varying ways depending on their role and the functions that role permits them

to access. Users' perceptions are also dynamic and change over time as their physical, temporal, mental and social contexts change.

For example, people at work need to be able to complete their job tasks efficiently and accurately, with minimal training, nominal need for documentation and with low error margins, all while optimizing workflow execution – this is a must for enterprise efficiency. The desirability factor is not always a priority when it comes to using and developing enterprise software. Users generally do not expect to have fun when using a system for business purposes – even if an enjoyment factor might enhance their experience.

Understanding which interface elements are needed before trying to implement them is an essential part of crafting UX, especially as users have diverse characteristics and their contexts are constantly shifting.

Otherwise, it will be impossible to create user experiences that are meaningful for people.

## Brand as a unifying factor

Brand-design strategy needs to be simple and clear – each time a user encounters a product or service is an opportunity to build recognition. Applying unique, usable and recognizable visual elements (as illustrated in **Figure 1**) to every part of an offering is essential. Recognition building is not limited to the visual aspect of a product or service; it can also be applied to the way functionality is implemented.

In today's competitive telecom environment, designing similar – yet not

## BOX A Terms and abbreviations

GUI	graphical user interface	SUS	System Usability Scale
NPS	Net Promoter Score	UCD	user-centered design
OSS	operations support systems	UI	user interface
SON	self-organizing networks	UX	user experience

identical – assets that provide comparable functionality, in different ways for different products, is neither financially justifiable nor good in terms of usability. By adhering to and expanding graphical and interaction guidelines, and reusing common assets and code for similar functionalities, design teams can instead focus on the important task of creating relevant content and functionality; in other words, content that is useful and usable.

Creating a common look and feel at a deeper level has the twofold benefit of reducing time to market and meeting external UX demands.

### The strategy

As illustrated in **Figure 2**, Ericsson's UX strategy is that every product should be:

- ❖ useful – do what users need;
- ❖ usable – efficient, pleasant and easy to use, learn and remember; and
- ❖ consistent – in terms of look and feel.

To implement this strategy, products and services need to be developed according to a life-cycle process by teams from a variety of disciplines, and progress needs to be measured at each phase of product development and where findings are acted on.

#### Design life cycle

At each stage of the product design life cycle, focus on usefulness, usability and consistency is paramount. Ericsson uses a product-management methodology, with the proper checks in place, to ensure that designs stay synchronized with users' needs and expectations.

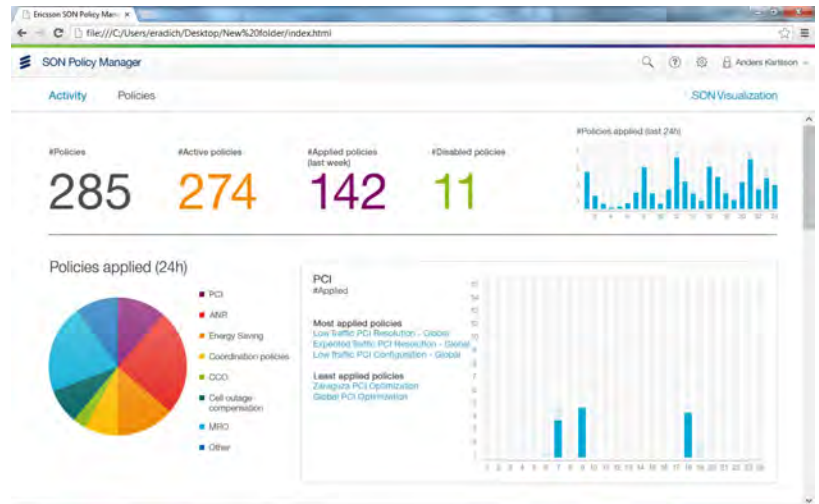
#### Cross-functional teams

Teams from various parts of the organization have a deep, yet different understanding of users, business goals and technology possibilities. Cross-functional teams with varied backgrounds and cultures can provide a richer understanding of the user. In this way, it is possible to avoid the common pitfalls that arise when crafting UX is carried out in isolation or driven by a single design discipline.

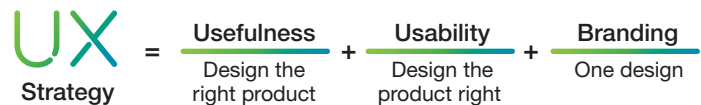
#### Measuring results

Including metrics at every phase of the design process to monitor UX and measure the usefulness, usability and

**FIGURE 1** Design through the SON Policy Manager application



**FIGURE 2** The Ericsson UX strategy



consistency of products and changes to them over time is the single way to ensure that changes made continue to enhance the user experience.

### Measuring UX

Although there are many aspects to UX, successful products have one thing in common: they elicit an emotional response. Experiences make people smile, they exceed expectations and make individuals happy, which leads to user recommendations, sharing and repurchasing – and all of these actions can be measured.

Measurements are the only way to monitor progress over time and understand the impact of a given implementation. Without them, popular opinion may influence development processes, sending development teams offtrack, as more vocal promoters and detractors demand all the attention.

Measurement shows how a product meets the needs and expectations of users, demonstrating whether or not improvement efforts have hit their

mark. The ability to show improvement is a strong motivator for development teams; it makes progress tangible and facilitates investment prioritization.

Measurement needs to happen throughout the product life cycle, from concept to release. Measurements should be taken as soon as possible and as often as possible. Waiting until the end of the development process will ensure maximum cost to rectify errors made due to incorrect assumptions made along the way.

Running remote, online tests and surveys is one way to measure the impact of a change. The advantage of this method is that it tends to be relatively quick to set up and cheap to run. The two principal metrics that Ericsson uses in the development of its products are the System Usability Scale (SUS) and Net Promoter Score (NPS)<sup>2</sup>.

As the most widely used questionnaire for measuring usability, SUS contains 10 questions, that are designed to assess a user's perception of a system in terms of ease of use, ❖❖

learnability, cohesiveness, enjoyment and confidence. As UX goes beyond usability, Ericsson has started to complement SUS with NPS, which is a popular way to track loyalty. It is a simple one-question survey that asks users how likely they are to recommend [the product or company being tracked] to a friend or colleague. The two metrics combined provide a fast and simple way to track progress, compare products and assess the impact of improvements on customer perception.

Ericsson also captures product-specific metrics, which are created according to predefined product goals. For example, a strategic goal for enterprise applications such as OSS is to reduce operational costs by automating and simplifying interfaces to make them easier to learn.

To gain an understanding of what works and what can be improved on when developing software, Ericsson supplements surveys with one-on-one interviews, measuring success rate (does the application solve the user's problem?), time taken to complete a task and perception.

Some measurements are performed in lab environments, but measuring usage over longer periods of time as well as in the actual working environment is critical to attaining accurate results. By observing the evolution of customer perception throughout the product life cycle from the creation of early prototypes to the release of the final product and embedding UX measurements into the various phases of the design process from discovery, through definition to delivery UX may be maximized.

### User-centered design

Carrying out the design of systems that are both useful and usable requires an effective development process, so teams can deliver high-quality work. This process, called user-centered design (UCD), focuses on users as early as possible in the product life cycle and as often as possible – from the discovery phase through to deployment. The UCD process has four phases – discovery, definition, development and delivery – that are flexible and iterative by nature, with each phase laying the foundation for the next.

**FIGURE 3** Self-reporting analysis at Ericsson Research



### Discovery phase

As user experiences are both subjective and diverse, understanding the physical, temporal, social and mental context in which they take place is fundamental for designing intuitive products. Some valuable and meaningful influential factors include where a person works, lives and spends their leisure time. Understanding how new or improved products and services can address an individual's needs, motivations and aspirations is a key part of the process, and this is where the discovery phase of the human-centered design process comes into play.

This phase is about understanding people, business and technology, as well as the way inspiration, knowledge and insights can help to create a deeper understanding of the design or functional elements that are needed. It is about understanding stakeholders and their strategies, as well as the needs of new and existing customers. Studies of existing solutions, competitors and research carried out in related fields are valuable when opportunities and limitations need to be defined.

Extracting information from potential users is an important part of the discovery phase. If at all possible, researchers need to get to know these people, talk to them, ask them questions, listen to them and engage with them on many levels. Researchers need

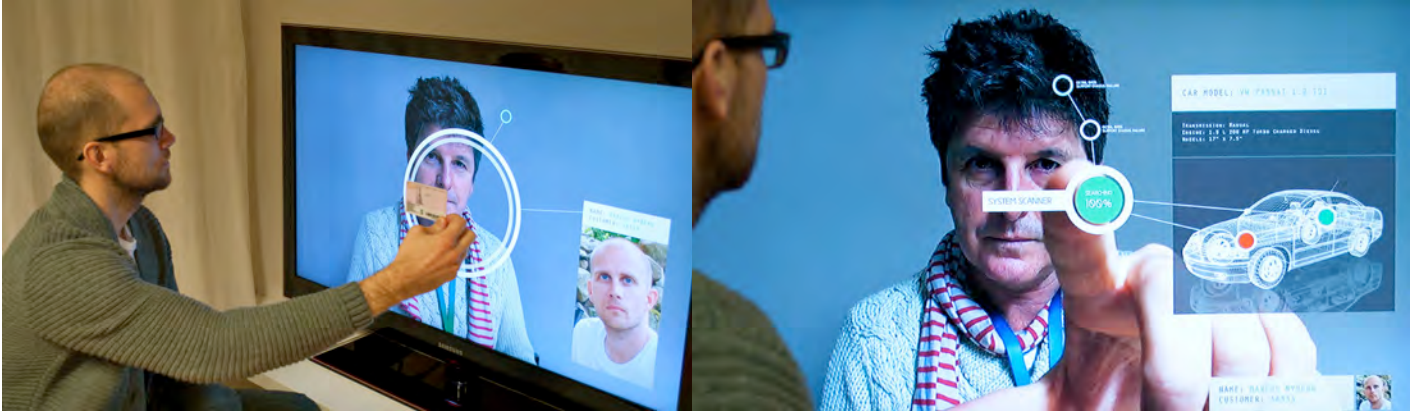
to visit and observe users in their natural environments, and understand the context of how and where people spend their time. Such detailed observation helps developers to create the steps to solve a given challenge, and provides an understanding of how people use products and technologies in widely differing scenarios. Putting the researchers in the shoes of the user in as many ways as possible helps develop empathy with the target user group and improves the odds of designing good user experiences.

Most of the methods used by Ericsson Research UX Lab are qualitative<sup>3</sup>. The discovery phase is used to explore the unknown rather than verifying assumptions. Ericsson ConsumerLab<sup>4</sup> carries out quantitative consumer research, by studying people's values and behaviors, including what they think and feel in relation to ICT products and services. These insights help to create a basic understanding of a given target group for a specific product area. For example, a recent ConsumerLab report called Young Professionals at Work<sup>5</sup> states that companies today are not taking full advantage of the special skills that millennials (the latest generation to join the workforce) possess, especially when it comes to technology and their natural talent for collaboration. ConsumerLab combines such insights into a user segmentation model, describing the values and drivers for different consumer characteristics – a model that can provide guidance to developers, helping them to prioritize target groups.

There are a number of lab and online methods and exercises that can be used for workshops, brainstorming sessions, and ideation or idea-generation activities, including focus groups, interviews, surveys, bulletin boards and self-reporting. These exercises are illustrated in **Figure 3**. During such creative sessions, researchers compile a high-level UX description together with behavioral scientists, interaction designers, technical specialists, programmers, product managers and business builders.

All of this information puts product managers in a position to create a product vision, describing the typical user, their issues, their needs and expectations, and how this product is superior to other solutions currently available.



**FIGURE 4** Wizard of Oz scenarios

The product vision is the output of the discovery phases and should be used as input to the next step, the definition phase, during which it is also refined.

#### *Definition phase*

The goal in this phase is to visualize and describe the target users of the product or service, and the context in which it will be used. Using this description, the UX workflow can be drafted, without any need to focus on graphics.

During this phase, working iteratively is crucial, as is failing fast. By working in this way, a product proposal can be refined rapidly, and product-related decisions will always be made with user needs and expectations top of mind.

It is often tempting to spend valuable time building prototypes or writing code parts to test ideas. However, investing that time in getting concepts right during the definition phase results in significant resource and financial savings later on. Time invested early on results in a reduced need for changes or fixes that need to be implemented to improve the UX at a later stage in the process.

Clearly, to create the best UX, as many ideas as possible should be tested in rapid iteration during this phase.

Telling stories by creating scenarios where the context or scene is set, where actors take on the personas of individuals in the target group, is a good way to initiate discussions, foster ideas and reach consensus in a project group. As illustrated in **Figure 4**, the objective of any given scenario is to identify,

clarify and organize initial functional needs, and this can be visualized in several ways including text, sketches, pictures, movies and comic-book style or Wizard of Oz demos.

The beauty of this approach is that a given scenario will generate some sort of reaction in the user, which allows researchers to check whether or not they are on the right track. Providing users with tangible ideas makes it easier to discuss new and sometimes abstract concepts – maintaining focus on core concepts rather than details.

Personas are powerful, as they help people to understand the rationale leading to design-related decisions. The personas Ericsson creates for its products are synthesized from data collected through surveys, ethnographic research, interviews and contextual inquiries.

The main challenge of the definition phase is to allocate sufficient time to discuss, assess, define and refine the value of the future product or service. Taking the time to ensure that the product or service will satisfy the target audience's needs and meet its expectations helps to avoid jump-starting the next phase. Ensuring the business value of a product requires a design with guaranteed desirability and usability, to create a desire within the target user group to want, use and purchase the product – or in the enterprise case, get their procurement department to purchase.

#### *Development phase*

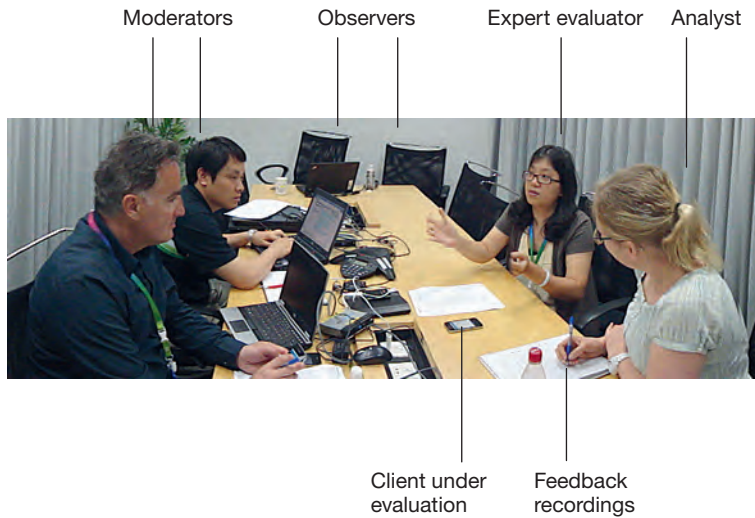
Combining the personas developed in the definition phase with scenarios leads to the creation of a powerful tool for development teams, who are able to match personas with their users during sprints. This in turn guides prioritization decisions for product backlog and UI design.

The agile development process is commonplace in many organizations, as it offers flexibility and huge benefits for carrying out user-experience design. By using iteration instead of the waterfall model, where changing design requirements cannot be catered for, continuous improvements based on user feedback can be brought into the development process, allowing applications to evolve, change and be refined over time.

The product vision, together with the holistic UX workflow, provides agile teams with an overview of the actual product. Catching issues early on makes it much easier and faster to implement changes; making changes once implementation has been completed tends to be much harder and more costly. Depending on the features designers want to validate, prototypes can be hand-drawn, drawn using UX prototyping tools available on the market, or coded in semi-functional prototypes using HTML/JavaScript/CSS. The key here is the ease with which the prototype can be modified through fresh iterations based on feedback from users and the development team.

Such prototypes are evaluated in various ways, by: 

**FIGURE 5 Expert evaluation setup**



- ❖ the development team members and stakeholders;
- ❖ UX experts – as illustrated in **Figure 5**; and
- ❖ target users through usability tests.

To determine the relevancy of a given iteration, UX designers want users to tell them about:

- ❖ the problems or issues encountered when using the product/solution to solve a given problem or carry out a specific task;
- ❖ the success rate of carrying out the assigned set of tasks;
- ❖ the level of effort needed – for example, very simple, quite complicated or far too complex; and
- ❖ their reaction to using the application – for example, was it good overall, was it fun, or was it boring?

By analyzing the answers to these types of questions, researchers can determine which parts of a given interaction are valuable and meaningful to the target audience, offering them a way to capture early UX quality metrics and keep development on track.

The agile development process, however, presents UX designers with a few challenges. For example, to stay ahead of development, time needs to be set aside during the current sprint to design UX for future sprints. Product development

is often split across several teams, each with its own backlog of requirements and upgrades. User stories can be viewed as small chunks of functionality that need to be implemented in just a few days. This can make it difficult to keep track of the product-development process as a whole. It is also difficult to conduct user testing ahead of implementation – after all, how can you test a product that doesn't actually exist?

Most of Ericsson's applications are part of a much larger product portfolio. They tend not to be used in isolation, but rather in combination with each other, so the overall user experience depends on how well they all work together. Reaching the point where all of Ericsson's applications provide an integrated and consistent behavior across all the target user groups is a challenge that Ericsson is overcoming through guidelines and product assessments.

### *Delivery phase*

The work delivered by the UX teams during the fourth and final phase is crucial to ensure that products meet specific customer needs and help to achieve actual business goals. Even though a significant part of the work on the product has already been completed at this point, the aim of this important step is to fulfill customer expectations and

ensure that the capabilities of the product are tailored to fit into the offered solution.

Ericsson's experience has shown that only a few products meet specific customer needs exactly when they reach this phase, and that most of the solutions usually need to be customized.

It is only once a product is actually launched and put into context that true user value becomes apparent. Real usage is the ultimate test. Users have thousands of interactions with the product, accomplishing real tasks and adopting or rejecting certain features. Some have good experiences, and others come across unforeseen obstacles. This is the time to capture UX metrics, through surveys such as SUS or NPS, and to carry out field studies by observing users interacting with products in their environment, to listen to what they say through feedback channels, such as customer support, sales, or services, and to feed that information back into the design cycle.

Improving the user experience doesn't end with the product launch; in a sense this is just the beginning. We keep on measuring and adjusting, feeding insights into the next product release.

### **Conclusion**

In large technologically-driven organizations, establishing a user-centric approach to design as well as setting up metrics to monitor UX over time, guidelines, policies, and multidisciplinary teams that have an overview of all channels and consider all aspects of the solution design can be challenging.

At Ericsson, UX is recognized and established as an important part of our organization's business and strategy. Our teams – which comprise usability engineers, designers, software architects and developers, and business stakeholders, all working collaboratively – integrate UX criteria into standard product-management processes to ensure that product development stays on track.

By establishing a shared vision across all groups involved in the development of products and services teamwork becomes more effective and coordinated efforts lead to a greater design and a better user experience. ❖

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✦ has been the global UX lead at Ericsson's Business Unit Support Solutions since March

2012. Prior to this position, he worked as a UX manager at Consumer and Business Applications, a solution area within Ericsson's former Business Unit Multimedia. He also worked for almost 10 years as a senior interaction design specialist at Ericsson Research, where he was involved in both mobile- and TV-related user-experience research, focusing on concept and product design, as well as user-centric methods. Chincholle also acquired a wide variety of skills as an ergonomist at the French aerospace agency Aérospatiale, where he cooperated with French astronauts on defining the interior arrangement of Hermes, the European space shuttle. He also collaborated with the French Civil Aviation Authority (DGAC) on the GUI of its air traffic control systems. He holds a master's of architecture from the Strasbourg School of Architecture, France.

### Cecilia Eriksson



✦ has an M.Sc. in interaction design Chalmers University of Technology in

Gothenburg, Sweden, and is currently responsible for UX design in Ericsson customer delivery projects, presales and demos, working in a multicultural environment with customers from around the world. She joined Ericsson's Business Unit Global Services in 2008 as a consultant within the Media and Applications area. She has extensive experience of working with services and content delivery for multiscreen solutions through the Ericsson Multi Service Delivery Platform (MSDP), and also from working with user interfaces for IPTV services. Her primary interests and expertise are in creating multiscreen solutions from a consumer perspective that transcend the requirements of both the operators and users, and provide a rich subscriber experience.

### Sylvie Lachize



✦ is a technology and systems UX manager, responsible for metrics and user research at

Ericsson's Business Unit Support Solutions in Stockholm, Sweden. She joined Ericsson in 2010, first leading the UX practice in Montreal, Canada, then overseeing the Business Unit Networks OSS Portfolio UX in Athlone, Ireland, as an operational product manager/owner. Lachize has 15 years of hands-on experience in interaction design and has worked extensively as a consultant with telecom companies, such as Bell Canada and Fido, interviewing and observing hundreds of their customers and translating research findings into online strategies and designs. As UX director at the ad agency CloudRaker, she led the complete redesign of the award-winning bell.ca website in 2006, showing that iterative design based on metrics and user feedback is a sure way to surpass business objectives. She holds two post-graduate degrees, one in multimedia-hypermedia from the National School of Fine Arts/Telecom, Paris Tech, in Paris, France and one in cognitive sciences from the National School of higher studies in Social Sciences, Paris, France.

### Claes Bäckström



✦ joined Ericsson in 2010 to run UX for product line OSS at Business Unit

Networks. He holds a master's in cognitive science from Linköping University in Sweden, and has spent the past 15 years exploring different aspects and applications in this field. He has researched demented drivers for the Traffic Medicine Centre at Karolinska Institute, the Medical University in Stockholm, and air force pilots at the Defense Research Agency (FOI) in Linköping, Sweden. This is also where he assessed the readability of warning texts on cigarette packets, an investigation for the Swedish National Board of Health and Welfare, which became the basis for the Swedish and EU directives on this matter. During his 11 years of employment at Saab, He pioneered wearable computers and head-mounted displays in collaboration with MIT Media Lab. He also researched and developed cockpit displays and flight simulators, and managed and served as a UX specialist in several projects within civil security.

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### **Marcus Nyberg**



is a senior researcher at the Ericsson Research User Experience Lab. His main tasks include

informing, influencing and inspiring other parts of the organization through user-centric activities. His strengths lie in the exploration process providing, for example, insights from qualitative user research, visualizations of scenarios, and development of concepts. Nyberg has been involved in projects within areas such as megacity challenges, visual communication, m-health, and mobile TV. He has also published several papers on these and other topics at international conferences. He first started at Ericsson Research in 2000, but has spent a few years outside the company at Sony Ericsson, and as a consultant at Sigma Information Design before returning to the User Experience Lab in 2007.

### **Fredrik Magnusson**



holds a master's of fine arts in industrial design from the University College of Arts, Crafts and

Design, Stockholm, Sweden. He joined Ericsson in 2010 as brand design manager. He is responsible for developing and aligning all touch points with Ericsson from a visual and brand-value perspective. Prior to joining Ericsson, Magnusson worked as design director for the Fiskars Group in Helsinki, Finland (2007-2010). He founded Propeller, where he also worked from 1995-2007. At the time this was one of the world's leading design agencies working with clients such as GM, Microsoft, Trimble, Ikea, Electrolux and Volvo, as well as with numerous start-ups around the world. Propeller was acquired by Semcon in 2005. Magnusson is a long-term board member in numerous innovative companies and in the Swedish Industrial Design Foundation (SVID). He has been awarded more than 30 international design awards and frequently appears as a guest lecturer at design schools and private enterprises.