

United Nations Division for the Advancement of Women (DAW, part of UN Women)
United Nations Educational, Scientific and Cultural Organization (UNESCO)

Expert group meeting
Gender, science and technology

Paris, France
28 September - 1 October 2010

Gender Dimensions of Product Design

Expert paper prepared by:

Klaus Schroeder*
Design-people
Aarhus, Denmark

Abstract

The gender research and user experience research carried out by the project team of the Danish “female interaction” project uncovers a number of gender dimensions in product design that need to be addressed to make more women friendly tech-products.

1. the value dimension
2. the functions/benefit dimension
3. the interaction dimension
4. the aesthetic dimension
5. the communication dimension

Based on the observation that tech-products often are biased towards males, the paper presents which female values, motivations and barriers can be addressed to make advanced electronic products more relevant and attractive to use for female users.

The “female interaction” principles that are presented can serve as practical guidelines for understanding and addressing needs of female users.

* The views expressed in this paper are those of the author and do not necessarily represent those of the United Nations.

Introduction

Product design comprises a number of dimensions. In this paper product design is considered as both the creation of new product concepts (their functions and benefits), the design of the user's interaction with the product (be it physical or digital / screen-based or auditive) and the physical design of the product - its shape, colours, surfaces and branding. These different dimensions can be influenced by a focus on gender.

Gender has been a design dimension in product development for ages. Within certain branches like clothing, shoes, perfumes, jewellery, it has been a long tradition to distinguish between male and female products. Other, more technical products have also been specifically directed at women and men once they have established themselves in the market and their basic functions have matured technically. Bicycles and wristwatches may serve as examples for these kinds of products.

Other product categories, like advanced (consumer) electronics, have however until now only been superficially directed at women – with a few exceptions. This has mainly been attempted by adjusting their exterior design for an often stereotypical "female" taste - a process often referred to as 'pinking' in the industry.

The basic premises for developing advanced electronic products, like a TV, a hifi-system, a mobile phone or a GPS, seem to a large degree to be dominated by male thinking. The values that drive the basic specifications, features and the interaction design for these kinds of products - this is the thesis of this paper - scarcely reflect female values, preferences and life style. Therefore these products are not as attractive and useful for the female users as they could be. The value proposition of the technology which could enhance women's lives does not fulfill its potential.

Background

This paper focuses on the design research project "female interaction" - a 2.5 year project with a budget of €700.000. The project has been set up by experienced product- and interaction designers at design-people.dk together with specialists in product development, interaction design, user-driven innovation, interaction psychology and marketing (a list of the team members is at the end of the paper). The project is sponsored by the Danish Government's program for user-driven innovation. The goal of this program is to promote user-driven innovation in the Danish industry - as a way to make Danish companies more competitive by creating more value for their customers.

While the project is Danish, the project team aims to develop guidelines that are valid internationally. Therefore we are happy to share and discuss our findings in this expert group meeting.

The "female interaction" project's goals are:

- to review findings on gender preferences concerning the use of advanced electronic products
- to develop guidelines for design directed at female users and
- to test and refine user-driven development methods that integrate a focus on female users and their preferences

- to communicate on and promote the project and the ensuing guidelines

The research carried out by the project team is therefore not only theoretical but also includes practical research and development activities in order to test findings and user-driven development methods.

Three large Danish companies participate actively in the project: Danfoss (indoor climate), Bang & Olufsen (home entertainment) and GN Netcom (hands-free mobile communication). Each company contributes with a case product that is analysed and investigated for its female impact and potential through user studies and other analytic studies. Besides, the companies are represented in the team to ensure that the guidelines being developed are applicable, useful and valuable.

All three companies see a business potential in addressing the needs of female users more specifically. Studies show that 80% of buying decisions in private households in Denmark and the United States of America are made by women. So there definitely is both a need and a business potential.

The project's research is focused on advanced electronic products like communication technology and building technology - not chairs and lamps. This is because the gender challenge and potential seem most explicit in complex technology - these products being designed mainly by men.

Insights from both broad gender research and the specific exploration of the female user perspective on the case products drive a design process for new alternative product concepts - based on the value proposition of the original case products. For example: How can the mobile telephone headset case product be designed in new and better ways that reflect female values and preferences? The current design work carried out by of the project team aims to release and visualise the potential for advanced electronic products to better address female preferences.

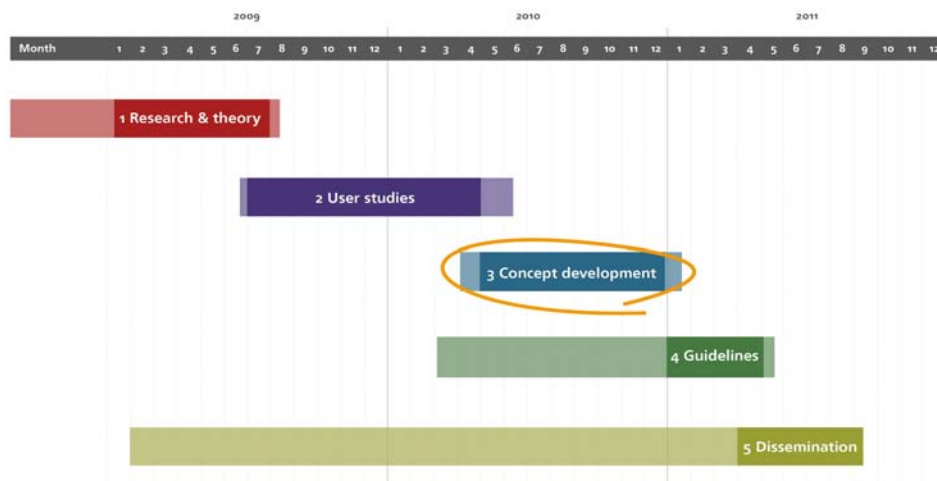


Figure 1. "Female interaction" project plan

Based on the new alternative "female interaction" concept, the following activities will be undertaken: user feedback and co-creation, design refinement and visualisation, international user market feedback, analysis and evaluation of user tests.

The insights derived from these activities will lead to the final conclusions and guidelines to be made by the project team in 2011. Presented in this paper are the preliminary findings and guidelines generated by the project, based on 1.5 year of research carried out by the multidisciplinary project team. These findings have been through a number of iterations already, influenced and refined by reviews and insights of scientists, designers, product development and marketing specialists both inside and outside the project team. The project website, www.femaleinteraction.com, can be used for getting further and updated information on the project and the project team.

Methods

The methods and activities of the project team can be found at the end of this paper, along with a list of references. In general terms we can say that we try to combine qualitative in-depth user studies (design ethnography) with quantitative studies (market research techniques) for a verification of the large picture. We also go for a combination of regional and international user studies with different techniques, in order to find a mix and balance that are practicable, swift and affordable for the companies, while still giving valid results.

Results

What are the gender dimensions of product design?

When analyzing products and user experience from a gender perspective, it is essential to distinguish between the following dimensions:

- the value dimension
- the functions/benefit dimension
- the interaction dimension
- the aesthetic dimension
- the communication dimension

Each of these dimensions can be gender biased and needs to be specifically focused on to create the whole user experience.

Our analysis of the case products (a climate control system, a mobile headset and a media player) shows that all of these dimensions need to be integrated with a common approach that reflects women's preferences for product design focused on women to give them the best user experience.

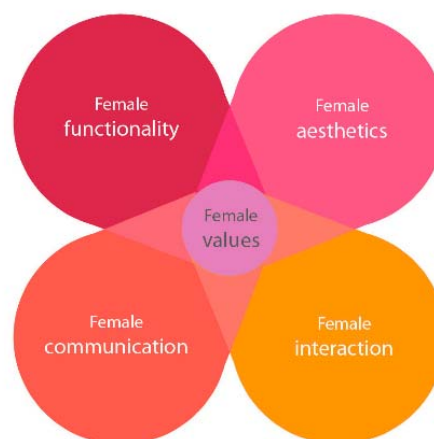


Figure 2. Gender dimensions

Which aspects of gender differences are relevant for the perception and design of technological products?

As part of an analysis of international (gender) research articles, we extracted the following findings on gender traits that can relate to technology use and perception.¹

Female traits include a focus on communion and a holistic approach (sense-making through coherence)

Male traits include a focus on individual needs and a detail approach (technology being meaningful in itself)

The figure shows more related findings for both genders:

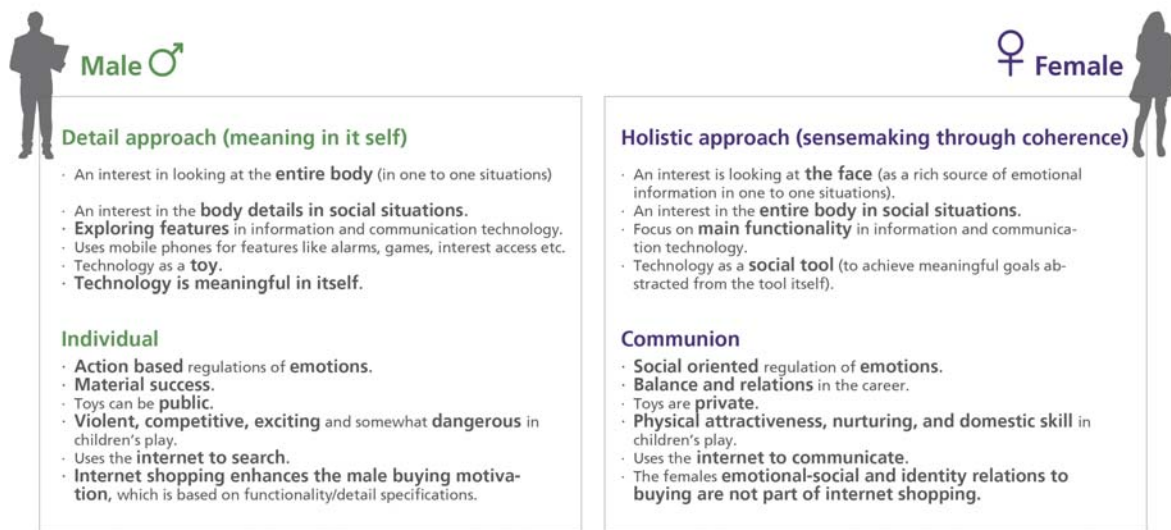


Figure 3. Gender traits related to technology use

These traits echo some observations made in the aide-mémoire for this expert group meeting (paragraphs 21 and 22), namely that girls were more likely to envision a future in health sciences, including nursing, while boys wished to become computer scientists or technicians.

The following figure shows the female traits and preferences that are most likely to be overlooked by male developers despite their important potential to make advanced technology more relevant for female users.



Figure 4. Soft values – often overseen by male-biased product developers

¹ The survey was created by interaction design PhD Rune Nørager.

Gender is a continuum

The differences described above present extreme traits of each gender. We find it relevant to present gender as a continuum with the clearly female and clearly male traits on each opposite side, and the unisex in the middle. The position of individuals on this scale will vary.



Figure 5. Gender is a continuum

Situative gender factors

When we observe the way a specific person expresses gender in a specific situation, we find the following model is helpful: the way gender comes into a specific situation is a combination of biological gender disposition of the individual, cultural and situative norms. Besides a person's biological gender disposition, there can be a difference in how gender is expressed in Denmark or Zimbabwe, and the norms for acting gender will be different in a job interview than at a wedding.

Converting this insight into practical guidelines for designing products means that in order to be able to navigate gender you need to investigate cultural gender norms (which can vary depending on region and/or sub-culture) and you need to map situative aspects of use concerning the product you design. The user knowledge gained through the combination of expert knowledge and specific user studies will help the developers identify specific gender factors to be considered in the design of a product.



Figure 6. Gender factors influence observed behavior in specific situations

Enacting gender roles

With regard to the situative gender factors, the following principle helped us understand barriers and motivations for using technology. Our research shows that a person's ability to operate a technological product is related to the motivation to do so. Their motivation depends on whether operating the specific product would fit with his/her gender role. There

may be shifting cultural norms as to which gender is supposed to operate a lawn mower, but there can also be specifically negotiated arrangements on this issue within a group of people or between a man and a woman in a household. An example of a rigid cultural norm, on the other hand, is the ban on women's driving.



Figure 7. Enacting gender roles

How can female stereotypes be avoided?

Stereotypes are a human mechanism to make a complex world easier to handle in every day life. These stereotypes, however, can prevent you from seeing and addressing the complexity behind them. A major goal of this project is to help the predominantly male product developers address the complex female target group in a more subtle way which is made complicated by the stereotypical view of women they have.

An effective way to eliminate female stereotypes is to work with different female personas. The ones we developed in the female interaction project were generated as a result of a cluster analysis that was based on the results of telephone interviews of 200 Danish women (a statistically valid probe) on their use and attitude towards advanced electronic products.²

The female personas that are based on the statistic clusters are:

- Young individualist communicators who have no fear of gadgets and use technology both for practical and social means
- Pragmatic traditionalists who are sceptic towards technology and see it only as a mean to gain pragmatic benefits
- Technology benefit seekers who take interest in new technologies and what products and new features can do for them
- Aesthetic benefit seekers who use product design and aesthetics to express themselves

² The cluster analysis was run by Mette Jacobsen from Lindberg International.

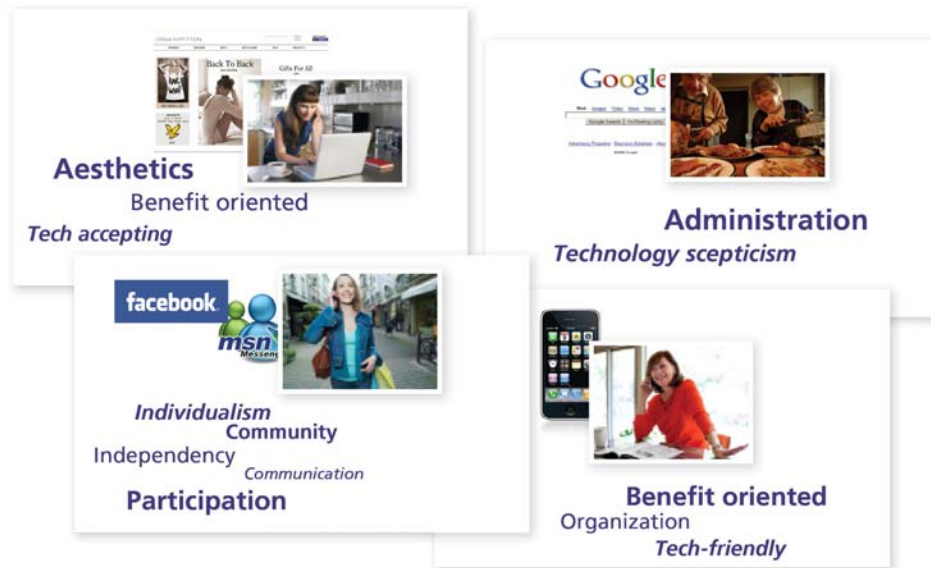


Figure 8. Female personas based on cluster analysis of 200 Danish women

The personas are applied by the project team in the design process that is going on, and they have proved to be an effective tool to avoid stereotypes and to make the complexity of female traits and attitudes more manageable. The persona method has a large potential for better addressing “overlooked” female target groups from underdeveloped areas in product development processes.

How do gender differences express themselves when it comes to women’s approach to and use of advanced technology?

The challenge of communicating technology, its features and benefits

Analyses of qualitative market research with a gender focus

In the context of the Female Interaction project, Lindberg International re-analyzed data from three previous international projects from a gender-specific angle. This new reading gave amazing new insight to the respective mechanisms of male and female respondents and the way new technology-products can best be presented in a research-context.

Three cases were analysed. Below is an excerpt of one case analysis.

Case 1: Development of mobile application/extension to office personnel

This project was conducted in seven different cities, on three different continents. For each city, the setup was dual group-discussions: one with mobile office personnel and one with stationary office personnel. The recruiting criteria were half men, half women per group - and this phase already showed the relation between gender and profession. It was clear that women were overrepresented in the stationary category and that it was very hard to recruit women in the mobile category (sales people, higher level management...) due to a relatively smaller amount of women holding these positions. In the groups, women had a hard time relating to technical terms when presented with product features. They were more interested in the benefits they would obtain: mobility, better flexibility and thus a better, common working environment. While male respondents could discuss product performance, size and

gigabytes for hours, female participants instead rapidly concentrated on an area that they felt comfortable with: the product design, such as aesthetics and ergonomics.

The analysis of other cases showed the same tendency for implicit use of a male agenda and male bias in ways to communicate about technology - tech talk rather than benefits that matter for women's (social) life.

We have transformed this insight into the following principle:



Figure 9. Benefits instead of tech-talk

How does gender thinking influence female perception and use of specific technological products?

We have analysed three different case products in the project, which all reveal a potential for better addressing the needs of female users and the gender principles described. As our analysis shows, the design of the climate control system, the media system for private homes and the mobile telephone headset are largely based on male values and thinking, and on the male gender traits described above. In each of the described design dimensions there is a potential for reaching out to the female population in better ways and thereby enhancing their gain of potential technological benefits.

More specifically, the analysis of the mobile telephone headset revealed the following conclusions on gender values, female benefits, motivations and barriers:

- The headset as it is designed now is based on a “performance” value which is predominantly male - “making you more effective by using hands-free communication”. To twist the value proposition of the headset for it to fit the female domain, its core benefit could be described as follows: “giving you time to communicate and making you more safely available for the ones that matter for you”.
- Female users find the blue tooth pairing of mobile phone and headset a major barrier for their use of the headset. Some female users call others for advice and assistance, while others give up.
- It motivates the female users to be able to make practical phone calls hands free in “spare time situations” i.e. when driving to or from work.

- The female users have a problem with being seen wearing a headset: one reason is that they find it impolite because it signals that they are not fully available for the people around them.
- They find it troublesome to make sure that the headset is available and charged when they need it – daily use needs a lot of attention and focus on the device.
- Many women have a practical problem when putting the headset on/into their ear and when taking it off as it tangles with their hair if they wear it long.
- The communication that surrounds the product – both on the website, the user manual and the packaging is too technical, detailed and feature oriented, rather than exposing and explaining the benefits the device gives her.

These findings give an insight into the potential of addressing the preferences of female users more explicitly. They also indicate that removing some barriers can benefit all users, including men (easier Bluetooth pairing, for example), while removing some other barriers will benefit females specifically.

Motivation as a key factor

We differentiate between women's use of technology in their professional life and their private life. In their professional life, women approach technology in a professional way - their motivation to use the product is part of their job. In their private lives, they tend to be more selective concerning the use of advanced electronic products. If the product does not motivate them, give them essential benefits, and perhaps is even troublesome to use, they will avoid it and thereby will not have access to the potential benefits the technology might give them.

Therefore the three case products that are analysed in the project are for “private” use. This does not mean that we do not see a potential for optimizing professional high-tech products for women - but we see an extrinsic motivation to use advanced technology professionally, which can compensate for other barriers. For example, a female photographer is not expected to have trouble in operating an advanced camera system as she is motivated and trained for that as part of her job. The majority of women though would choose a less feature-packed camera model for private use, while men on the other hand are more likely to focus on a camera's feature range also for private use.

How can the potential for more “female” product design and technology use be released?

Here a condensed summary of what we think needs to be focused on to succeed in making tech-products more female-friendly.

- Creating awareness of the fact that tech-products often are biased by male thinking.
- Creating awareness for the potentials of directing the products' design dimension towards female users.
- Providing practical development guidelines on how to efficiently take into account female users in the design phase of new products. Promoting an approach that gives more emphasis to a user-driven approach to innovation than innovation based on market insight and new technology.
- Showing good examples that inspire developers, that prove that it can be done, and show how it is done.

Implementation barriers and perspectives

In our presentations and discussions of the preliminary results of our research, we have encountered resistance with regard to the general idea of using a gender perspective as a tool for making better products (for him or her). The ideal of equality and equal rights for men and women sometimes prevents people from tapping the potential that lies in an analysis of and a focus on gender differences. This barrier is just as important to deal with as the factual insights in gender differences as it can prevent people from taking the first step to address the issue and potential.

There is a reluctance to speak about basic “soft” (non-physical) gender differences like motivational aspects.

In the female interaction approach, we see a broader perspective that can benefit all potential users of a product. The male fascination and preoccupation with technological systems in themselves seem to generate technology that require a similar fascination in order to be fully useful. The female value propositions may help design in general stay tuned on the societal perspective of new technology and not get sidetracked by the technology itself.

Conclusions

There is a male gender bias in many tech-products. Male and female preferences concerning tech-products vary in ways that need to be considered in order to create products that reach out to female users.

It can be difficult to implement the idea of gender-focused design for some people, for whom it seems to conflict with the political idea of gender equality.

These barriers can be overcome when business decision-makers are willing to focus on the female potential and are willing to apply new development principles and methods, some of which are mentioned in the article.

Our studies have, so far, shown a large potential for making advanced technological products more beneficial and relevant for female users.

Acknowledgments

Thanks and credit to all “Female Interaction” team members, who have contributed to the findings that are referred in this paper and to Rune Nørager for his valuable contributions to the paper itself.

The project team includes:

University of Aarhus

Marianne Graves Petersen, Ph.d., Department of Computer Science

Marianne has specialized in interaction design and human-computer interaction.

Rune Nørager, cand. psych. and PhD. fellow in Design Psychology

Rune has specialized in interaction design psychology (HMI).

Lindberg International is specialized in global business-to-business market research and down-to-earth sales and marketing consulting.

Bang & Olufsen a/s is world renowned for its distinctive range of quality audio, video and multimedia products.

GN Netcom is a world leader in innovative headset solutions through its Jabra brand.

Danfoss is a global player within development and production of mechanical and electronic products and controls.

Danish Enterprise and Construction Authority is responsible for the Danish national enterprise and construction policy – and the program for user-driven innovation, that co-finances the “female interaction” research project.

design-people, the initiator of the “female interaction” research project, is a Danish design consultancy with international profile – specialized in advanced interaction design, research and strategy.

References

- Baron-Cohen, S (2003). *The essential difference: men, women and the extreme male brain.* Penguin/Basic Books.
- Baron-Cohen, S, Knickmeyer, R, and Belmonte, M (2005). Sex differences in the brain: implications for explaining autism. *Science*, vol. 310, pp. 819-823.
- Brody, L.R. and Hall, J.A. (2008). Gender and emotion in context in *Handbook of emotions.*
- Cunningham, J. and Roberts, P. (2006). *Inside her pretty little head: A new theory of female motivation and what it means for marketing.* Cyan Books Marshall Cavendish.
- Colley, A. and Maltby, J. (2008). Impact of the Internet on our lives: Male and female personal perspectives. *Computers in Human Behavior* 24 (2008) 2005–2013.
- Blakemore, J.E.O. and Centers, R.E. (2005). Characteristics of boys’ and girls’ toys. *Sex Roles*, vol. 53, 9/10.
- Davis, J. and Kuhn, S. (2003). What makes Dick and Jane run? Examining the retention of women and men in the software and internet industry.
- Diekmann, A.B. and Eagly A.H. (2008). Of men, women, and motivation in *Handbook of motivation science.*
- Dittmar, H., Long, K., and Meek, R. (2004). Buying on the Internet: gender differences in on-line and conventional buying motivations.
- Dyke, L.S. and Murphy S.A. (2006). How we define success: A qualitative study of what matters most to women and men. *Sex Roles*, vol. 55, pp. 357-371.
- Franck, K.A. (2002). Women and environment. In R.B. Bechtel and HA. Churchman (Eds.), *Handbook of environmental.* New York: John Wiley.
- Gharibyan, H. and Gunsaulus, S. (2006). Gender gap in computer science does not exist in one former Soviet Republic: Results of a study. *TiCSE'06*, June 26–28, 2006, Bologna, Italy.
- Hawkins, J. (1985). Computers and girls: Rethinking the issues. *Sex Roles*. vol. 13, No. 3/4, 16.
- Jackson, L.A., Ervin, K.S., Gardner, P.D., and Schmitt, N. (2001). Gender and the Internet:

- Women communicating and men searching. *Sex Roles*, vol. 44, pp. 363-379.
- Hou et. al. (2006). "Girls don't waste time": Pre-adolescent attitudes toward ICT . CHI 2006, April 22–27, 2006, Montréal, Québec, Canada.
- Kima, D-Y., Lehtob, X.Y., and Morrison, A.M. (2007). Gender differences in online travel information search: Implications for marketing communications on the internet. *Tourism Management*, vol. 28, pp. 423–433.
- Li, N. and Kirkup, G. (2007). Gender and cultural differences in Internet use: A study of China and the UK. *Computers and Education*, vol. 48, pp. 301–317.
- Nelson, A. (2005). Children's toy collections in Sweden-A less gender-typed Country? *Sex Roles*, vol. 52, pp. 1-21-2, 93-103.
- Philbin, M., Meier, E., Huffman, S., and Boverie, P. (1995). A Survey of Gender and Learning Styles.
- Ren, F. and Kwan, M. (2008). The impact of the Internet on human activity–travel patterns: analysis of gender differences using multi-group structural equation models. *Journal of Transport Geography*, vol. 17, pp. 440-450.
- Slyke, C., Comunale, C.L., and Belanger, F. (2002). Gender differences in Perceptions of web-based shopping. *Communications of the ACM*, vol. 45, no. 7.
- Sun, X. and Zhang, Q. (2006). Gender differences in trust perception when using IM and Video. CHI 2006, April 22–27, 2006, Montréal, Québec, Canada. H.5.3
- Wright, J., O'Flynn, G., & Macdonald, D. (2006). Being Fit and Looking Healthy: Young Women's and Men's Constructions of Health and Fitness. *Sex Roles*, vol. 54, pp. 707-716.

Annex. Methods applied in the “female interaction” project

1 Theory research phase

In the first half year, the following research activities were carried out by different partners within the project team:

- Review of international literature concerning gender, extraction of findings that relate to women's use and perception of advanced technology
- Research review workshop – discussion of scientific articles
- International female statistics – investigation on statistic sources on women and technology
- Cluster analysis based on web and telephone interviews with 200 Danish women based on a questionnaire on women's attitudes and habits concerning technology and advanced electronic products.
- Description of four female technology lifestyle segments (a combination of the Minerva model and the Gallup kompas model)
- Research and development of new user-driven methods
- Research and analysis– methods for initial investigation of three case products
 - Competitor mapping
 - Trend insights
 - Research on gender focused product design
 - Technology in female media, mapping
 - Case products - communication check up

- Case products - MMI check up
- Case products – product history and journey
- Case product – female experience rating

2 User exploration concerning three case products and their value proposition

- Four female personas, based on the cluster analysis of Danish women from phase 1
- International web panel survey addressing 600 women in six countries, gathering knowledge on women’s motivations and barriers for using technology
- Value based user research
 - Value mapping
 - Value fictions
 - Three value exploration workshops with four to five potential female (personas) users of each of the case products
 - Desired experiences mapping
 - Experience ideation and visualization
- User research field studies with 11 female users of the case products containing:
 - Semi structured interviews
 - User diary interview
 - Observation
 - Empathetic insight
 - Test assignments
 - Video filming
 - Value exercises
- Dealer interview with one dealer of one of the case products
 - Semi structured interviews
- Feature-benefit mapping of user studies
- MOBA (motivations and barriers) analysis
- Customer journey analysis

3 Concept development and test - methods

- Innovation vectors, summarizing insight and directing ideation - describing the essential female motivations and values within specific areas
- Ideation workshops, brainstorming in groups
- Idea clustering, creating clusters of related ideas
- Idea prioritizing workshops, discussing and ranking the idea clusters in relation to innovation vectors
- Concept workshops, transforming the ideas into new innovative concepts
- Scenario development
- Rapid Mock ups
- Focus group testing and co-creation, testing concepts, essential values and benefits
- Field tests – user feedback
- Female experience rating