

## **CO-OPERATIVE INNOVATION – BRINGING THE ADDED VALUE OF DESIGN RESEARCH TO MEDIUM-SIZED COMPANIES**

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### **I. Preface**

What can the profit for the discipline of design research be when co-operating with partners from the industry and vice versa? How does research for businesses effect the design research and doctoral education? This paper gives answers to these questions and specifies the impulses for all stakeholders, illustrated through a case study. Besides the specific results of the case study, the general benefits and effects of a co-operative approach are discussed: for the industry, the discipline of design research, the education of design researchers and the interests of the researchers.

The case study was carried out by the Institute for Ergonomics and Design Research (IED) in co-operation with a medium-sized company. The underlying co-operative approach within this case study will be discussed in detail. The research partner IED is an institute of the department Design and Art Education at the University of Duisburg-Essen. The IED employs international scientific staff from the areas of design and engineering. The spectrum of activities is broad: it includes the areas of teaching and research. A human-focussed point of view is the basis to the IED's thoughts. As different as the tasks may be, in the work the IED always refers to human characteristics in terms of physiology, psychology and emotions.

### **II. Case Study**

#### **Project Targets**

There was one initial target for starting the co-operation between the IED and the company: the client wanted to receive new perspectives on how they can successfully develop their product range further. In detail, the goal of the co-operation was to develop new product concepts for bathroom interiors. Furthermore it was aimed at developing new concepts for the product showroom and to give answers to the questions: how to communicate the advantages of the products?

#### **Project Base and Procedure**

For the realisation of the companies goals the co-operation was structured as followed: two workshops were planned and carried out employing chosen methods. After the first workshop a research phase was integrated into the project. The second workshop was designed to discuss the collected data and finally to define aspects for a transfer into design concepts. Therefore the IED was asked to develop design concepts in three areas with focus on: products and display solutions for stores. The co-operation ended with a final meeting of both teams, presenting the results of the market research and the product lines realised thus far. The project was financed 100% by the private partner.

In March 2005, the company presented, based on the co-operations results, their new product lines and corporate identity at the International Trade Fair, Building and Energy Technology, The Bathroom Experience, Air-conditioning and Ventilation - ISH in Frankfurt.

### **Workshop Structure and Employed Research Methods**

The first workshop had the function to initiate a communication and research process between the IED and the company members and to introduce employed methods. Within the second workshop all participants of the first meeting came together to present their collected research data and discuss further steps in the project.

The participants of both workshops were homogeneously compiled, they were: industrial design students (advanced study period), scientific assistants with background in industrial design, junior and senior distribution employees and one partner from the executive board of the company. They had a sum of nine persons.



For the two workshops a combination of different methods was selected. Firstly, design oriented methods like creating moodboards, sketching quick and dirty solutions were introduced and carried out. Secondly, communication and idea oriented tools were used, for example several brainstormings were set up. Thirdly, a method set to detect user needs was selected. “Companies and their designers today face the challenge of combining technologies (...) with new product concepts based on user needs and activities in order to be able to innovate successfully” (Verheijen et al. 2001). Thus, the teams logged everyday activities in the bathroom, conducted interviews and surveyed the living contexts of users. Fourth, tools with marketing focus were employed in the workshops, such as axis diagrams to visualise and discuss the differences of the companies products. Additionally, a survey of the market situation was realised with 100 interviewed people in selected stores.

The four mentioned method groups had different aims and functions for the project process, in the whole this combination of methods and tools targeted to innovate the product line and the product communication.

## **Results**

The cooperation had diverse benefits for the client. The workshop and research phases gave impulses for the product development and communication. Due to a tight schedule this phase was driven 100% by the company, so research and product development could be forced parallelly. Two innovative bathroom furniture sets have been worked out, with clear structured differences in function and appearance. Additionally, a new product solution was carried out that refers to unsolved wishes and needs of customers.

Besides the three developed product lines, the company also achieved results in product and corporate communication. The workshop discussions initialised a rethinking process on corporate graphics and product communication by the client. Thus the company decided to create a new headline for branding their products. That action was guided by a redesign of their corporate graphics for displaying the product range in stores, including a new designed packaging concept and an adequate stand for trade fairs.

To sum up, the co-operation helped the company to identify lacks in their product range and communication strategy. The fruitful mixture of discussions, used research methods and suggested concepts had a positive influence on the clients process to renovate and innovate the company and its products.

## **III. Impulses of third-party funded projects for Design Research and Industry**

At first the benefits of the co-operative approach for the discipline of design and the involved company will be discussed. Enclosing the general impulses and benefits for the discipline of design research and the doctorands and design students will complete this paper.

### **Resumée of the Preconditions for a Co-operative Approach**

This approach can be summarised focused on the needed preconditions as follows: it is an interdisciplinary interaction between design researchers and company members with different backgrounds. That interaction has to fit to the companies structures and their communication processes. For the co-operation an open minded attitude is needed. The experience of the case study teaches that projects with co-operative elements should have resources in time. Due to the fact that the process includes learning phases and that more communication is needed in the beginning than in common projects.

### **What are the benefits of the co-operative approach?**

It enables all team members from both institutions to get experience into research practice: dealing with methods and accomplishing the analysis as well as the evaluation. By employing the approach the client got to know how design researchers work and which results can be expected by using different kind of methods. The researchers, on the other hand, get an insight to the clients questions, wishes and the companies perspective on the research topic. Thus the design researchers are able to adjust their research plan on the clients focus.

An further aspect of the clients participation in the design research is that the knowledge can be implemented faster into later project phases. For the phase of concept definition and the following phase of guiding the design process, the design research experience of all members stimulates and simplifies the communication and decision processes. Due to faster development times this benefit is of a high value.

In respect to the mentioned arguments, it is questionable whether the high effort in man power, time and budget is balanced. In particular, the clients' employees are not specialists in the field, if they are involved in research work their regular tasks have to stand back.

The other perspective is, that especially medium-sized companies have a small financial scope for research projects, therefore they profit from the solution to integrate available resources. And the participation of company members has a positive stimulus on their motivation, due to further education. As a result on that, design research can also provide trainings for those involved in the product development process. One might argue that specialists are more effective, if they stay within their area of expertise. Correspondingly, "Fox points out the huge overlap between the roles of the designers and the engineer in the design process". He notes that these roles are not fixed. The role of each on the design team, he argues, is fluid and "depends on the particular bent and choice of the individual" [Fox, 1993, Margolin 2002]. According to Fox the co-operative approach supports the underlying interdisciplinary work within the design process, and invites even more disciplines like business economics, marketing and distribution to participate in the design research phase.

### **Human-focused Impulse on Co-operative Innovation**

*"There is so much to learn from getting under other's people's skin, being in their environments, and so much that can be drawn from it to improve the products [...] people have to deal with."* [Black, 2003]

A human-focused research gives the design researchers and the industry a valuable source for innovation. Specifically in the described case study the company members saw the customers way of storing products and devices in their bathroom. To give an example, before the project started the company produced cupboards that are either closed or open and structured in units that fit around a bathroom sink. After having seen the situation in the households the team rethought their products. They started to ask: how they can meet the wishes and need of the users dealing with their products? Black describes the moving from rational and practical issues to more subjective fields of experience with the needed competence in empathy. [Black, 1998]. *"Design empathy is not only information and facts but also inspiration and food for ideas. [...] It calls for direct contact or connection between the users and the designers – studying potential customers in their own context"* [Leyonard, Rayport, 1997]. The empathic aspects within design research have a high impact on the results that help to innovate products. Finally, there are no boundaries for other disciplines beyond the design within the empathic approach. The case study proved that the team members with background in marketing and distribution do benefit from the participation in the design research process.

Next to the aspect of empathy, a further door for innovation is open if human-centered research is combined with the co-operative approach. Thus, new perspectives can be obtained and shared by the participants. No external advice has to be given for future product concepts. This is in particular an advantage due to the fact that external input often results a sceptical opinion or causes blockades. With the co-operative approach ideas and knowledge come from inside the teams. Moreover the identification with and belief in the solutions is stronger and can be borne by all participants of the co-operation. Consequently, the best conditions are supplied for a successful innovation process.

### **Benefits of third-party funded projects for the Discipline Design Research**

The above discussed benefits of the case study show how various the positive aspects for all stakeholders are. In the following part the benefits for the Design Research, due co-operations with industry, will be discussed.

Margolins delivered interesting considerations for the design research discipline: *“There was a level of abstraction in the design methods movement and in Simon’s “science of design” that most practioners believe to be too remote from actual design situations. However, the separation of design reflection from what I will call “project-oriented research” is a necessary first step to envisioning design as a more autonomous practice that can occure independently of a market framework. In time, this seperation can create new possiblities for thinking about practice, but meanwhile, practioneers have been inclined to develop their own research agendas that are directed to market-oriented forms of production.”*

[Margolin, 2002]

From the IED’s perspective the demand to look at the practical field in detail is needed, to reflect new methods and approaches on how designers are working in the real project context. More practically oriented approaches are effected in Duisburg-Essen, because the German education systems is in a modelling process. There is no extra research budget from the official side to do research in design. But there are a lot of topics to work on. For example social scientists are now joining design firms just as engineers and architects did in the 1930s [Margolin, 2002], but nowadays designers are also offering their human-oriented research services to other areas. “Marketing and human factors data is often not adequate for designers to get a good empathic grasp of people in their dynamic contexts. Thus, designers need to have a role in conducting user studies” [Mattelmäki, 2003]. Refering to this development new fields of design research are coming up and need to be dealt with.

### **Discussion on Design Researchers Advantages**

Through third-party funded projects the IED experienced new possibilities to employ design researchers as well as design students to support the research projects with man power. The design researchers have the chance to gather know-how in conducting research projects and, due to the employment to start their doctoral thesis. The young design researchers are quite early in their carrier, offered the challenge to work with major business partners, e.g. Daimler Chrysler, Ford, Freudenberg. For the design researchers that challenge is motivating and give them research competences and skills in the field of professional project management. The researchers will tell you that this combination of research and projects makes them staying at the university more attractive. The research projects are also incorporated into the teaching of industrial designers. The “new blood” gets involved and motivated for methodical supported projects. The third-party funded project model seems to be a ideal base to educate new generations of designers and design researchers.

According to this positive resumeé there are aspects that are a task for the team. The co-operation with clients from industry include a tight scope of supply. In most cases the clients have defined a clearly structured task that does not allow to produce additional scientific output, which can be transfered to the discipline of design research. Thus, there is less direct funding by the industry on basic research in design, but it is needed to be forced in order to bring forward the design research discipline forward.

In the future a combined funding from two sides, e.g. from the industry side and the German state or EU-side could offer more possibilities for basic research topics. Projects funded by the official side have next to the task description benefits on the scheduling of places of employment. Projects with industry partners are challenging the IED on the point of a long term planning for staff resources and accordingly finances, due to the projects with industry are mostly terminated on six to ten months.

### **Effects on Doctoral Education by Third-Party Funded Projects**

The scientific approach is affected at the IED by practical impacts, according to the third-party funded projects. The positive effects are, firstly, the increase in practical and research oriented skills, and secondly, the financial base to enable a doctoral education on a large scale. Further benefits for the doctoral students are a valuable comparison of their experience and skills within research projects with the industry. They can deduce their potential and where to expand their knowledge and competences. Another positive aspect is that with the involvement in different projects out of diverse fields the doctoral students are able to build up experience in topics beyond their thesis issue. That might hinder them in concentrating on their issue, but extends also their portfolio.

Next to these advantages, there are other effects that might have been changed in the future. The projects with industry often cause schedules that are tight and are not beneficial for the process of the doctoral thesis. Due to the priority of the industry projects the researchers' resources are often bound. The projects with industry bring, next to the financial aspects, also disadvantages on tight project boundaries – these kind of research projects are not expansive enough to be the sole content of a dissertation. One future goal has to be to participate in larger research projects within doctoral students can realise large parts of their thesis. Nevertheless, apart from the points that have to be improved, the IED model for offering a doctoral education has potential for the future.

### **Summary**

At the beginning of the paper there were two questions asked: Firstly, about the stakeholders profits through a co-operation of design research and industry, and secondly, on the effects of this co-operation for the doctoral education.

A positive summary can be given: Customised research for medium-sized companies can be realised and financed. The co-operation optimises the development processes through communication and a view on the internal processes. Internally driven innovations are the results of a human-focussed co-operative research.

There is a profit for the design research through co-operations with the industry. This co-operations result practical focussed inputs on methods and reflections for the discipline. Besides, universities are able to finance design research education with the support from industry, and the doctorands benefit by an additional experience in industry projects and an extended practical based portfolio. Finally, it can be deduced that the discipline and design research education are positively stimulated by third-party funded projects with industry.

*References:*

- Black, A. (1998). *Emphatic Design. User Focused Strategies for Innovation*. In: *Proceedings of New Product Development. IBC Conferences*, in: Mattelmäki (2003)
- Black, A. (2003). *Why I work in User Experience Consulting*, pages: 147-152 in: Koskinen et al., I.c.
- Fox, J. (1993). *Quality through Design: The Key to Successful Product Delivery*, London: McGraw-Hill
- Koskinen, I.; Battarbee, K.; Mattelmäki, T. (2003). *Empathic Design. User Experience in Product Design*, Edita: IT-Press
- Leyonard, D., Rayport, J. F. (1997) *Spark Innovation through Emphatic Design*. *Harvard Business Review*, Nov-Dec, pages 102-113, in: Mattelmäki (2003)
- Mattelmäki, T. (2003). *Probes: Studying experiences for Design empathy*, pages: 119-130, in: Koskinen et al., I.c.
- Margolin V. (2002). *The Multiple Tasks of Design Studies*, in: *The Politics of the Artificial: Essays on Design and Design Studies*. Chicago: The University of Chicago Press
- Verheijen, T.; Kanis, H.; Snelders, D.; Green, W.S. (2001) *On observation as inspiration for design*, *Contemporary Ergonomics*. Pages 383 – 388, London: Taylor & Francis