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THE IMPORTANCE OF EMPATHY IN IT PROJECTS: A CASE STUDY ON THE DEVELOPMENT OF THE GERMAN ELECTRONIC IDENTITY CARD

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ABSTRACT
Although there is a great interest in user driven innovation, the IT industry still shows a strong focus on technology driven innovation development. Understanding the perspective and social context of the user also is not part of a regular technical education. As a result, IT development shows a tendency to concentrate on technical issues while often missing the users' actual needs. This case study describes how disregarding the users' needs caused serious problems regarding the introduction of the electronic identity card (e-IC) in Germany. We argue that this lack of user-centeredness is a direct result of the underestimated value of empathy and empathic knowledge within many IT projects. We consider empathy to be of crucial importance in the development of IT projects, and it is due to this that we employ the user-centered and problem-solving approach of design thinking. The conclusion reached is that the more active attention is paid to empathy throughout a given project, the less likely are unfeasible products, increasing costs and avoidable time delays.

Keywords: empathy, design thinking, public sector, electronic identity card, empathic design.

1 INTRODUCTION
IT development processes demand professionals who are capable of dealing with complex technical issues. But oftentimes a project's technical complexity receives more attention than its social aspects. If the user's perspective and the social context are not taken into account, functionalities may shape up as incomprehensible or unimportant, while crucial features are not being addressed. In the ongoing debate about the improvement of the acceptance of products, the application of design thinking in the IT industry plays an ever-increasing role [1]. In our opinion, design thinking could indeed remedy some of the deficits mentioned above. In this paper, we want to focus in particular on empathy, which we regard to be a key component of the design thinking process and a strong impact factor of design thinking education. In order to bring more clarity to an understanding of the problem area, it is essential to analyze the underlying components of design thinking which could support and optimize innovative IT development. We argue that in IT development the implementation of design thinking will not only function as a driver for increased innovation, but also generally contribute to the integration of empathic mindsets. In our view, these mindsets form the basic framework for collaborative creativity and team competence.
Within design research, much emphasis has been placed on the investigation of obvious design skills like prototyping or brainstorming. Research literature relating to implicit factors like empathy is underrepresented in design research. In this paper empathy is portrayed as a basal implicit component of the innovation process, using the example of an important governmental IT project, which will affect every German citizen – the introduction of the electronic identity card (e-IC). This paper serves as a case study, which examines the relevance of empathic interventions and strategies. We found strong evidence for the hypothesis that neglecting the empathy-inducing components within a project leads a) to a lack of acceptance on the side of the user and b) to an avoidable waste of money and time. Relying on our case study, we argue that the implementation of design thinking improves the innovativeness of results due to the development of empathic mindsets.

1. 1 What is Design Thinking?

Design thinking is a user-centered and teamwork-based approach that solves problems in an iterative way [2, 3, 4, 5]. It accentuates the importance of trans-disciplinary teams and is therefore based on a variety of methods and tools gathered from a multitude of different fields, ranging from design to social sciences.

The term "design thinking" in the way it is used in this context was mainly coined by a group of Stanford Professors (David Kelley, Terry Winograd and Larry Leifer) and the design firm IDEO. It is based on their experiences in product and engineering design. Design thinking relies on six iterative working modes:

- "Understand" and "Observe" are about exploring the nature of the problem and understanding the users and their needs.
- The findings of this phase are then categorized in a "Synthesis" step, which incorporates the main findings and acts as a "persona" (an ideal user) to validate decisions later in the process.
- The remaining three modes are "Ideate", "Prototype" and "Test". They are about generating ideas that are expressed through prototypes in order to test them with users, which are close to the persona.

The whole process should guide the designer iteratively from a vague understanding of a problem to a concrete and appropriate solution. The six modes can be passed in linear order, but they can also be adapted depending on the status of the given project. So if, for example, a design team would discover that they did not fully understand user behavior while testing a prototype, they might go back to the "Understand"-mode to conduct further interviews.

As a learning model, design thinking supports design creativity, utilizing project and process based learning by emphasizing creative confidence and competence [6].

2 EMPATHY IN IT – A SOLUTION TO WICKED PROBLEMS?

In our case study we observed the implementation of the electronic identity card (e-IC) in Germany. The e-IC is a hard- and software-device, which was tested and analyzed utilizing design thinking methods after the project had been finished. It could be shown that the original e-IC-project led to dissatisfying results and rejection by the users. We argue that these results correlate strongly with an obvious lack of *empathy* in the implementation of the original e-IC-project.

Empathy is a key component of design. Design problems are closer to everyday life compared to many other problems in science or industry. The aim of design is to find solutions (products, services, systems), which are as viable as possible for users. Therefore, designers usually do not aim for scientific or theoretical breakthroughs as such but rather focus on the more practical application of user insights - a form of knowledge that can be called and classified as *empathic*. Acting empathically is clearly not limited to designers. Empathy is rather something that can be conveyed, for example via design thinking education. As a project-based-learning-approach, it provides tools and techniques that lead to empathic and human-centered work. In the following chapter we therefore describe a) what we refer to when we talk about empathy and b) how design thinking provides important tools to build empathy for the user.

2. 1 What is Empathy?

In this paper, we understand the term empathy in its broadest sense as perspective-taking, including both the involuntary act of feeling with someone else as well as the cognitive act of putting oneself into someone else's position and taking their perspective. As a basic form of social cognition, empathy is the capacity „to share, to experience the feelings of another person" [7]. Empathy is an ability that allows us to comprehend the situations and the perspectives of others, both imaginatively and affectively [8]. In the current psychological and philosophical literature about empathy there are two essential ways, which supposedly lead to empathy:

1. *Understanding the other via similarity (simulation theory)*: Empathy is based on the ability to mentally simulate another person. It is a special case of mental simulation, in which the outputs are affective or emotional states: "empathy consists of a sort of 'mimicking' of one person's affective state by that of another" [9].

2. *Understanding of the other via the generation of knowledge (theory theory)*: The observer understands the other person via an Archimedean point: There exists a shared emotional basis and vocabulary about feelings, so that one can relate to these intersubjective feelings. Theory theorists consider this folk-psychological body of knowledge to be essentially equivalent to a scientific theory [10]. This is why the theory theory is characterized as emotionally "cold".
Design thinking assumes that one can act knowingly empathic: It teaches students to collect behavioral facts and data about users in order to gain fundamental insights for the conceptualization of a product. This means that in the context of design thinking empathy is a technique for the construction of reality – namely, of the reality of the other agent. For our purpose we employ a mixture of both definitions about empathy, meaning both those that focus on empathy as something spontaneous-emotional ("warm") as well as those that see it as something cognitive-rational and constructed ("cold"). In spite of the ongoing scientific discussion between simulation theory and theory theory [10, 11, 12, 13], we argue that the differences between these two models are less grave than it seems [14]. The emotional component of empathy and rational capabilities in sum build the construct of an elaborate form of empathy. This is empathy as it is understood in the original philosophical context, here delineating „inner or mental imitation for the purpose of gaining knowledge of other minds"[11].

2.2 Empathy and Design Thinking

Dorothy Leonard coined the term "empathic design" [15]. Empathic design enables companies to make product refinements in their customers' own environments by identifying and addressing needs that may not be obvious. The reason for that is highlighted by Leonard: "Habit tends to inure us to inconvenience; as customers, we create "work-arounds" that become so familiar we may forget that we are being forced to behave in a less-than-optimal fashion - and thus we may be incapable of telling market researchers what we really want" [15]. Thus, empathic expertise could be considered a low-risk and low-budget investment. Beyond Leonard's "empathic design", design thinking teaches elaborate design techniques which aim at types of empathic information that cannot be gathered through traditional marketing or product research.
In line with our definition from the former chapter, we define empathy as consisting of both emotional as well as cognitive aspects. Therefore empathy cannot only be taught by conveying techniques and methods: A change of mentality, the generation of new mindsets, is necessary for achieving empathy – for "being empathic is a complex, demanding, strong yet subtle way of being" [8]. Precisely because empathy is such a dichotomous construct, an education focusing on building empathy needs to be double tracked: This is realized by teaching methods and tools on the one hand (rational/cognitive) as well as imparting mindsets and an empathic culture on the other hand (emotional).
In a broader sense, empathy in design thinking is relevant on three fronts:

1. Empathy with the user.
2. Empathy with the teammates.
3. Empathy in the relation between client and user.

In this paper we focus primarily on the first form of empathy. Our ongoing research is concentrating on the remaining two ambits.
Within the design thinking process, clearly, the phase "Empathize" is strongly related with empathy [5]. "Empathize" is the beginning of the design process and it could be divided into:

- Observation. It is important to view users and their behavior in the context of their entire lives.
- Engagement. Interaction and qualitative interviews with users through both scheduled and short 'spontaneous' encounters.

The design thinker has to interchange his user-insights with the other team members. He has to make sure that his teammates get the same picture of the user. There exist a few methods to share this empathic knowledge, which stand in relation to the basic steps that are crucial to the development of empathy - a high competence of reflection, a sophisticated language [16] and aesthetic clarity [14]:

- **Interviewing**:

Design thinking provides basic skills for interview techniques. By repetition, the students improve their skills regarding "asking the right questions" and learning how to observe people. They gain insights into the user's thoughts and feelings in order to create an empathic framework. This method is linked to the model of *theory theory* mentioned above: They learn to understand people better by collecting facts about them.

- **Storytelling**:

Storytelling helps to communicate the user's insights to the other team members as well as to the client. In fact, narration is a requirement for creating an empathy-inducing situation [14]. With the storytelling-technique design thinking aims at developing a sophisticated language, which is also a premise of empathic understanding and perspective-taking [16]. IDEO founder Bill Moggridge suggests that storytelling is a potential solution for prototyping: "When you put all these things together, with elements from architecture, physical design, electronic technology from software, how do you actually prototype an idea for a service, and it seems that really, it's about storytelling, it's about narrative." [17]

- **Metaphor:**

To communicate the design challenge or the given problem to team members and external partners, it is helpful to use the "metaphor" technique. It helps the design thinking-team to visualize and explain the problem in greater clarity – not only to themselves but also to others. Creating new metaphors also generates new vocabularies and provides different perspectives which help to interpret the world. That is why the philosopher Richard Rorty emphasizes how the creation and development of new vocabularies coincides with the development and adoption of new perspectives [18]. Via the metaphor-technique, a form of aesthetical clarity is being trained: An ability to transform facts and information into metaphors, which helps the other person or team member to create a clear and accurate empathic picture. This aesthetical clarity is a basic precondition to empathy [14].

- **Persona:**

After taking the perspective of the user and "walking in his shoes" via observation and interviews, the user insights need to be clustered and synthesized. This is done by creating a point of view combining all user profiles (persona). The competence of being reflective, being able to step back from one's own opinions and the ability to regulate one's own emotions are reflected by this method and at the same time form a basic premise for empathy [10].
Having elaborated upon how design thinking encourages empathy and at the same time having defined empathy as crucial to collaborative creativity, we now want to explain the relevance of empathic design thinking by turning to our case study.

3 CASE STUDY: ELECTRONICAL IDENTITY CARD

The German governmental electronic identity card (e-IC) project was postponed because there were difficulties in various ambits. Shortly before the release of the e-IC, the Ministry of Internal Affairs therefore engaged design thinking to improve user understanding and empathy. This intervention arrived late, since the software had already been developed. To evaluate the underlying problems, the Ministry of Internal Affairs commissioned a project team from the Hasso Plattner Institute (HPI) in Potsdam to conduct a study, using a design thinking approach while focusing on user aspects. For our case study, we accompanied the HPI project team to find out more about the role of empathy in IT driven projects. We observed the HPI team, which conducted a study on the failures of the already completed e-IC project.

3.1 Methodological Approach

We applied an inductive approach, which uses empirical data in order to build theories combined with literature review. The theory of the impact of empathy on IT projects was developed by using the grounded theory approach as a method to analyze the case study in order to develop theories [19]. The

data collection, which leads to the development and foundation of theories, integrates practical rather than abstract experience [19]. The examination of practice is operated via case study research on the work of the HPI design thinking team. Case study research analyzes cases, describes them and develops empirically founded concepts [20, 21, 22, 23].
As an initial step in our research, we analyzed the work of the HPI team which conducted research on an existing IT project (the e-IC). We used this intervention and the research work that followed by the HPI team as a case study, in which we accompanied the e-IC project. The case study was undertaken by participating observation in an open and unstandardised way, and following the team of HPI design thinkers through the project. The design thinking team of HPI evaluated the outcomes of the e-IC-project using qualitative methods within a design thinking approach. Doing so, they discovered that the original e-IC-project had led to dissatisfying results and rejection on side of the users from the get-go.
We analyzed their reasoning and explanations for the results of the study and reached the conclusion that their findings suggest that the project failure correlates strongly with a lack of empathy towards the citizens' needs. In the following section we will go into more detail about our insights.

3.2 Case Study

On the 1st of November 2010 the new German e-IC was presented to the public. Beforehand, the Ministry of Internal Affairs had proclaimed the main advantages of the e-IC to be its smaller size when compared to the old ID card as well as also providing some additional features. Furthermore, it was said to guarantee a reliable and secure authentication infrastructure that serves public administrative and economic needs alike.
Despite these high ambitions the software of the e-IC had to be recalled a few days after the presentation because of security deficiencies. Beyond that, the media raised doubts regarding usability and operability of the new e-IC-software. Due to a comprehensive survey that was undertaken by a design thinking team of HPI and that we used as a case study, we were able to reconstruct some of the crucial aspects that led to the negative results and the recall of the e-IC-software.
In the final phase of the e-IC-project, the Ministry of Internal Affairs commissioned the HPI to evaluate the acceptance, usability and the perceived value of the new e-IC from a user's perspective. The background of this assignment was that after testing the first prototype of the software it became clear that the former focus on the technological and legal requirements of the e-IC was not sufficient for the success of the project. The new features of the e-IC would lead to a change not only in business- and bureaucracy-processes but also on side of the citizens. Therefore, it was obvious that the project required a new way of thinking – embedding the citizens' point of view. While planning the release of the e-IC, the government realized that it was not sufficient to focus solely on the mentioned issues. It became increasingly important to understand the public's perception of the provided services.
Throughout the e-IC-research project the design thinking team of the HPI was able to depict various difficulties regarding the outcome of the project. These results were used afterwards to improve the software's user interaction. The HPI team consisted of two computer scientists, a communication expert, a political scientist, an interior architect and a graphic designer. They undertook extensive desk research, conducted over 50 qualitative interviews and used video coding to analyze recordings of user interactions.
The HPI project was divided into two parts:

I. Understanding the current scenario:

In the beginning, it was important to gain a deeper understanding of the complex environment the e-IC should be used in. The aim of this step was to bring the team on a shared level of knowledge, so that they could all count as experts for the e-IC-issue.
The diversified examination of this issue included qualitative research by users and experts alike.
The group of test persons consisted of 40 people:

- 21 experts:
    - 1 trust research professor (University of Potsdam)
    - 4 independent computer scientists (Fraunhofer Institute)

    - 2 computer scientists (Ministry of Internal Affairs, competence center for the identity card)
    - 1 chairperson of chaos computer club
    - 10 chiefs of the 15 service providers involved in the e-IC-project
    - 1 data protection commissioner (German government)
    - 2 civil servants
- 19 persons randomly chosen (on the street, neighbors, taxi drivers)

The knowledge gained in this process was condensed by a joint dialogue which led to a 360°-perspective of the problem space.
The findings of this first step were:

- Ambivalent goals of different stakeholders concerning the e-IC

The communication with the users regarding the goals of the government turned out to be ambiguous and not clear. On the one hand, the government portrayed the e-IC as a sovereign document (and recommended its usage only in essential situations). On the other hand, the government supported usage scenarios in which the e-IC was presented as a door-opener for various services.
Potential users were rarely aware of the goals of the e-IC. They did not know whether the project was about innovation, safety or about a simple online-shopping-identification. The interviews showed that conflicting messages given by the different stakeholders of the e-IC-project confused the users.

- Missing value for the user

By the time the study was conducted, there existed only a few obvious usage-scenarios which convinced the users of the benefit of the e-IC. Nearly all features seemed to be provider-oriented, meaning that they mostly helped service providers and not the end-user. The only gleam of hope for the interviewees in order to benefit from the e-IC's introduction was the access to e-government-related services.

- Trust and transparency

After analyzing the interviews, it emerged that only a small percentage (18%) of citizens was open-minded regarding the online-functions of the e-ID. Therefore, only a few persons could be considered potential users.
The interviews also showed that two further premises had to be taken into account if potential users were to give the e-IC a chance: First, they would have to trust the government in terms of its technological competence regarding the citizens' safety in the internet. Second, users would only accept the e-ID if they believed that the government was interested in the enforcement of data privacy policy. However, the combination of these two factors was rarely existent within the range of interviewees.
Transparency was only a predictor of trust if the user had a deep understanding of technical issues, which also was not the case in the majority of instances.

II. Evaluating the user interaction:

The second part addressed the user interface (UI) of the software.
The group of test persons consisted of 20 people:

- 5 computer scientists of HPI
- 15 randomly chosen persons (age: 3 of them between 60 and 80, 12 of them between 20 and 35 years)

In order to test the UI, existing scenarios were acted out with the test persons. For example, the test-persons were asked to open up an online-banking account or to borrow a video, in both of which cases the age-restriction was managed by using the e-IC. It was necessary for the test-persons to install the software as well as the e-IC card reader on their computers. The whole process was video recorded and complemented by user interviews in order to really understand the issues on a behavioral as well as on an individual level.
By doing so the HPI-research-team uncovered the following difficulties:

- Difficulties during installation

Confronted with a set of components consisting of a card-reader, device drivers, software, and the need to download from multiple internet sources, users were confused and experienced a great deal of difficulties installing the software in the first place. Despite their expertise, it took even experienced computer scientists about 36 minutes to install and run the software.

- "Where is it?"

Once the software activation was installed, the users were unable to locate the e-IC within their operating system. The question "Where is it?" was asked more than once. It reflected the astonishment of participants who were searching for the program icon after they had installed 80MB of data on their system. This was completed by the fact that the software was only represented by a small desktop icon while the configuration tool was represented on the desktop by an application interface.

- Usability problems and safety-risks

A second obstacle was the personal identification number (PIN), which is needed to activate the e-IC after installation. It was not understood why this PIN was needed and how it should be used. While facing the issue of replacing the PIN by a more secure and self-generated one, most users chose either their date of birth or an ordinary numerical order like "123456". This was not only observed by the HPI-team, but was also revealed in a study undertaken by Imperva [24].
This initial step already let to profound security risks, which had not been addressed by the development team beforehand.

- Absence of transparency during data exchange

While using the testing mode to validate their installations, users were surprised and confused. The connection with the service seemed intransparent as there was no visual clarification of the type of data (name, address etc.) that was being transmitted to a provider they also did not know.

- Certificates with inexplicit meaning

The authentication certificate of the service provider, which was displayed in the app, was only represented by technical terms. These were unintelligible for almost all users and therefore neglected by most of them.
In addition, the word "certificate" confused the users since it suggested more than it actually was intended to imply. Some users expected that this certificate to be given by the government in order to guarantee trustworthy and fair business partners. But as a matter of fact, it was just the approval of the identity of the service provider.

- Confusing terms

Another confusing terminology was the use of security abbreviations, for example: PIN, "TransportPIN", CAN, PUK, "Sperrkennwort" and QES. All of them had to be used in the initial setup procedure. According to the developers, these terms all made perfect sense, but they were often misunderstood by and ambiguous for the users.
From these insights amongst others the HPI team formed the picture of a "lead-user", a persona. As described in chapter 2.2, the persona represents the needs of a target group and makes it possible for a project team to take over the perspective of the user at any given time.
The persona of the e-IC-project is used to the internet, makes use of online services regularly, trusts the state and has confidence in the technical competence of the government.
Based on the revealed problem areas, the two-stepped survey of the HPI team led to a catalogue of 10 suggestions for improvements. Users were not only seen as a means for testing and validating of results, but rather as a provider of continuative ideas. In this way, users were involved in the development of solutions. The outcome was a profound redesign of the software and its UI. The most relevant suggestions on how to improve the e-IC experience for its users/holders are presented in Meinel et al. [25]

4 CONCLUSION

Building on this case study we were able to show that design thinking correlates positively with the development of empathy. By collecting insights (theory theory) and creating a persona (simulation theory), the teams provided each other with a profound understanding of the user and shaped the client's thinking (in this case of the Ministry of Internal Affairs) about user-centeredness in a way that influenced its decision.

The revealing facts of the HPI study made it easy for the Ministry of Internal Affairs and IT developers to understand the problems of the e-IC project and to generate a connection to the user. In consequence, the second release of the software was postponed to make critical improvements in order to implement user-centered solutions. Through the inclusion of empathy based solutions, users found the product itself much more accustomed to their needs. This had a positive impact on the acceptance of the product and user satisfaction.

This case study highlighted the crucial role of user understanding concerning IT projects that involve a wide range of users. Therefore, we found support for our initial hypothesis: Ignoring the users' perspectives during the implementation process includes a high risk of a collapse of the budget and erroneous time planning. The money spent on unnecessary development would have been sufficient to do an even more extensive user study and needs assessment in the beginning.

Although most industry projects do not plan with an extra-budget for early user involvement, our results should have made it clear that it is crucial for a project's success to "step into the shoes of the user" in order to create empathic knowledge. In essence, one might argue that businesses should invest early on in the process, in order to save money at the end of the project.

Yet, one has to take into account that situations in the business realm often differ from the situation in the design-thinking-context. Business-structures tend to underlie certain regulative factors like budget and time, which may not allow for an empathy-led user-research. It seems paradox that these habits within business culture decrease the effective use of the two most fundamental resources: money and time. Thus, further research is needed in order to improve the structures in business and to generate techniques that enable empathy.

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