A Canvas Method to Foster Interdisciplinary Discussions on Digital Assistance Systems

Holger Fischer(✉), Björn Senft, Florian Rittmeier, and Stefan Sauer

Paderborn University, SICP, Fürstenallee 11, 33102 Paderborn, Germany
{h.fischer,b.senft,f.rittmeier,s.sauer}@sicp.upb.de

Abstract. Meaningful and usable digital assistance systems that support the employees in their everyday tasks seems to be a challenge for many organizations in terms of individual and organizational acceptance including usability, UX, or Work 4.0 issues. Existing software engineering methods are insufficient to integrate employees in the design and development, and to discuss solution concepts of such systems at eye level. In this paper, a lightweight canvas method is presented that shall address these challenges. It includes the human, the business as well as the technological perspective in one communication instrument. First evaluations show that participants appreciate the canvas concept and that the method is versatile in different scenarios. Several questions enrich the discussions about new systems and improve the acceptance as well as the mindset at early stages in the design and development process.

Keywords: Digital assistance systems · Canvas method
Acceptance · Organizational communication
Human-centered software engineering
Requirements engineering · Software quality · Work 4.0

1 Motivation

In Germany, the term "Arbeit 4.0" (en. Work 4.0) as a part of digitization addresses the direct and indirect interaction between digital technologies and all processes of work design, organization of work, and working conditions [1].

Software solutions especially digital assistance systems (DigASys) are increasing within the professional work context [2], e.g. cooperative robots in industrial manufacturing or augmented reality glasses in the commissioning. We understand a *digital assistance system* as follows:

Definition 1. *A digital assistance system is a software solution (e.g. apps) as well as a combined software and hardware solution (e.g. smart glasses, augmented reality, drones), with which people interact via a user interface and thus are supported in their work situation. Excluded are hardware solutions with embedded software (e.g. autonomous industrial trucks, robots) that do not have a direct user interface.*

A. Marcus and W. Wang (Eds.): DUXU 2018, LNCS 10918, pp. 711–724, 2018.
https://doi.org/10.1007/978-3-319-91797-9_49

The possibilities are versatile and also encourage further discussions about the impacts on the human working life.

The employees' as well as the organizational acceptance of these systems is crucial and includes quality aspects of usability, user experience, and Work 4.0 as well as of the business perspective [3].

In addition, we can observe five big trends affecting work in the future [4]: New behaviors due to social media, millennials in the workplace, mobility, globalization, and new technologies. These developments change the expectations regarding software solutions like they are part of the organizations today.

Despite all efforts, today's software products have quality gaps in terms of functionality and usability [5,6]. Organizations spend lots of money to develop digital assistance systems, which are not accepted by employees or works councils (employee representative committees) after their rollout. Software solutions increase in their complexity or expectations, and user needs are often out of focus. Project managers and software developer cannot cope with the challenges on their own. The active involvement of employees in the software development process has become essential.

Current software engineering (SE) methods are insufficient. Methods do not focus on users – the employees working with the software – in terms of active involvement during the development process. Human-centered design (HCD) methods address the active involvement of users, but do not take the business strategy into account, which is important for the organizational acceptance.

A lightweight method to foster the communication and discussion between all stakeholders starting from the beginning of an assistance system project is necessary to include all three perspectives: The human, the business and the technology. Such a method can create an overview and address critical issues right from the start.

In this paper we present an approach that is based on a canvas concept. Our aim is to create a lightweight method that is easy to use, quick to conduct and accepted by both management and employees. Therefore, we sum up canvas-based methods as related work, introduce our "Digital Assistance System Canvas", and conclude with our experiences.

2 Canvas-Based Methods

To achieve the goal of a lightweight and management-accepted method, we have adopted the concept of the *Business Model Canvas* (BMC) [7]. Osterwalder and Pigneur published their BMC in 2010 and challenged the way to *"systematically invent, design, and implement [...] powerful new business models"*. With their method, they addressed questions like *"How can we question, challenge, and transform old, outmoded [business models]?"* and *"How can we turn visionary ideas into game-changing business models that challenge the establishment – or rejuvenate it if we ourselves are the incumbents?"*.

The BMC addresses the business perspective of an organization and *"describes the rationale of how an organization creates, delivers, and captures*

value". Therefore, Osterwalder and Pigneur specified nine basic building blocks categorized into three main areas of business – the customers (customer segments; customer relationships; communication, distribution, and sales channels) and the offer (value propositions), the infrastructure (key resources; key activities; key partnerships), and the financial viability (revenue streams; cost structure).

As described, the BMC is focussed on the business value of an organization. It merely takes the employees of an organization into account as a key resources and does not model the working processes that shall be supported with a digital assistance system. Nevertheless, the canvas concept is highly accepted by managers, academics, and practitioners around the world and seems to be a good starting point for innovation projects [8].

While the BMC is focussed on the whole business strategy of an organization, Patton [9] adopted the BMC concept in his *Opportunity Canvas* and aims on facilitating discussions about new features or capabilities. He assumes that a product already exists within an organization and eliminates the operational or revenue building blocks. Patton puts the focus on the user's problems instead as there are too many ideas for features that could be added. With the Opportunity Canvas, he encourage the participants to think about how the users would use the solution to solve their problems and how this can either hurts or helps the business.

The advantage of this canvas lies in the focus on the users' problems. Concerning the development of new digital assistance systems, this would be an adequate starting point to support employees in their work. Nevertheless, Patton only addresses features of already existing systems and neglect issues like the working context, the work design, or possible impacts of a system. Furthermore, he only makes assumptions about users' problems instead of involving actual employees in the discussion.

Another adoption of the BMC and Opportunity Canvas is the *Lean UX Canvas* presented by Gothelf [10]. The aim of this canvas is to *"help teams frame their work as a business problem to solve (rather than a solution to implement) and then dissect that business problem into its core assumptions"*. Therefore, Gothelf established building blocks to describe the users and customers, the users' benefits, and hypotheses as well as questions what shall be learned to validate the hypotheses.

The focus on validation of hypotheses is an advantage towards the Opportunity Canvas and reduces the risks to not only build a system on assumptions and to get rejected by employees or works councils. Nevertheless, the Lean UX Canvas focusses on business problems and does not take account of the working context, the work design, etc. to build assistance systems that support working processes in an adequate way.

To sum up, all three canvases contain worthwhile concepts to address business problems and to discuss business outcomes. None of the canvases puts a focus on the working context or the task that shall be supported, let alone looking at impacts on the users and needs of the users of the system. Therefore, we adopted these canvases and changed the focus towards work, acceptances criteria and active user involvement.

3 The Digital Assistance System Canvas

The working context of an organization is very important. Every organization needs satisfied employees in order to be innovative and to create values for customers of its products and services.

Due to new technological possibilities and new work concepts, the way we work is continually changing. Digital software-based assistance systems support the employees who can focus on their core tasks again.

In order to build meaningful assistances systems, it is necessary to foster a communication culture within organizations. The acceptance of such systems is not only created by the systems themselves, but also by the way employees are valued and involved during the development process. We base these assumptions on our observations that we have made in several projects with business partners.

To create a lightweight method that is easy to use, quick to implement and accepted by both management and employees, we have done research on existing canvas concepts (cp. Sect. 2). Furthermore, we have analyzed several projects with our business partners concerning questions about what behavior we observed among the various stakeholders and which activities have led to more acceptance of the final solution (Sect. 3.1). Based on that, we have defined objectives to be achieved with our canvas (Sect. 3.2) and have developed a structure as well as questions for every building block of our canvas (Sect. 3.3). In addition, we have created a short practical guide to apply the canvas, which is based on human-centered design following ISO 9241-210 [11] (Sect. 3.4). Finally, the concept of the canvas has been evaluated with focus groups of practitioners (Sect. 3.5).

3.1 Observations Within Business Projects

In the last three years, we have been supporting various companies in the design and implementation of digital assistance systems in their working environments. Three of the projects are described below to illustrate the differences in their thematic orientation and their company structure:

- *Project 1: Energy-efficiency installation.* The organization of this case advises, installs and maintains combined heat and power (CHP) units of all sizes for various properties. Therefore, they are kind of responsible for the energy-saving result. However, the decision for an optimal CHP is very complex and depends on the interaction of all the energy consumers of a property as well as the people working there. In order to demonstrate the actual energy savings as well as to interpret deviations in the behavior and to plan maintenance work ahead, it is necessary to analyze and interpret a large number of energy data. The aim of the project was to introduce an assistance system to support all actors from the craftsman through the energy engineer to the owner of the property. During the project, we had access to all stakeholders and were able to validate assumptions with them.

- *Project 2: Facade engineering.* The organization of this case is active within the context of building construction and supports their customers (e.g. architects, engineers, constructors) with free of charge services in order to convince them to buy their building elements later on. Some stand-alone solutions exist that supports the involved people with some assistance. With the aim to improve the overall construction planning and coordination process and to connect existing solutions, a project has been set up to analyze the context of use within the company (sales, engineering, consulting) as well as with the users of their services. During the project, we did interviews with all internal stakeholders and we were able to talk to several customers of the company.
- *Project 3: ATM assembly.* The organization of this case produce all different kinds of self-service systems, e.g. automated teller machines (ATM). The automated production of the parts needed is followed by a manual assembly line. Multiple quality gates within this assembly line ensure the quality of the products. As the number of produced machines is low within each order due to individualization by the customer, quality problems are reported at a time when they cannot be fixed anymore. A project has been set up to identify possibilities for digitalization of paper-based documentation and quality assistance for the worker. This was the most complex of the three projects described. Due to the size of the company and the nature of the project, we had to involve the works council as well as the union in order to talk to the workers in the assembly line. We had to conduct many interviews to keep everyone involved and validate findings as well as concepts in regular meetings.

Within the different projects we observed that mixed teams in an organization started to talk to each other in the past only after new software solutions were unsuccessfully introduced or developed.

For example, a developed enterprise social network was stopped by the works council just before the start due to data privacy issues that have not be considered before and have not been a problem in other countries. As a result, the start was postponed by two years.

Another example is a tablet-based commissioning system that failed after usage by a test user. The test user had been unsatisfied by the solutions and influenced his colleagues in not using it. The company had to rework the whole system in order to restore the acceptance with the system.

We claim that a digital assistance system should be discussed within an organization right from the beginning including three crucial perspectives: A solution should be strategized for the impact it has on the *business* and on the organization. It should be designed for the outcome that is generated by the *employees* and that can change their workflow. And it should be built for output using *technologies* that fit to the business goals as well as users? expectations.

Otherwise, we observed that crucial questions regarding digital assistance systems were asked late in the development process. For example, some of our business partners bought multiple smart glasses and tablet computers because they were interested in the technology. Only then did they ask in what scenarios

they could use them. After spending lots of money and implementing first applications, the people in the project teams started to learn what they are doing and to ask crucial questions that did not come up before the implementation due to communications issues, e.g.:

- Is it fine to have shared smart glasses for augmented reality due to sanitation issues?
- How long is it suitable to wear smart glasses due to ergonomic aspects (e.g. neck muscular)?
- What about the liability of mobile devices in case of damages?
- Shall mobile devices be locked during breaks or after work?
- Shall we have a personal mobile devices or shall it be shared by the employees?
- How is accident protection organized, e.g. while using tablets or smart glasses in areas of forklift trucks or autonomous vehicles?

All these questions are able to interrupt or even to stop a project, but could have been avoided if people would have started earlier to talk and to discuss with each other. To enrich the communication between different people within a project or within an organization, we started to develop our canvas method, which shall also address further objectives.

3.2 Objectives

The authors present a method to foster the communication in early stages before buying or developing new software solutions: The Digital Assistance System Canvas. The canvas shall be a living document. It shall foster the discussion within multidisciplinary project teams (managers, works council, union workers, employees, IT, etc.) to uncover critical questions as well as crucial impacts on the workflow (e.g. changes on task responsibilities) as early as possible, and to remember the overall vision and these findings during the ongoing design and development. Therefore, we would like to address different objectives with the canvas:

- *Communication* is a crucial aspect in every organization and also when thinking about digital assistance of human workflows. The method shall foster the communications within teams to build the right system.
- *Participation* of all stakeholders (employee directly interacting with the system; employee that are affected by the system; employee that perceive itself to be affected by a decision, activity, or outcome) shall be supported. Stakeholders shall participate in every development stage starting with requirements elicitation in order to ensure an appropriate workplace design and individual acceptance. Human-centeredness shall be an integrated aspect in the design and development of assistance systems.
- *Interdisciplinary teams* shall be introduced comprising managers as well as workers, works council, etc. to deploy an appropriate digitization and to enable innovations through the employee. It shall support the organizational

change within the software-using organization and shall create a feeling of participation and decision on the employee level likewise. The decision-makers within an organization shall decide, which workflows they would like to digitize and in which way they would like to do this. They shall balance different perspectives with different objectives for a digitization. All perspectives shall be taken into account, to foresee possible impacts and to formulate a strategy, including key performance indicators (KPI) to ensure individual and organizational acceptance.
- *Acceptance* of digital assistance systems can be established in two ways. One way is to build a system that is suitable for the tasks. The more important one is to create acceptance through the process of participation. Both aspects shall be fostered by the method.
- *User needs elicitation* shall be enriched by the method through communication and visualization, since lots of implicit needs can only be communicated when the idea becomes tangible.
- A *shared vision* shall be created with the canvas concept and shall guide the team through the project so that the usability and user experience of the system can lead to more acceptance and usefulness.
- A *big picture* of dependencies of human workflows, organizational processes and existing systems shall be identified in advance to achieve a broader view of the organization and to enable an appropriate interaction and user experience of digitized assistance services.
- *Consolidated goals* shall be specified through the method so that they are visible for every stakeholder.
- As a *"companion"*, the canvas shall be used through the whole design and development process, and shall foster an ongoing reflection of assumptions made.

3.3 The Canvas Structure

The Digital Assistance System Canvas shall take three perspectives into account: Human (H), business (B), and technology (T). Therefore, it is structured into three parts (see Fig. 1).

Furthermore, the canvas is divided into five areas (see Fig. 2). Essentially, the canvas focusses on the employees that are the domain experts of their tasks as well as the users of assistance systems. They have to work with the systems every day and are crucial for the acceptance of digital assistance systems.

Following the framework of human-centered design for interactive systems [11], the part *Human* is divided in three areas, which focus on the employees (I), the working context with the tasks (II), and solution concepts with its impacts on work (III). The business investments and outcomes for the organization (IV) is focussed in the part *Business*, and the technological settings (V) are discussed in the part *Technology*.

Behind the three perspectives with its five areas, nine building blocks enriched with supporting questions represent the actual content of the canvas:

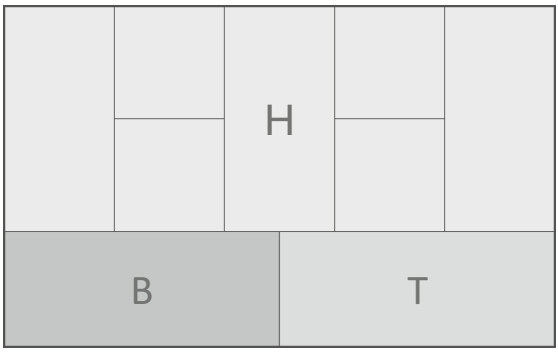

Fig. 1. Three perspectives: human, business, and technology

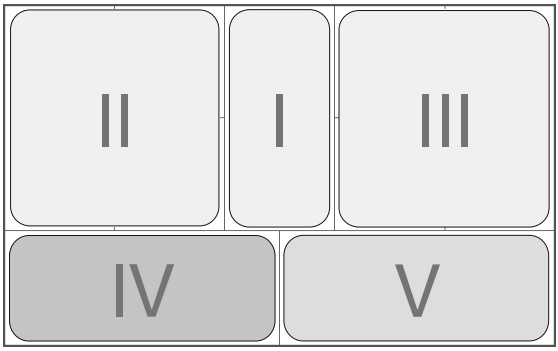

Fig. 2. Five areas of the canvas

1. *Employees/Users:* The employees of an organization and therefore the *users* of the digital assistance systems are represented in the first building block. There are a variety of characters when designing interactive systems in a work context. They have a different technology affinity and also different competencies or experiences. To increase the acceptance of interactive systems, it is necessary to think about what kinds of people work in the organization, who will be affected by the digitization project, what are their personal motivations and goals, or if there are any cultural challenges. In a manufacturing context, this could be, for example, workers, foremen, operations managers, the works councils, or even IT manager responsible for system integration.
2. *Work Context:* After identifying potentially relevant stakeholders, it is necessary to analyze the problem space and take a look at their job. Questions for discussions can be how a typical working day looks, which tasks have to be done, what kind of unplanned work influences the normal tasks, which particular behavior can be observed, if there are any workarounds used, or what current pain points are.

3. *Physical Environment:* In addition to the tasks, it is worthwhile to look at the physical environment in which the tasks are performed. Designing interactive systems, it is necessary to analyze the workplace and ask questions like how the workplace is structured, if the people have to walk between different workplaces, if there are any occupational safety requirements like gloves, protective goggles, or if their are any noise or light impairments. These information can be crucial in later technological considerations, e.g. is it possible to use touch interaction due to gloves, to use voice interaction due to noisy surroundings, or to use tablets in places without tray areas.
4. *Social Relationships:* Certain workflows require, for example, the release of supervisors or make collusion with colleagues necessary. Therefore, it is important to analyze social relations as well. Which employees have to work together, how does the kind of communication look like (e.g. direct interaction, information providing, reporting, approval procedures, work instructions), or how does the manner towards other employees look like, shall be questions of interest.
5. *Solution Idea:* Having analyzed the problem space, possible alternative solution concepts can be discussed. Therefore, it is necessary to decide on the tasks that should be supported by a system and to think about necessary preconditions, potential or natural inhibitors of the solutions, or if the solutions help to meet the core needs of the employees.
6. *Acceptance Criteria:* After sketching solution alternatives, a crucial step is to think about criteria that have to be addressed in order to create solutions that will be accepted by the employees. A possible model of acceptance criteria can be found in Fischer et al. [3].
7. *Impacts:* When deciding about systems that influence or change the work context, it is necessary to analyze the impacts of the solution ideas. Questions might be how activities or responsibilities will change, if there are other workplaces that will be affected by the solution as well, or if there might be any communication impacts.
8. *Business Invest & Revenue:* In addition to substantive questions, it is also necessary to consider what this means for the organization due to the organizational acceptance of the system. A major discussion point might be the financial invest as well as the expected added value (e.g. time saving, effectiveness, quality improvement, or flexibility). But also other questions about necessary or caused changes have to be considered: Do we have to change some mindsets first? Do we need to adapt the organizational culture? Do we need to change our business processes?
9. *Technology Setting:* Last but not least, the technological feasibility is crucial before starting the implementation of the solution. Therefore, decisions have to be made about technologies that can be used and how these technologies might fit to the overall system infrastructure. It is necessary to analyze which information are needed, from where the information can be obtained, and if the data quality is sufficient for the solution concepts.

3.4 Usage of the Canvas

The Digital Assistance System Canvas (see Fig. 3) is meant to be a communication instrument within workshops to bring together all relevant people and perspectives of an organization and project. It can be used in multiple ways:

1. *Initial Workshop:* This kind of workshop takes place in the early beginning of a project and lasts at least about four hours. The canvas can either be used to map the entire organization depending on its size or as commonly used to look at a defined area. There should be people with any experience levels participating from the trainee to the professional and from the shop floor to the management. Especially in larger organizations, it is recommended to involve the works council as well. The canvas is meant to be plotted on a large poster format (DIN A0 or 46.8×33.1 in.). Sticky notes are used to put the information on the canvas. One sticky note color shall be used for each modeled employee type. This way the colors can be used in the other building block to visualize the dependencies to employees of the first building block. They are flexible and can be moved over the poster during the workshop. If there are more then approx. ten people in the workshop, multiple canvases can be worked out in parallel in smaller groups with around 5–6 people. The canvases have to compared and merged at the end of the workshop to get an overall picture. The building blocks of the canvas have numbers from one to nine printed in the background. They define the journey of the participants during the workshop.
2. *Follow-up Workshops:* The canvas is meant to be a living instrument. Hanging in the meeting or project room, it can be continuously enriched with further details or even specific models of the different perspectives. Techniques from usability engineering can be used to analyze and specify the context of use, e.g. personas [12] detail the employees building block, context models [13] or flow models [14] detail the work context and the social relationships. Techniques from the business domain can be used to analyze and specify the business invest, risks and outcome, e.g. SWOT analysis [15], key performance indicators [16], etc. Techniques from software engineering can be used to specify the technology setting, e.g. UML [17], IFML [18], software architectures, etc. The new findings can then be discussed in further workshops from time to time having the overall big picture visible all the time.
3. *Comparative Workshops:* The project team will learn while doing the project. At some point it might be helpful to hang the existing canvas aside and to start with a blank canvas and an initial workshop to see how the ideas and assumptions have changed over time.

As shown, the digital assistance system canvas is versatile and foster the communication with the organization. Especially the idea of a comparative workshop with a blank canvas came up during one of our workshop sessions.

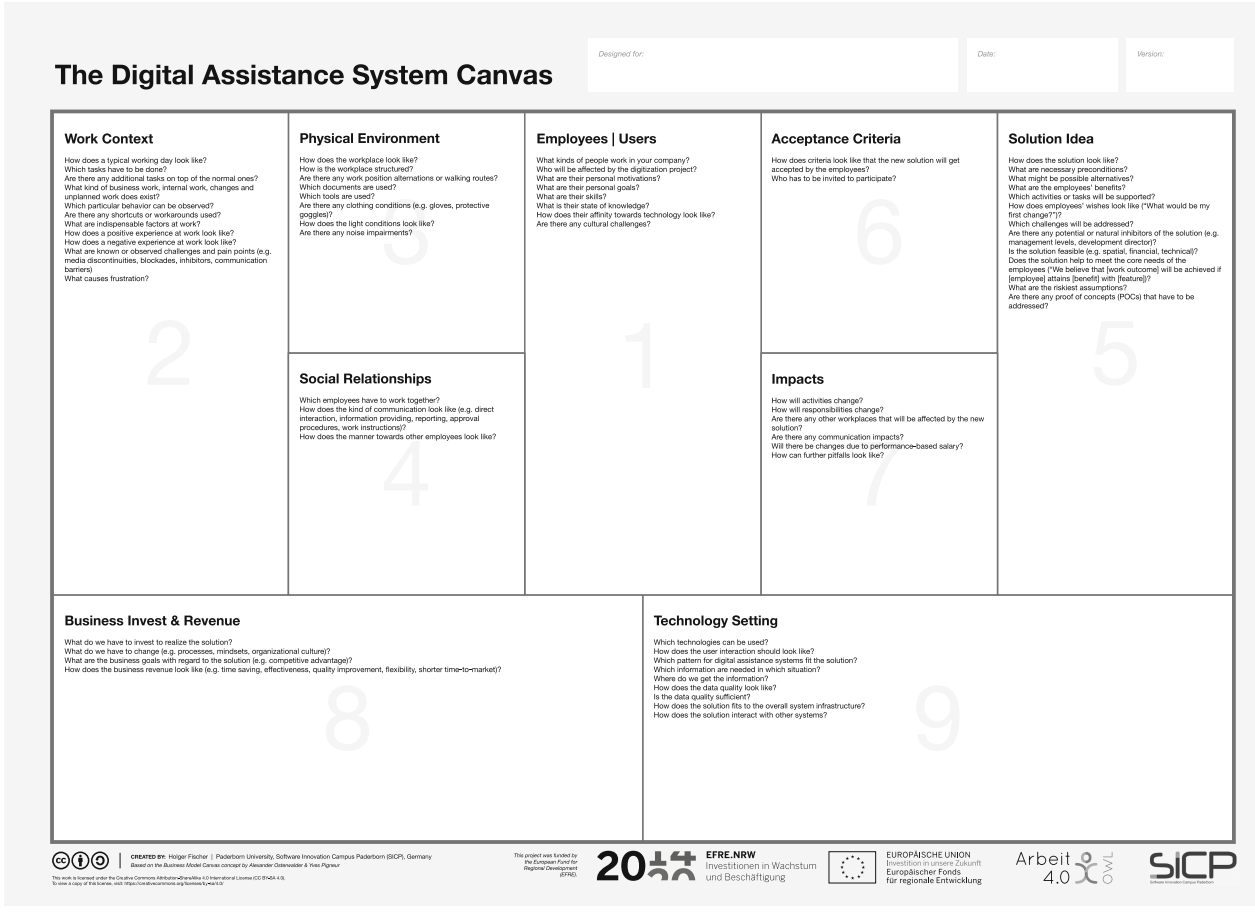

Fig. 3. Digital assistance system canvas (download: http://bit.ly/DASCanvas)

3.5 Evaluation

So far we have evaluated the concept of the canvas within focus group workshops with about ten practitioners each. Thereby, we described an easy to understand scenario for an order process. The item of the order was a customized cake at a cake shop. The story was told to the workshop participants and they discussed digitization potentials and impacts on the work. We observed their discussions while performing an initial two hours canvas workshop. We asked them to think aloud if any questions occur concerning the canvas. Afterwards, we did a review and collected feedback of the group of participants.

Overall, the canvas was very well received and all participants understood and appreciated the idea. The participants started to discuss the scenario and placed sticky notes all over the canvas without having obvious problems.

In addition, the participants started to develop further use scenarios of the canvas during the review part of the workshops. They figured out that the canvas can be used in various situations:

1. The problem is clearly understood and defined and the canvas is used to discuss the solution ideas.
2. The solution idea is already existing and the canvas is used to detail or validate the feasibility of the solution, or to check if better alternative solutions might exist.
3. The canvas is used to identify the work space that the organization would like to digitally support. Therefore, multiple potential solutions exists and are compared with each other.
4. The canvas is used to identify overall digitization potentials of an organization.

Furthermore, the participants discussed if only one canvas should be used in the group or if multiple canvases would be helpful to either have one canvas for each modeled employee or for each identified solution idea. As an alternative the participants discussed to improve the method by starting with the identification of all employees and edit all other building blocks step by step with only one user group after another.

Talking about iterations of the canvas, the participants came up with the above described concept of a comparative workshop. Their idea was to start with a blank canvas and review the result with the previous canvas. The newly worked-out knowledge either might lead to further ideas or it might confirmed the already existing ones.

Currently, the applicability of the canvas is evaluated using it in workshops with multidisciplinary teams within manufacturing companies.

4 Conclusion and Outlook

Summing up, the aim of this paper is to enrich the communication among the project team and the quality when designing and developing digital assistance

systems. Current established requirements techniques like observations or contextual interviews seems to be insufficient. People as well as hierarchies in larger organization shall learn from each other to create individual as well as organizational acceptance during the project and not afterwards.

Therefore, the concept of the digital assistance system canvas has been presented. It shall foster the envisioning, the big picture as well as the visible concept during the ongoing project, and ensure the participation of the people that have to work the system. The canvas equally addresses the human, the organizational and the technological perspective. It discusses the employees, their tasks, their work environment and the social relations, and contrasts it with the solutions ideas and their acceptance criteria as well as impacts.

Existing canvas concepts have been analyzed regarding their focus on human-centered quality characteristics. Several finished projects have been reviewed to identify important questions and crucial pitfalls. The canvas has been created based on these findings. Focus group workshops with practitioners have been carried out to evaluate the concept of the canvas. Overall, the results show that the canvas was received by the participants very well and that participants communicated at eye level.

Future work will contain further evaluations to validate the practical feasibility within digitization projects. The canvas is thought of as an agile companion within the project which continuously reflects the mindset. As it can only be enriched by the use of further techniques, it has to be proven if the visibility of the solution concepts during the project will be supported by the canvas.

The canvas addresses software solutions in the B2B area that focus on assistance in work situations. It has not been developed to address software solutions in the B2C area, e.g. e-commerce web applications. It would be interesting to evaluate if the canvas can be used for such solutions, too.

Acknowledgement. This work was partially funded by the European Fund for Regional Development (EFRE) within the projects "Arbeit 4.0 - Lösungen für die Arbeitswelt der Zukunft" (en. "Work 4.0 - Solutions for the future workplace") (funding code: *34.EFRE-0300029*) and "Business 4.0 - Neue Geschäftsmodelle und Wertschöpfungsketten mit IKT" (en. "Business 4.0 - New business models and value chains with ICT.") (funding code: *34.EFRE-0300028*).

References

1. German Federal Ministry of Labour and Social Affairs (BMAS): Re-Imagining Work - Green Paper Work 4.0 (2015). http://www.bmas.de/SharedDocs/Downloads/DE/PDF-Publikationen/arbeiten-4-0-green-paper.pdf. Accessed February 2018
2. German Federal Ministry for Economic Affairs and Energy (BMWi): Monitoring Report Digital Economy (2014). www.bmwi.de/EN/Service/publications,did=686950.html. Accessed February 2018
3. Fischer, H., Engler, M., Sauer, S.: A human-centered perspective on software quality: acceptance criteria for work 4.0. In: Marcus, A., Wang, W. (eds.) DUXU 2017. LNCS, vol. 10288, pp. 570–583. Springer, Cham (2017). https://doi.org/10.1007/978-3-319-58634-2_42

4. Morgan, J.: The Future of Work - Attract New Talent, Build Better Leaders, and Create a Competitive Organization. Wiley, Hoboken (2014)
5. Johnson, J.: CHAOS 2014. The Standish Group, New York (2014)
6. Sage Software GmbH: Independent Study on IT investments (2014). http://goo.gl/qy0eM0. Accessed February 2018
7. Osterwalder, A., Pigneur, Y.: Business Model Generation-A Handbook for Visionaries, Game Changers, and Challengers. Wiley, Hoboken (2010)
8. Stampfl, G.: The Process of Business Model Innovation - An Empirical Exploration. Springer, Wiesbaden (2016). https://doi.org/10.1007/978-3-658-11266-0
9. Patton, J.: Opportunity canvas (2016). http://jpattonassociates.com/opportunity-canvas/ Accessed February 2018
10. Gothelf, J.: The Lean UX canvas (2016). http://www.jeffgothelf.com/blog/leanuxcanvas/. Accessed February 2018
11. ISO 9241–210: Ergonomics of human-system interaction - Part 210: Human-centred design for interactive systems (2010)
12. Cooper, A.: The Inmates are Running the Asylum. Macmillan Publishing Co., Inc., Indianapolis (1998)
13. Holtzblatt, K., Beyer, H.: Contextual Design - Design for Life, 2nd edn. Morgan Kaufmann, Cambridge (2017)
14. Fischer, H., Rose, M., Yigitbas, E.: Towards a task driven approach enabling continuous user requirements engineering. In: Joint Proceedings of the REFSQ 2016 Co-Located Events, 2nd Workshop on Continuous Requirements Engineering (CRE), vol. 1564. CEUR-WS (2016)
15. Kotler, P., Berger, R., Rickhoff, N.: The Quintessence of Strategic Management. Springer, Berlin (2010). https://doi.org/10.1007/978-3-642-14544-5
16. Kaplan, R.S., Norton, D.P.: The Balanced Scorecard - Measures That Drive Performance, pp. 71–79. Harvard Business Review, Boston (1992). issue January–February
17. Object Management Group (OMG): Unified Modeling Language (UML). http://www.omg.org/spec/UML/. Accessed February 2018
18. Object Management Group (OMG): Interaction Flow Modeling Language (IFML). https://www.omg.org/spec/IFML/. Accessed February 2018