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Co-designing Tools for Assessing Sustainability in SMEs and Public Organizations – Negotiating a Social Setting for a Co-design Study

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Abstract

The research method of focus in this case is based on design science. The case describes how a research process that aims to design a novel digital tool suitable for both small and medium sized enterprises (SMEs) and public organizations progresses as a co-design research process where researchers, business support experts, public organization experts, and entrepreneurs or employees in SMEs each have active roles. In the first phase of the process, data collection is conducted through rapid ethnography, then completed in later phases with other forms of data collection while the co-production of knowledge is facilitated as a part of the research process. Finally, the design science-based research project develops a practical framework and a tool for micro enterprises and SMEs and evaluates the first version of the tool. Along the process, researchers utilize theory to support the process and build contextual knowledge, which results in theoretical contribution related to the key abstract terms. This case study focuses on how data collection was designed, how participatory elements were included in the creation process, and what kind of choices were enabled to enhance participation. Readers will learn how the social setting for data collection and opportunities for participation in the creation process can be implemented.

Learning outcomes:

- Understand how to initiate research with practitioners and SMEs in an international project setting.
- Describe a pragmatic “world-to-theory” orientation and the position of practice and theory within.
- Understand an interactive process for negotiating roles for participants to support rigorous research design.
- Describe participants’ different motivations for participating and build a research design that brings value to both practitioner and academic participants in international projects.
- Develop practical project aims to account for both the academic and practitioner lenses.

Project Overview and Context

Distance LAB is a project funded by the Interreg Baltic Sea Region -program. It is one of the European Territorial Co-operation programs that aims to advance regional development and cooperation between regions. The project is part of the program “Innovative Societies”, and addresses program priority “Resilient Economies and Communities”. The Distance LAB project is conducted by nine project partner institutions from six countries in Northern and Eastern Europe. The project co-develops tools for SMEs and public organizations to improve their capabilities in remote contexts. The tools are related to remote innovation and communication capabilities, sustainability, and business strategies. The present case described initiating a participatory research process necessary for developing one of these tools - a design for sustainability tool for SMEs and public organizations.

The initial idea of the *design for sustainability* tool was conceived at the start of the project. The program does not fund the research but instead the practice-oriented development activities. Therefore, the tool could be developed without any academic aims, and the research is seen as a supportive activity for practical development here. The tool aims to support micro enterprises and SMEs in designing sustainability practices and elements to their business models, products, and services. Sustainability related challenges are often associated with resource-intensive industries and resource-intensive companies, yet sustainability aspects are increasingly an imperative for both resource-intensive enterprises and businesses in general today. The sustainability of businesses covers environmental, social, and economic aspects (Elkington and Rowlands 1999). Moreover, knowledge-intensive SMEs have an essential role in contributing to United Nations Sustainability Development Goals (SDGs).

More particularly, the dynamics of their business models, including products and services can contribute to sustainability on many levels (Laukkanen 2019). However, in their daily operations, SMEs often lack resources in managing and developing these aspects strategically (Torkkeli et al. 2017). Sometimes, company leaders may experience sustainability primarily as a requirement for reporting from customers, stakeholders, or legal standards or policies, and strategic orientation for sustainability may remain undeveloped. Often, the reports detect former times while contemporary and future orientations may not be represented.

Sustainability challenges also hold business opportunities (Adams et al. 2016) as in the long term also markets will prefer environmentally, socially, and economically sustainable products and services over less sustainable (Porter 2011; Elkington and Rowlands 1999). Those enterprises that have the capabilities to demonstrate their engagement in sustainability initiatives – or preferably to cultivate sustainability throughout the company’s business model consistently, will be market winners in the long run. The need for sustainable business models comes from planetary conditions and in the end, also from socially determined business requirements. In summary, SMEs often struggle to fulfill the increasing amount of their ethical and legal responsibilities and there is a need for support enterprises taking the leadership about the topic in a proactive manner.

Design science-based method was deemed to support the practical development of the tool while also connecting the empirical development and evaluation process to academic concepts and theory development.

Section summary:

- *The research project is integrated to a project that is funded by a European territorial co-operation program (Interreg Baltic Sea Region)*
- *The project theme responded to the challenges SMEs face in sustainability initiatives due to the inherent lack of resources stemming from their relatively small size compared to large multinational companies and other larger organizations.*
- *The research supports the development of a sustainability tool for knowledge-intensive micro enterprises and SMEs.*

Research Design

The research design in this study builds on the knowledge needed for developing Design for Sustainability (DFS) - services for design, analysis, and prototyping that aim for improving the competitiveness of micro enterprises and SMEs in a networked context. Actionable knowledge (i.e., identifying knowledge that identifies meaningful needs and goals of the target group related to sustainability in business models and products and services) was sought. The primary beneficiaries in the study were knowledge-intensive micro enterprises and SMEs. William Starbuck (1992) defines knowledge-intensive firms as firms that have greater importance on intellectual resources to create value more than other resources.

Theoretical knowledge has a role from the beginning as it provides a knowledge structure for key concepts. As sustainability can also refer to a number of practices and initiatives, it was important to clarify its meaning. The concept of sustainability in this study built on the idea of a widely referred view of sustainable development as “development which meets the needs of current generations without compromising the ability of future generations to meet their own needs” (the World Commission on Environment and Development, WECD 1987). This definition of sustainability emphasizes planetary boundaries but also embodies the value of humanity and “our future” as citizens of the planet. The term sustainability is often viewed through the lens of the triple bottom line which refers to social, environmental, and economic dimensions in business (Edeigba and Arasanmi 2022). Cumulatively and from the macro perspective, SMEs have a central potential role in sustainable development as SMEs form the majority of enterprises in many countries (Jansson et al. 2017; Kuivalainen et al. 2015). Lately, also academic interest has grown in the sustainability of SMEs (Jansson et al. 2017; Uzhegova and Torkkeli 2023). The role of owners and leaders in SMEs is relevant in making strategic choices related to sustainability (Jansson et al. 2017). Silvia Cantele and Alessandro Zardini (2020) note that SME leaders process sustainability-related decisions facing internal and external pressures but also obstacles. Cantele and Zardini (2020) recommend SME leaders could increase sustainability by focusing on the benefits. Indeed, many scholars focus on innovations and market opportunities for SMEs related to sustainability (Oxborrow and Bradley 2013)

Further, an essential concept related to sustainability in a business context is corporate social responsibility (CSR). CSR can be defined as firms taking responsibility beyond their economic responsibilities and legal minimums voluntarily “so that they are ethical in all of their activities and that they take into account the impact of their actions on stakeholders in society, while simultaneously contributing to global sustainability” (Sarkar and Searcy 2016). CSR refers to economic, social, environmental, and ethical dimensions. CSR can refer also to philanthropy but as our focus is on sustainability that is integrated with business, we exclude philanthropic activities.

Another relevant term to understand in our study is the business model. According to David J. Teece (2018, 40) a business model narrates “an architecture for how a firm creates and delivers value to customers and the mechanisms employed to capture a share of that value”. A business model that contributes to sustainability has been suggested to have economic, environmental, social, and holistic characteristics in its structure and culture that support inter-organizational, socioeconomic, and environmental sustainability (Stubbs and Cocklin 2008).

As an inductive study, the study builds on a practical and bottom-up approach. The theoretical constructs are helpful instruments that have guided open-ended questions. We use concepts and frameworks that are seen as useful and develop a shared knowledge map collaboratively. The study builds on the traditions of design research methodology which typically studies the problem and the context in a structured way and suggests a solution prototype, tests, and evaluates it in the context (Missimer et al. 2017).

An understanding of existing tools and key concepts guides the next steps. Also, the concepts, the existing tools, and some initial discussions with the field informed the research group. Preliminary research questions were set in this phase and were as follows:

1. *How do knowledge-intensive micro-entrepreneurs and SMEs make sense of assessing the sustainability of a business model, including products and services?*
2. *What kind of framework and assessment tool could support knowledge-intensive companies in designing business models, including products and services that are sustainable or contribute to sustainability?*
3. *What kind of sustainability assessment and development tool would be useful for knowledge-intensive micro-enterprises and SMEs?*

The research setting builds on the design science approach as it supports the pragmatic aims of this study. Dimo Dimov et al. (2022) describes design science as a cycle of creating and evaluating. Design science is based on understanding the problem in its natural setting and designing a solution for the problem, an artifact. The research entails both the social participation process and the sociotechnical outcomes (Hevner et al. 2004; Papas et al. 2012). Our research followed four phases in line with the description of Dimov et al. (2022): a design process that entails phases for creating and evaluating an artifact, and a more general assessing phase that will entail theorizing and justifying.

The creating phase focused on understanding the problem in the field and framing the problem with participants. Framing the practical problem in the field related to managing sustainability in SMEs is conducted as a collaborative process. Participants of this task collect data via rapid ethnography (Smith et al. 2022). As Donna Baines and Ian Cunningham (2013) describe, rapid ethnography is a multi-method ethnography that can build research by collecting data from different sources in a relatively short period of time. The data collection can contain observations of participants, interviews, documents, and sometimes also surveys. Rapid ethnography suits the multifaceted knowledge purposes in this study, it enables focus on the sensemaking of individuals, groups, and organizations as well as the sensemaking of sustainability of a business model and any contextual elements. It allows the collection of any relevant data on multiple physical or virtual sites and events. The ethnographic data collection will be used also when creating an evaluation framework and evaluating the artifact.

The theorizing and justification phase follows when the artifact has been developed. This is when inductive reasoning is used for creating a theoretical contribution and generalizability and boundary conditions will be discussed (see Dimov et al. 2022). The study produces interpretative theoretical perspectives by conceptualizing the phenomena related to leading and assessing sustainability in SMEs in the light of a given analytical design process (Charmaz 2014).

Section summary:

- *The design science-based approach prioritizes pragmatic aims.*
- *The design science-based approach collaborative frames a problem and creates a solution to a problem, evaluates it, and produces theoretical contributions related to it.*
- *Ethnographic research allows researchers to collect data from multiple sources in multiple locations.*

Research Practicalities

Design science research calls for collaborative development, and therefore the researchers need to negotiate a plan for how collaboration is organized and led. As our international project is practice-oriented, the first task to was to communicate a research opportunity to partners in the project. It was important that international project partners should understand the that the development work could also benefit from systematic research. The project is led by a coordinator and has many subtasks, and a sustainability tool was led by our own organization's team. Data management practices and data protection rules were also discussed in the beginning and a shared data protection notice was agreed upon. The ethical considerations were also

important, especially referring to the ways in which a fair overall process for all beneficiary groups and participants could be facilitated and ensured.

It was also important to discuss how project partners want to participate. It is an advantage if a researcher can communicate and negotiate as early as possible about objectives, expectations, and roles of participants who are not researchers but have an active role in the research process. It is important to balance communicating clearly for inviting the process and inviting those who want to create objectives together to influence. Experts who may have not utilized research methods, systematic data collection methods, or analysis methods, in their work, may not want to participate. The research activities may be uncomfortable for people who are unfamiliar with research, as they may prioritize other things than the shared learning process. Researchers can encourage participation by communicating the benefits and making the process and roles clear and transparent so that participants feel safe and motivated to participate. Researchers can also try to support the process by planning it well and by providing mentorship for those who want to participate.

As a project plan frames the timeline for the development of the first version of the tool within a year, this also gave a time limit for the first data collection, as the first datasets should be collected rapidly. The aim of the data collection was to gain understanding of how the target group manages sustainability issues, what kind of challenges they experience and what kind of tools they would need to assess and develop sustainability dimensions. Our team was familiar with interviews and surveys as data collection methods and suggested to the international team that each would use a similar theme interview approach. This would make data collection structured and consistent. The first idea was to collect interviews in the same format in English from each partner country, regardless of the native language in that country. This would have been an easier choice for researchers. Interviews would be recorded and transcribed, and datasets would be then shared in a digital working space to which only project partners have access. However, partners from business support organizations felt that interviews should be done using the interviewees' own language. Using interviewees language had benefits, it can cause richer responses and interviewees may share more detailed information. However, the international team felt that translations and transcriptions would be too time-consuming. Thus, we were facing a challenging situation for research because a rigorous data collection process has an essential role in ensuring validity and reliability of the resulting findings.

Systematic data collection was critical for our research approach. A well-structured data collection has an essential role in making research (Foxwell 2020) However, our ultimate aim was to create useful knowledge in a collaborative process. In our ethical thinking, we use the framework of trustworthiness by Lincoln and Guba (1985, 2013). We value fairness, ontological authenticity, educative authenticity and catalytic authenticity. Fairness in our research process means participants are respected and heard, and the process evolves through shared learning. Ontological authenticity refers to being true to lived experiences by participants and confirming interpretations. Educative authenticity in our process means we share learning and create applications that can be used by wide group of entrepreneurs. Catalytic authenticity in our process means we aim to understand the challenges and phenomena widely and stimulate discussions and initiate positive changes in the field, by co-developing a solution and possibly supporting other initiatives and shared learning experiences.

To solve the data collection challenge where we had a need for first-hand knowledge from micro-enterprises and SMEs, but the partners were not eager to record the interviews, we decided to conduct more informal interviews and committed to taking notes about what was discussed. Rapid ethnography allows researchers to collect observations and narrative data on sites (Davies et al. 2022). This can produce a situated, contextualized understanding of how companies make sense of sustainability in their everyday work practices as well as more public strategy or communication statements. As looking for solutions to this problem, rapid ethnography thus was deemed to serve our project. The rapid ethnography enabled us to interact with target groups, learn from them and create an atmosphere for co-constructing knowledge.

Some of our partners were participating in rapid ethnography were business support experts who meet enterprises anyway. Our target groups also rely on business support experts, and we acknowledged our

research would produce subjective knowledge that would be produced in intersubjective situations. We defined the objectives for what kind of data and observations were needed. We wanted to learn about who sustainability is made sense of in micro, small and medium sized enterprises (MSMEs) in practice, how are the phenomena related to sustainability spoken and managed, and what kind of tools, measures, or frameworks are used. We also wanted to know how they see what they need in this area, because our ultimate aim was to create actionable knowledge for developing a useful tool for assessing sustainability for MSMEs. In the research participant group, we had monthly online meetings to discuss what we had learnt. We also shared some documents and notes in a shared digital working space. As ethnographic research aims to understand and capture the multiple layers of phenomena in their context, it seemed an ideal data collection method. Each partner took notes and wrote their observations. Also, many companies described that they have websites where they describe their sustainability work, and those websites then also were included as part of the datasets to be analyzed.

The rapid ethnography data collection had also ethical considerations. We had to think of the legal basis for collecting and processing data. We collected data based on consent which means informants had the right to know about the purposes and choose whether they want to participate. The ethical considerations were discussed with the project consortium and our own organization. Our own organization and the coordinator organization created data protection plans. It was also lined that no personal data would not be exchanged between organizations. That would have required more legal contracts. All data processed together would be anonymized. Caeymaex et al. (2023) view that ethical considerations are important throughout the research process and ethical challenges should be considered from the beginning to the dissemination of results.

Participation of any micro-entrepreneur or SME entrepreneur in any interviews or events was voluntary. They were informed about the project and its data collection policies that had been agreed upon at the project level. Also, a data protection notice was available for them to see. The entrepreneurs could decline to participate in any phase of the process. An important advantage of rapid ethnography is that it is a more natural setting to invite participants and engage them to participate in the later phases, such as workshops and testing a tool. Planning an active role for micro-entrepreneurs and SME entrepreneurs was an important goal. The participatory research literature provides guidance for engaging participants and the level of involvement in the process (Schubotz 2020). It must be noted that our research was not purely user-led but the scope was also determined by the project plan and the funding program. Mangrum (2016) notes that participatory research has also risks of going in directions that funders do not want to

Our participatory approach borrows elements from user-led participatory research, and thus a collaborative development is an important value for us. We believe that the tool will be more relevant and valuable for users if they have a chance to be involved in the process. We invite participants of the target group in the program regions to discussions, surveys, interviews, voting for priorities, testing, and giving feedback and using the services in multiple ways. The participants can participate in just one event or throughout the three-year project. The representatives of target groups are also invited to a steering group that meets bi-annually, with the aim that entrepreneurs can gain value from participating in the research process. The interactions could provide opportunities for reflecting the phenomena from their perspective, but also for co-constructing new ideas.

A rapid ethnography is not an easy method that anyone could be ready to use without training. It requires looking at phenomena in the field with an open mind, thinking holistically but also being attentive to details (Janesick 2016). The problem is that people tend to take a lot of information for granted and give not effort to reflexivity. This is a challenge in participatory research that invites data processors and informants to be research instruments and co-researchers. Leaders of a research process can facilitate this process by encouraging deeper reflection.

In addition, business support experts from business support organizations were interviewed along the process, and one of the questions was how they view motivating participation for the project could be provided for entrepreneurs. Most business support experts viewed that the concept and value propositions for

business participants should be well-developed before inviting entrepreneurs to participate in the project. The project also has the aim to engage entrepreneurs in a very early phase and hear them before creating the first concept. Therefore, some entrepreneurs were contacted via phone to inquire upon the topical issues and experiences they had about the topic and the project. While they were the most influential in the first conceptualization, their perspectives on the matter varied, and the diversity of viewpoints did not adequately inform the team on how to prioritize the ideas. Since the tool developed in this study was developed collaboratively, a new, local round for rapid ethnography was conducted to organize data and to prioritize. The questions entailed choices about the preferred use of the tool in terms of participation, alternatives of aims, and in the method of the tool.

Thinking of the motivations of entrepreneur participants to participate was a collective effort of local business experts and researchers. One business support expert suggested that businesses that undertake the sustainability assessment developed by us should gain a diploma. Whereas some business experts felt that this tool should be addressed to those who need it most and no not mention sustainability in their strategy, the enterprises who got interested in the tool were enterprises who had a mature sustainability strategy already. However, design principles can inform the process in dilemmas such as this. Identifying these conflicting requirements is an important part of the process. As the research- and development process is iterative and emphasizes feedback, it may lead to developing different modules for different needs.

Section summary:

- *The data were collected through a rapid ethnography and the use of surveys.*
- *A diversity of viewpoints can make it challenging to develop a single research tool for use across industries. A diversity of viewpoint of informants can be challenge that can be solved by grouping knowledge and giving opportunities to vote.*
- *In an inter-organizational data collection setting clear rules are needed how to obtain, control and process data In an international data collection setting, as there can be challenges related to language*

Method in Action

Major challenges in a collaborative research process such as ours relate to time management and communication. A timetabled and structured plan was shared with the group and each partner had a chance to influence the plan. The plan formally was for a one year process, yet in practice, the group had only six months to collect data and develop the first version of the tool. The responsibilities were quite clear, in that our organization was responsible for developing the tool and for leading the process.

Our team faced several challenges along the world-to-theory research journey in creating engagement, in the data collection and analysis and creation phases. First, developing an initial shared practical and theoretical knowledge base was the first task in the process. We shared a brief literature review with the group, and the key concepts were shared in a digital platform in a form where they were easy to read and comment. The key concepts had been addressed in the project plan, but they still needed to be defined to connect participants to share their views on the topic. A discussion about the concepts is an integral part of connecting the research process to theory, and theoretical concepts help to frame and delimit the phenomena that could be included in the concepts of sustainability and business models.

In addition to explicit knowledge, also tacit knowledge, that is the expertise knowledge that the participants and beneficiary groups hold, was needed. However, in the beginning, we did not understand each other's competencies and did not know each other well. Ideally, we could utilize diverse expertise in early phases of the project in planning roles, but we had to collect expertise areas by survey and invite interviews with our own international team members as well.

In the previous section, we discussed the challenges in agreeing practically about data collection methods but here we also describe the challenges in conducting rapid ethnography. Partners may have very different

orientations for conducting rapid ethnography and how much they can take notes and pass on and share information. In hindsight, the data collection would have required additional boundaries beyond wide questions such as, “*what kind of challenges micro entrepreneurs and SME entrepreneurs have related to sustainability and what kind of tools they use, and what kind of tools they would like to use*”. We would have gained more out of first phase of rapid ethnography if all data collectors were more prepared to observe in the field with an open perspective, instead of starting with a preconceived idea. Listening open-mindedly and sharing notes and observations precisely is a skill that is useful in this phase. Being sensitive to all the details regarding the questions on focus needs more guidance so that information is collected and shared and does not emerge by itself.

Rapid ethnography can in principle contain a large variety of data collections, and after notes and observations, we also conducted new data collection rounds as planned. The new rounds were planned iteratively based on briefly analyzing the previous findings, and we included in them new target groups to get be able to get enough information to develop an understanding of the field. Our primary beneficiary groups are micro-enterprises and SMEs but in the following rounds, we also included business support organizations and regional organizations that aim to support business in their regions.

Ideally, the participants can become knowledge co-producers (Clark et al. 2022). The level of participation of project partners and beneficiary groups is an important quality factor in a research process. Designing decision-making rights for non-research participants requires they are enough engaged and have enough information to be able to make decisions. This is of vital importance in a participatory study. Being transparent about the research process, maintaining open communication and building feedback mechanisms in the process were important. For research ethics, the once obtained informed consent had to be continuously ensured, and research participants always have an opportunity to exit the research process. In our study, the decision-making rights were part of the second data rounds and workshops where experiment companies give feedback on the elements that should be changed or further developed in the first version of the artifact. In addition, a joint digital platform invites participants to make choices and vote on elements they find important in the tool in terms of contents and methods, and other properties. The key questions and choices were described in a digital platform called Howspace, and entrepreneurs were invited to comment and to vote for suitable options. The tool will also be developed into a digital form and digital developers participate in the research process with their views, inputs, and feedback in designing the artifact in a digital form.

The wider data collection was a phase before designing a first solution. Along and after the wider data collection, a smaller group of SMEs were invited to the experiment group where they engage to participate to test the first version of the framework and the tool. In order to invite SMEs to participate, we developed an informative brochure and shared it in our international network. We proposed to them the value they gain from participation and how much time they should invest. The experiment SMEs come from three predetermined partner countries. A design phase is based on the problems, needs, and wishes identified in the field. The representatives of beneficiary groups, in this research are called “experimental companies”, and they are invited to test the first version of a solution in local face-to-face workshops led by local teams and refined in line with the feedback. The participation of “experimental companies” takes a minimum of one interview and two workshops but if they want to invest more time, they can. For most firm participants, the motivation to participate is gaining novel insights and learning from the process for own work, and for some, it is to influence the tool as they are pioneers in the field.

The research process progresses in a cyclical process where justifications and analyzing happen with participants collaboratively as creating a tool proceeds and researchers ensure the link to theorizing (Berglund et al. 2018; Dimov et al. 2022). This is also a challenge as design science-based research produced holistic and interpretative information, and it is a challenge specifically because two different worlds meet: Collaboratively developing a practical application requires different skills than theorizing. Bridging different expectations of the academic world and action-oriented research requires creativity and dedication (Kendon et al. 2007). In our case, we create one study describing a development process and a tool holistically, and

another related, narrower, and nuanced perspectives are studied with other analysis methods in other articles. It is also relevant to identify journals that could potentially publish design science studies. Some of the articles focus on more detailed perspectives and utilize some parts of data collections only.

Section summary:

- *A design science based research aims to create practical solutions.*
- *A design science based research is a multifold social and technical development process.*
- *A research process progresses in a cyclical process of creating, giving feedback, modifying, analyzing and testing. This cycle is recursive.*

Practical Lessons Learned

Choosing a design science-based research strategy for our study was a practical decision because our team is developing a framework, a practical tool, and services. The design science approach fits well with the need for applicable data, working and documenting the work and perspectives in the field and facilitating iterative development cycles. As a research strategy, it supports the idea of participants collaboratively forming the problem and contributing to imagining, creating, and evaluating the solution.

Planning an active role for individuals and groups participating is an essential part of a participatory research process. When participation is a long-term and evolving process, this requires sensitivity, responsiveness, and capacity to learn throughout the process (Caeymaex et al. 2023) There are many ways to invite and engage non-research organizations to research processes and aimed outcomes. Participatory research is an umbrella term for many research approaches (Kindon 2007 ; Greenhalgh et al. 2019; Slattery et al. 2020; Schubotz 2020). The potential participants always evaluate the benefits and risks of participation. Researchers facilitate a communicative process of creating roles, a structure, and the rules for participation. The most ideal situation is when participants and beneficiaries are interested in the topic and want to co-develop and influence. However, this may be rare if they do not have prior positive experiences with such university-industry collaboration projects. Some participants may genuinely be interested in a community and learning while other participants may value more tangible results, such as media visibility or an opportunity to get an evaluation for a company and a certificate for participating a process or an opportunity to utilize the materials commercially.

The research process is based on voluntary participation; therefore, each participant should experience they can benefit from the process or outcomes. They were clearly told about the purpose of the research and about a voluntary opportunity without any pressure. They were aware of their right to withdraw from the research process at any time. However, the value for different participants depends on their roles and how they want to participate. Whereas some participants took part in just one interview, others wanted to engage in a long-term collaboration in developing and testing a tool. In our research process, entrepreneurs had a chance to host project partners visiting them, and they could join discussions and events. If they are not motivated or have something more important, they simply could decline visitations and events.

Another important learned lesson is that creating a framework and a tool is a creative process, and as such requires clear structures and roles. One of the dilemmas is how to enable communication of diverse participants and manage the complexity of the topic. In our case, the first phase of data collection was not collaborative, and it was used to organize processing data for the next phases. Therefore, researchers coordinating the process also need skills for showing how and when participants can influence individually or as a group and why their contribution is meaningful. A researcher or researchers coordinating the process need to anticipate the process and developed a clear plan for participants in advance.

Researchers should also pay attention to creating forums and an atmosphere where participants can truly make enable co-creation, make different contributions visible, and allow opportunities for dialogic development (Bergold and Thomas 2012). Ideally, the group participating shares an in-depth understanding as an individual, but they also can learn from each other and comment on each other's views. The co-production of knowledge is also a situated, contextualized phenomenon, and therefore all communication channels and social phenomena are an important part of the research process. For this, we advise researchers to plan well phases where individual contribution is needed to avoid groupthink when participants of the group are unwilling to express any divergent opinions (cf. Russel et al. 2015). This can be done for example collecting first individual outputs and then organizing knowledge collectively later. In addition, anonymizing joint sense-making and prioritizing concepts may be beneficial in some cases.

Facilitators should consider the extent to which joint sensemaking should be democratic and how best to facilitate it. In our case, both individual entrepreneurs as well as business support organizations had a wide variety of perspectives, and thus the first phase of rapid ethnography also produced a wide number of different perspectives. To create data in an applicable form, there was a need to have participatory, participatory decision-making elements in the next phase. In the next phase, the relevant questions and choices were investigated through individual surveys. However, the participants could have more opportunities to justify their views, and conversations could be productive in creating shared understanding. It is always a choice how rapidly choices must be made and what level of knowledge and level of participation is required for developing useful artifacts.

It may be helpful to think of a set of criteria to evaluate the quality of research. As a design science research project is a qualitative research strategy. The methodology should aim for credibility, applicability, consistency, and confirmability (Lincoln and Guba 1985, 2013). Credibility refers to internal validity and entails that the findings reflect the participants' perspectives. Applicability criterion describes that the findings should also be applicable in other contexts. (Lincoln and Guba 1985) The cyclical development process ensures this by testing ideas and the applications with other participants. Consistency is ensured by systematic and transparent research process. Confirmability is managed by exercising reflexivity in a research process.

The ethical considerations of facilitating active and meaningful participant roles are at the heart of the participatory research process. Building relationships is time-consuming, but the connections determine the participatory aspect of research. A group of beneficiaries and participants can set the criteria with researchers for the evaluation of a framework, tool, and the research process.

Section summary

- *What kind of ethical considerations participatory research has?*
- *There are many ways to invite and engage non-research organizations to research processes and aimed outcomes.*
- *It is important to negotiate and inform about the roles and benefits of participants.*

Conclusion

A design science-based research approach provides opportunities for building shared understanding, co-creating, and testing a shared design for an artifact. It aims to identify and address authentic field problems (van Aken et al. 2016). Dimov et al. (2022) notes that "design science is not a specific method but a generic world-to-theory methodology that conveys a distinct stance toward entrepreneurial artifacts, as they could be

or as we intend them to be.” The world-to-theory approach describes a research method that aims to link practice via design principles to scholarly knowledge (Dimov. et al. 2022).

An important part of the research process is to facilitate a social, iterative development process and provide systematic opportunities for participation. This study first collected data with rapid ethnography but then developed methods for increasing the level of participation. We encourage planning opportunities for interaction and social flows to enable co-production and reflexivity to support the idea of co-production.

Research methodology and collecting data should also meet scientific standards. The process should be well documented. The collected data can be many things depending on the need, but researchers create a systematic design for collecting data in collaboration with practitioners. The research process progresses in a cyclical process where justifications and analyzing happen with participants collaboratively as creating a tool proceeds and researchers ensure the link to theorizing (Berglund et al. 2018; Dimov et al. 2022). As a methodology, design science has a lot of potential for creativity also in terms of utilizing theory and contributing to theory.

Section summary:

- *Design science-based research process is a cyclical process of collecting data, creating, and evaluating.*
- *Design science-based research approaches are particularly useful when aiming to identify and address authentic field problems.*
- *A researcher can utilize academic knowledge in all phases of the process: in creating clarity with constructs and reframing them in line with sensemaking of the process.*

Discussion Questions

1. How could you apply a design science-based approach in the context of your own research?
2. How could you include participatory activities in different phases of a research process?
3. What cultural factors are important to keep in mind when developing a practical tool for SMEs in your home country?
4. How can you bridge theory and practice in your research design and why is this important?
5. What are the most effective ways to foreground expert opinions while also giving space to democratic decision-making design science-based research?

Multiple Choice Questions

1. What are the aims of a design science research project?
 - a. It aims to solve practical problems iteratively in a design-centric way integrating the use of theories and evaluating artifacts.
 - b. The main focus is on the engineering of the product.
 - c. The focus is creating a solution that is suitable for broadly everyone.
2. What is the position of the researcher in design science research?

- a. Researcher does not participate in design and creation.
 - b. Researcher takes a role of an observer in design process.
 - c. Researcher has a subjective, active role in the research process.
3. What kind of data collection methods can be utilized when conducting rapid ethnography?
 - a. Rapid ethnography can contain multiple data collection methods.
 - b. It is exhaustive data collection.
 - c. It is a representative sampling.
4. What kind of role does theoretical knowledge have in research science research?
 - a. A researcher links theory to the research process from start to end.
 - b. Theorizing is only descriptive.
 - c. Developing theory is an independent task from practice.
5. How does design science research relate to the future?
 - a. Design science research co-designs a solution for the future.
 - b. The process does not look ahead.
 - c. Design science research focuses on past events without imagining the future.

Further reading

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