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***Dr. Sylke Lützenkirchen studied communication design and completed her doctorate in design sciences under Prof. Dr. Brigitte Wolf.***

***As a design researcher, she is currently investigating companies in the phase of digital and sustainable transformationat the FernUniversity in Hagen. She sees creativity as a starting point on the way to a data-driven organization and says: "AI has come to stay – with creative power, we can design it in a useful way". In her research the focus lies on the needs of companies and employees when introducing new technologies and AI. What support and potential do creative processes offer? The results lead to qualification concepts, guidelines and new forms of participation.***

***As a communication designer, she founded the Office for communication design and supports medium-sized companies and organizations in communication. An important focus of the office is on management consultancy and co-creative concept development with clients. The consulting and development are human centered and thus tailored to the target group needs of her respective clients.***

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ISSN :2582-8304

# Design for all: Sustainability solutions through digitalization and AI – The "Twin Transition Innovation Lab". Creativity as a catalyst for involving employees in the development of digital sustainability solutions in SMEs.

*Dr. Sylke Lützenkirchen*

## Abstract:

**Today's companies are facing serious challenges. Their business models are put to the test. Competition is high and companies are being forced to transform their processes, particularly due to digitalization. The volatile sustainability regulations are also proving to be unmanageable for many companies. Here the combination of sustainability and digitalization can lead to meaningful concepts and a structured start to the necessary transformation processes as part of a twin transition. This article explores how a specific transformation with a lot of benefits for the company and employees can begin and how to identify suitable fields of application for each organization. With the "Twin Transition Innovation Lab" this article highlights a model as an efficient way to identify specific sustainability potential for each company, develop co-creative digital solutions and implement company-specific applications. The approach emphasizes the involvement of employees from all areas of responsibility and expertise throughout the entire process of digital and sustainable transformation, ensuring that the outcomes are tailored to their specific needs and preferences. Results indicate that it is an efficient**

**start to develop tailor-made and precise fitting ideas and implement handleable and practicable digital sustainability solutions.**

**The "Twin Transition Innovation Lab" model offers companies a useful and profitable introduction to the dual transformation process by customizing their approach to digitalization and sustainability. In summary, the article shows how digital sustainability solutions can be jointly developed and implemented in companies in a way that is useful for employees, for the company and highly relevant for society.**

**Keywords:** ***digitalization; AI; sustainability; twin transition; co-creativity; Applied Design Research; SMEs; transformation***

## Introduction

**Companies are currently facing a wide range of challenges. They are under increased competitive pressure and are being forced to transform their business processes, particularly as a result of digitalization. Entire business models are being put to the test. The volatile legal regulations in the area of sustainability at a global and regional level are also proving to be an unpleasant, almost unmanageable task for many companies and are currently becoming an additional burden (Jacob, 2019).**

**Therefore, this paper aims to fill this gap so that companies, especially SMEs, are able to master this task and make a confident start to the necessary digital and sustainable transformation ahead of them. This paper will first introduce the topics of sustainability, digitalization and twin transition. In the following a "Twin Transition Innovation Lab" as applied design research model will be presented. Here, all process**

**steps of the model will be explained in detail. Using this model, companies can develop their firm-specific, co-creative approach interdisciplinary together with their employees, which will be discussed at the end. In the following remaining introduction, this paper will continue with a deep dive into sustainability, digitalization and twin transition.**

**The extraction of raw materials causes high costs worldwide - for the environment, for people and for the economy (Unnerstall, 2021). An economy that requires more and more new (primary) raw materials is therefore not economically, ecologically or socially sustainable in the long term. The aim of a circular economy, for example, is to preserve the value of raw materials and products for as long as possible, to use materials sparingly and to keep them in. This ultimately strengthens the resilience and innovative power of companies and society (Banthien & Rompf, 2024). In general, the circular economy makes an important contribution to securing the supply of raw materials. It increases the resilience of supply chains and the resilience of the economy through the increased use of secondary raw materials and resource efficiency and reduces the primary demand for raw materials. It can stimulate new technologies and business models and thus increase value creation and productivity throughout the economy. Together with the accelerated use of digital technologies, this is associated with great opportunities. The topics here are: Avoidance, reuse, recycling, product design, primary and secondary raw materials in production, trade and consumption (Kammerer & Kappe, 2024).**

**The same applies to the area of climate neutrality. With the European Green Deal, the EU member states want to become climate-neutral by 2050. Greenhouse gas emissions are to be reduced by at least 55% by 2030 compared to 1990 levels. This requires a reorientation of the economy and society (German Federal Statistical Office, 2025). The reduction of $CO_2$ emissions is essential for companies and society, as it plays a central part in the containment of climate change. As stated by the IPCC (2023), climate change will generate grave ecological and economical damage worldwide. The report emphasizes that drastic emission reductions are necessary to limit global warming to 1.5°C or 2°C. Companies that reduce emissions at an early stage therefore strengthen their competitiveness, as according to a study by the OECD (2022), climate-friendly business models are increasingly winning over investors and customers. Therefore, climate risks and emission reductions are explicitly assessed as key elements for the future viability of companies. These are both physical risks due to extreme weather events, production downtime and higher operating costs, as well as transition risks due to changes in regulations and market requirements (TCFD, 2021; IPCC, 2023) such as political, legal or social changes; as well as reputational risks in the event of inaction (e.g. due to loss of customers or investors) or technology risks (e.g. outdated processes).**

**When companies actively implement sustainability, they must take economic, environmental and social aspects into account. These areas, also known as the three pillars of sustainability, are described as ESG criteria (E = environment, S = social, G = governance). In addition to the topics of circular economy and climate neutrality, the environment also includes areas such as resource efficiency, water**

**consumption, waste management and health protection and supports the area of corporate governance (G) with its activities. This "corporate governance" relates to factors such as the development of a sustainable business model, the promotion of innovation (twin transition), process optimization, cost efficiency, job security and the promotion of economic growth. "If sustainability in all its diversity is to be more than just an alibi or fig leaf, it must be practiced by managers and employees in companies on a daily basis. This requires broad cultural acceptance. It must occupy a prominent position in the value structure of the company and decisively permeate the thinking, behavior and actions of all company members" (Bodenstein, 2024 p. VI).**

**Sustainability issues are aimed at global climate and environmental policy goals and at the same time open up great opportunities for growth, employment and competitiveness (Kammerer & Kappe, 2024). However, this can only succeed if companies can pursue a direct economic benefit (Bodenstein, 2024). In addition to the benefits for the global society, there must also be a positive effect for the environment and companies. Companies benefit from resilience and investments in their own future viability, such as competitive advantages, customer loyalty, financial security and cost savings. Nevertheless, the resulting demands on companies are more extensive and complex than ever before (Ponstein, 2025). Small and medium-sized enterprises (SMEs) in particular are often still at the very beginning. Despite all these justified motivations, it is a major challenge for most companies to find a meaningful entry into the field of sustainability. Only with the innovative strength and creativity of**

**companies can the challenges realistically be overcome (Bodenstein, 2024).**

**Looking at Winkler et al. (2023) digitalization is one of the two mega-trends of the 21st century alongside sustainability. Both have great transformative power and can potentially reinforce each other (Winkler et al., 2023). They will dominate the future of companies and our society in the coming decades (Jacob, 2019). Calculations show that even accelerated digitalization can make a substantial contribution of up to 58% to achieving German climate targets by 2030 (Holst, 2021). Nevertheless, many companies feel disoriented when it comes to expanding digitalization and getting started with artificial intelligence (AI) applications. Moreover, digitalization and AI are not static phenomena but are constantly evolving in directions that no one can reliably predict at the moment and are thus often complicated to plan strategically (Langer & Landers 2021; Sartori & Theodorou 2022). Adding onto that, employees are often not willing to explore ways for digital technologies and accept changes that are connected with digital transformations.**

**Therefore, in the fields of digitalization/AI and sustainability not only the technical perspective is important, but also the socio-technical approach (Ludwig, 2016), the organizational perspective, and the need for a company culture that is open-minded to change and continuous learning (Westerman et al., 2014). As a result, digitalization and AI are not only and primarily viewed from the perspective of technical possibilities, but in contrast, should be developed from the usefulness and applicability for employers and employees. In the following model it will be shown how exactly a socio-technical pers-**

**pective can also involve "non-technicians" in the design of technical applications such as AI, how sustainable knowledge can be enriched and whether this can be achieved using creative methods.**

**Digital technologies can help many SMEs to become more sustainable and reduce their emissions without any economic losses. Furthermore, digitalization and AI can provide companies with more efficient and leaner business processes, cheaper and faster production, and the development of new sales markets or optimized use of resources through the automation of routine activities. Here, the fields of application are just as diverse as the possible uses – whether in production, logistics, marketing and sales or administration. In addition, there is not only untapped potential for increasing efficiency or reducing costs but also for reducing the workload of employees and improving customer service, as well as the aspect of ecological sustainability (Lundborg, 2023).**

**Successful match: Sustainability and Digitalization as Twin Transition**

**In general, green and digital transitions are two main trends that will shape the future for many, taking the example of the European Union (Muench et al., 2022). When sustainability and digitalization are combined, both can lead to a meaningful approach and a structured entry into necessary transformation processes as part of a Twin Transition, i.e. a double transformation. In doing so, the twin transition describes the interaction, mutual reinforcement and parallel implementation of the digital and sustainable transformation according to Fraunhofer (FIT, 2025). It is understood as a change towards a sustainable economy that is supported by modern technologies and digital solutions. Looking at the study of the European Union (Muench et al. 2022), twin transition refers to uniting the two transitions, which could accelerate**

**necessary changes and bring societies closer to the level of transformation needed.**

**Companies can derive the following benefits from investing in a twin transition (Thoma, 2024):**

- **Efficiency, resource and cost savings through process streamlining, energy savings, circular economy and the use of digital technologies.**
- **Improved competitiveness through innovative products and services that meet customers' increased sustainability requirements.**
- **Access to new markets in areas where customers are increasingly prioritizing environmental compatibility and social responsibility.**
- **Reduced risks through improved management, especially of risks associated with environmental impact, social issues and governance (ESG risks).**
- **Positive brand perception. Increased loyalty of environmentally and socially conscious consumers through sustainability and digital innovations.**
-

**For example, challenges arising from a reporting obligation (Corporate Sustainability Reporting Directive - CSRD) for companies or their suppliers – if they are required to provide key figures – can be supported by digital applications. However, suppliers often still do not have the necessary means to measure the most important key figures. They lack a strategy for connecting the numerous data sources centrally, making them accessible at all times and placing them in the right context with data (Thoma, 2024).**

**In addition, companies are generally structured very diversly and also have a very specific core business that sets them apart from their competitors in the market. Therefore, each company has its own very specific approach to this issue, but many struggle to find a starting point that is fully in line with their objectives (Lundborg, 2023). As a consequence, SMEs are faced with completely new challenges that require considerable effort and the adoption of new methodologies (Lundborg, 2023).**

**It is therefore important and will be of existential economic and social significance in the future to provide every company with company-specific access to digitalization and sustainability. As a result, the following research questions were considered: What exactly can twin transition look like for your own company and what could be a useful field of application? How can these be identified by the approach of "design for all"?**

## "Design for all" and how to start developing company-specific applications in Twin Transition

**To find specific approaches to new methodologies in Twin Transition, the federal and state governments and the European Commission started to support companies in the initial phase. This research is part of this support (2021-2026) and took place in the Zukunftszentrum KI NRW (Eng.: AI Future Center of North Rhine-Westphalia) which is one of in total 12 Future Centers across Germany. The Future Centers are intended to support SMEs with socio-technical digitalization (Brödner, 2013) and getting started with AI in the area of sustainnability. The funding bodies aim to explore digitalization and sustainnability through a participatory approach centered on employees and**

**their needs. This socio-technical approach goes beyond a purely technology-centered perspective (Ludwig, 2016). This is particularly relevant to the qualifications of employees and the selection and definition of processes (Lundborg, 2023). There is a clear lack of skills that would enable orientation in the current times (Ulrich & Frank, 2021). This is why it is important to teach not only technical skills but also critical thinking and creativity to solve real-world problems. Especially in China, these approaches seem to be a popular option for fostering problem solving (Global Times, 2024). This already concludes Basadur "In a stable world, efficient organizations may be successful. But in a changing world, organizations also need creativity as an ongoing process" (Basadur, 2011, p. 86). Creativity, as "the ability to create meaningful new forms" (Florida, 2004, p. 6), is the fundamental source of economic growth (Holm-Hadulla, 2011). Business enterprises and individuals can only be successful if they accept constant learning and change processes as challenges. This is where learning in times of digitalization becomes relevant (Elsholz, 2021).**

**Even Ludwig et al. (2024) realized some important key competencies in their study: "creativity, agility, problem-solving capability as well as expertise about innovation" (Ludwig, 2024, p. 109). They conclude that the following questions should be clarified within the company: "How can employees become actively involved in the development of digitalization solutions? How can digitalization solutions be developed across departments? What mindset is required for the agile and efficient development of digitalization solutions? How can digitalization and AI potentials be identified and evaluated within the company?" (Ludwig, 2024, p. 109).**

**This paper now will give an example of how creativity as an agile process design can contribute to the development of solutions in transformation. Specifically, this paper will dive into ways how creativity can easily be adopted by employees, even non-technicians. The ways in which the concept of "design for all" can enable learning in times of digitalization are discussed below.**

**But first, let us take a step back. What exactly is "design for all" and how is it impacting companies? The concept "design for all" is a well-established concept rooted in the principle of inclusion. It prioritizes the design of products and environments that are inherently usable by all people, without the need for further adjustments (BMAS, 2011). Accordingly, the design of the built environment, products, and services should reflect the full range of human capabilities, needs, and preferences, avoiding solutions that single out or stigmatize specific user groups (Leidner, 2008). Alongside "design for all" and accessibility, other frameworks with similar objectives include Universal Design – prominent in the USA and Japan – and Inclusive Design, widely adopted in the UK. "Design for all" is distinguished by its consideration of the entire creation process – including development, user orientation, and user involvement – as well as market orientation, covering both design and distribution (Neumann et al., 2014). Everyday products designed according to the principles of "design for all" should be characterized by ease of use, adaptability to various user needs, market orientation, high aesthetic quality – on the premise that only visually appealing products can appeal broadly – and user-centeredness (Neumann et al., 2014). User-centeredness involves integrating user needs and perspectives at an early stage of the development process. Contemporary design approaches aim to make pro-**

**ducts and services accessible throughout all phases of life while prioritizing user-centeredness. This may include the ability to use a product for example with only one hand – benefiting users who are permanently disabled (e.g., those with only one arm), temporarily impaired, or experiencing situational limitations, such as carrying a baby with one arm (Hampf, 2025). Furthermore, "design for all" should also address the needs of user groups that are currently underrepresented and individuals in the workforce (Klein-Luyten, 2009).**

**This is where the proposed model becomes relevant, as it involves users affected by changing and evolving work processes in the early stages of designing and implementing new applications. This broadens the employee's professional perspective and represents high added value for the company and society. In this way employees can get involved in the design of AI applications relevant to their workplace, by using their domain knowledge to influence the design of the application and their workplace according to their needs and ideas. This works specifically well, as the ideas for getting started a new application were developed based on their needs and have a specific and direct reference to other areas of responsibility in the company.**
**This leads us to applied research in human-centered digitalization, with the aim of integrating employees into the digitalization and sustainability processes – which means the concept of "design for all". On the one hand, it gives everyone in a company access to the field of digitalization and sustainability. On the other hand, the domain knowledge of employees is highly relevant for achieving meaningful improvements in sustainability. "Design for all" needs to be integrated in the development process of company specific and future-**

**oriented sustainability transformation. With this domain knowledge, it is possible to develop company-specific agile solutions (Lützenkirchen, 2024).**

**This is in line with the concept of applied design research (ADR). The primary goal is to generate data that is useful for the economy through the application of scientific methods (Wolf, 2025 a). ADR – a subfield of Design Science – occupies an interdisciplinary space between art, technology, science, and the economy. Theories developed in this context often emerge from specific practical objectives and are directed towards applied use (Mareis, 2014). This discipline is concerned with scientific knowledge about artifacts, as well as design itself as a scientific discipline (Cross, 2006), and the social and societal dimension of design (Mareis, 2014).**

**The aim of ADR is to develop design-based strategies that enhance the sustainable performance of companies in a global market (Wolf, 2025 a). Design makes technology usable to humans in the form of products and services. The most successful companies are those that understand the wants, needs, and challenges of their users. Therefore, it is crucial for users to have sufficient awareness of their habits and lifestyles. To achieve this, qualitative methods, as part of empirical social research, can be used to explore user requirements, anticipate changes and trends in daily behavior, and recognize the complex impacts of the socio-cultural environment surrounding users (Wolf, 2025 b). Design Research as design facilitation and applied solution development in transformation has a high impact in co-creative developing workplace-oriented solutions in digitalization and sustain-**

**ability. Following, the application of a creative lab, such as "Twin Transition Innovation Lab", can be understood as ADR.**

## Applied Design Research (ADR) as co-creative development in companies

**What is the basis of ADR? The intent is to learn experimentally how to discover problems, opportunities and recognize that such learning is the beginning of innovation (Basadur & Basadur, 2011). A creative mindset, an open approach and the reciprocal use of divergent and convergent methods are of crucial importance in the implementation of all creative processes. Guilford pointed out early, that creativity is a "natural resource" of humans (Guilford, 1968) and the distinction he offered in his "Structure of Intellect-Model" between convergent and divergent thinking and the dialectics of order and chaos proved to be enormously useful today (Holm-Hadulla & Wendt, 2020).**

**ADR enables the development of a wide range of ideas using diverse methods. These include team-based decision-making, which supports a focus on user needs and practical feasibility, as well as iterative loops that facilitate refinement and continuous development. Additionally, pain-and-gain analyses highlight benefits for both employees and the organization. Co-creative collaboration and deliberate shifts in perspective significantly enrich the idea space. Furthermore, involving employees in creative processes fosters a sense of ownership and responsibility, while also feeling valued and helping to generate practical, user-centered solutions. By using creative formats, employees gain access to agile, team-oriented and cross-divisional methods and learn how to use "professional empathy" by developing tailor-made solutions.**

**It requires a great deal of creative know-how and the involvement of employees to identify the company's specific potential. Based on this ADR specific ideas and digital solutions can be developed and practical applications implemented. Design and the creative processes associated with it can bring about change and transformation through ADR based on observation. Due to concrete needs, through research and learning, design can create solutions that meet the needs of all (i.e., design for all). Companies can react flexibly to change because of observation and ADR through creativity.**

**This ADR led to the questions: What exactly can twin transition look like for your own company and what could be a useful field of application? How can employees be qualified so that they can become involved in the process? How can useful applications be identified by the approach of "design for all"?**

**While exploring different solutions for SMEs, different methods were examined. Working in and with the field, the "Twin Transition Innovation Lab" further explained in the following, has had the greatest impact and the best future viability. In detail, it will be demonstrated how the "Twin Transition Innovation Lab" can create solutions that meet the needs of all. With the "Twin Transition Innovation Lab" this article highlights an efficient way to identify specific sustainability potential for each company, develop co-creative digital solutions and implement company-specific applications. The focus lies on all employees in the areas of responsibility for the new project and expertise while they are involved in the entire development process of digital and sustainable transformation through their specific expert perspective (domain knowledge). This is shown as an efficient way to**

**develop tailor-made and precise fitting ideas and implement handleable and practicable digital sustainability solutions. Using a creative approach, this paper explores the potential benefits of the "Twin Transition Innovation Lab" for SMEs and examines how specific areas of application can be identified for both organizations and their employees. The creative method of "Twin Transition Innovation Lab" highlights two workshop formats as a "Problem Space" and "Solution Space". They are supplemented by different phases of knowledge enrichment and lead to the design of IT applications in sustainable areas. Examples are presented of how iterative and co-creative processes can be carried out, how different employees can be involved and how the necessary skills can be taught. Finally, the impact of a co-creative approach on the quality of digital solutions in sustainability is discussed.**

**How to carry out the "Twin Transition Innovation Lab"?**

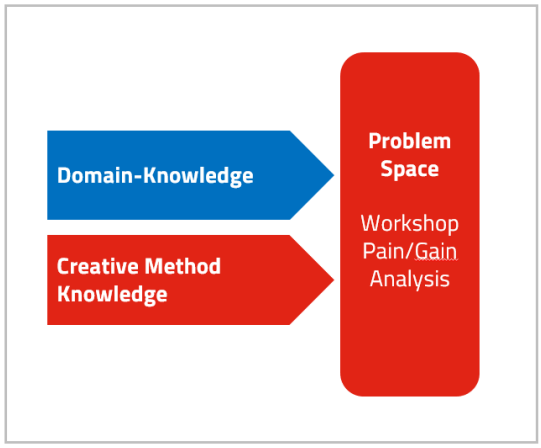


***Fig. 1: Problem Space: Workshop Start***

**Problem Space: To develop effective, actionable, and meaningful sustainability solutions for a company, it is essential to involve a group of employees that reflects a broad and representative cross-section of the organization. They possess the domain knowledge from**

**their workplace - hereinafter referred to as "Domain Knowledge Carriers". The Twin Transition Innovation Lab starts with 8 to 12 or even more "Domain Knowledge Carriers" and one or two people with Creative Method Knowledge - in the following referred to as "Creatives". Together they investigate the "Problem Space" of the workshop (see Fif. 1). The workshop will be designed, moderated and organized by the "Creatives". They ensure a creative, open and trustful working atmosphere, and a communication level where everyone feels valued and welcomed despite their different professional backgrounds and hierarchical levels (Lützenkirchen, 2024). In addition, the "Creatives" provide the necessary materials, structure, preparation and follow-up.**

**The workshop starts with the "Pain-Gain-Analysis". Here the "Domain Knowledge Carriers" must answer various questions that describe their pains in the context of work. Examples of these questions can be found in Table 1:**

| Questions in the context of "Pains" |
|---|
| What causes frustration, anger and headaches in the work process? |
| Which activities are time-consuming and cost time, effort and financial resources? |
| What is cumbersome, complicated, incomprehensible, not very motivating |
| What mistakes are often made because they are too complicated or incomprehensible? |
| Which current solutions are not sufficient, what is missing? |
| What technical and social risks do employees shy away from? |

**Table 1: "Pain"-Questions in Problem Space**

**Once many 'pain' points have been collected, the associated benefits for employees are analyzed. Questions that are helpful in identifying the benefits are listed in Table 2:**

| Questions in the context of "Gains" |
|---|
| What is the employee looking for most? |
| What support would make employees happy? |
| What would they wish for? What do they dream of? |
| What would make the work easier? |
| Why have similar solutions been well received by employees so far? |

**Table 2: "Gain"-Questions in Problem Space**

**This "Problem Space Workshop" will last about 2 hours, plus a short introduction to the workshop concept, which should be added at the beginning. The topics worked out in the area of pains and gains are noted on cards and clustered by the moderators or "Creatives". This collection is the foundation for the "Solution Space" which follows (see Fig. 2).**

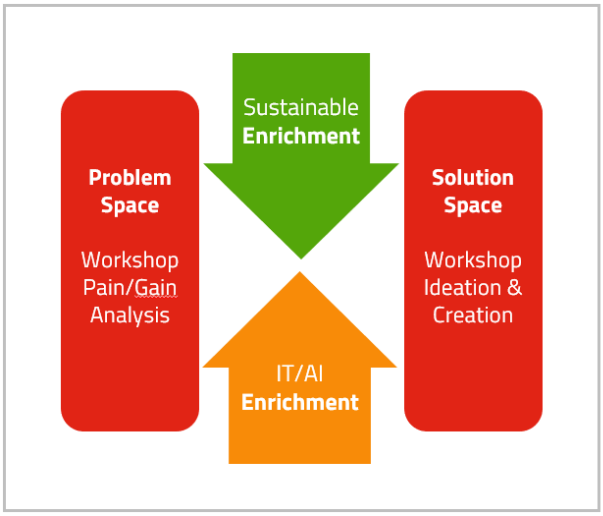


***Fig. 2: Solution Space: Workshop Second Step***

**Enrichment: In the next step the "Solution Space" will be prepared through two "Enrichments". The first one, the "IT/AI Enrichment" starts with an introduction to digitalization and AI. Questions are in which way IT/AI works, what the benefits are, what the risks are, and which examples exist? The second one "Sustainable Enrichment" starts with an introduction to sustainability: What are the basic features of sustainability, what are principles of the circular economy, energy saving, what are the main interesting facts, what could be the benefit for governance and employee? Both enrichments are followed by examples of digital solutions in sustainability which show practical hands-on applications in the field of sustainability with digital application. Those examples could be demonstrated and explained in a PowerPoint presentation, using demonstrators or examples which will be mapped out as best practices on the internet, social media, YouTube videos etc. Even the "Domain Knowledge Carriers" could be motivated to search for good practices of digital solutions in sustainability as examples.**

**In the space of enrichment, it is important to find a communication mood with little technical language, understandable for everyone and focusing on information that is useful for strategic decisions. The enrichment parts take around two hours each.**

**Solution Space: In the following the employees are well prepared with visualizations, examples and mental pictures, so the second workshop "Ideation & Creation" can start. The "Domain Knowledge Carriers" will be divided into groups of four. They take one of the relevant topics derived from the "Problem Space" and start with the ideation process. In the manner of brainwriting they individually think about solutions**

**in digitalization and sustainability. Everyone writes down as many spontaneous ideas as possible on cards (10 minutes). Questions from Table 3 may serve as orientation:**

| Questions in the context of "Ideation" (Brainwriting) |
|---|
| What digital support in sustainability (twin transition) would be particularly helpful in solving the problem? |
| Can solutions to the problem be found in the areas of circular economy, climate neutrality, resource efficiency, water consumption, waste management, health protection, etc.? |
| Which areas of the company can be supported by the solution? Expansion of a sustainable business model, promotion of innovation, process optimization, cost efficiency, job security, promotion of economic growth? |

**Table 3: Brainwriting-Questions in the Solution Space**

**Everyone then presents their brainwriting solution ideas to the group of four. They are discussed, concretized and prioritized in a matrix with the tangents usefulness and feasibility (Lützenkirchen, 2024). In a further step, some of the ideas evaluated as feasible and useful are presented to the entire group, which means all "Domain Knowledge Carriers", and discussed. Here too, a prioritization matrix or a 'dotmocracy/dot-voting' method is used to jointly evaluate all the ideas that have emerged in terms of their usefulness and feasibility. The "Domain Knowledge Carriers" can thus develop a wide variety of application ideas and enrich them from different perspectives to create a meaningful and practice-oriented solution. In the best-case scenario, some "Domain Knowledge Carriers" also assume responsibility in the subsequent implementation phase.**

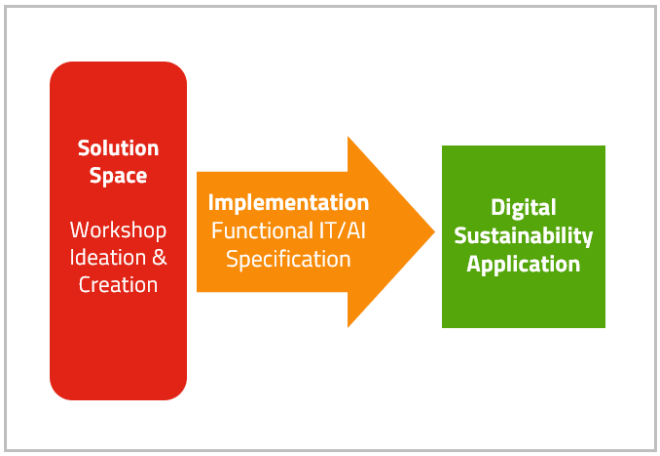


*Fig. 3: Functional Implementation*

**Implementation: Before the application idea is implemented (see Fig. 3), the following questions summarized in Table 4 should be clarified:**

| Questions in preparation for the implementation |
|---|
| Which areas of the company are affected by the new application as an interface? |
| Which data is required? |
| What hurdles can occur during implementation? |
| What in the company should remain unaffected by the change? |
| What are the new activities of the employees who will use this application? |
| What skills are required from them? |
| What exactly does the Twin Transition project look like for employees? |
| What are the benefits for employees? |

**Table 4: Preparation questions for implementation**

**Once these points have been clarified, a "specification sheet" with the necessary specifications for the IT implementation can be drawn up. This serves as the basis for programming the technical implement-tation of the Twin Transition solution.**

**In this way, a Twin Transition application is created as a Digital Sustainable Application. This should be checked precisely by the "Domain Knowledge Carrier" and compared and tested with domain knowledge (feedback). A cycle as a new round of the "Twin Transition Innovation Lab" can begin. As part of improvement and optimization of the application, the application can be further developed based on detailed feedback. It starts with a specific gain analysis in relation to the Twin Transition application that has now been developed as a solution. This is followed by the steps already completed in a very specific form and questions. As with an artistic artifact, a tailor-made application is developed, which is co-creatively developed by the "Domain Knowledge Carriers" from their working knowledge. In this way, in addition to a tailor-made application result, employees gain in-depth knowledge of digitalization/AI, sustainability and creative process design skills.**

**The working process all in all will take about 4-6 hours to complete the workshops (each at least 2 hours) and 4 hours for the whole enrichment section. The timeline for the implementation differs with the complexity of the Twin Transition solution and could not be predicted in general.**

## Findings and Discussion

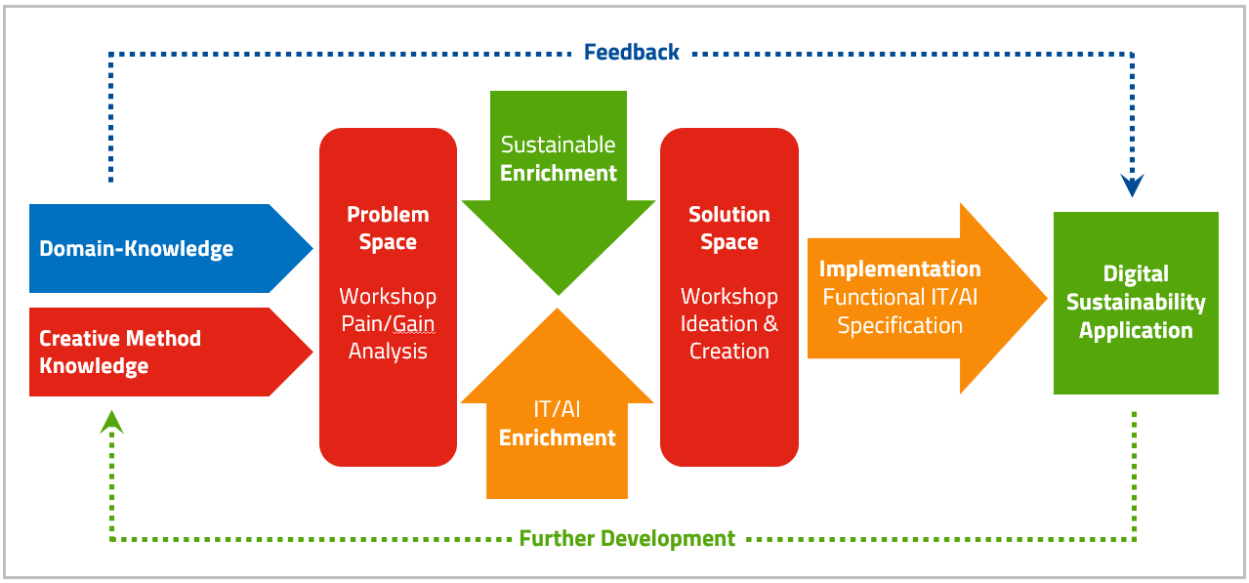


*Fig. 4: The Twin Transition Innovation Lab*

**Working in and with the field has shown that the process described above (see Fig. 4) has the most impact and future perspective. Therefore, the "Twin Transition Innovation Lab" in its phases, "Problem Space", "Enrichment" and "Solution Space" is very suitable. The lab is considered a well-functioning approach for starting the digital and sustainable transformation in SMEs and investing in the future viability of the company together with the employees as "Domain Knowledge Carriers".**

**In addition, it can be concluded that creative methods and processes can have a significant impact on the transformation and realignment of companies. This can also enable SMEs to independently recognize their potential for applications in the field of sustainability and the use of AI in their own company, identify the necessary steps and implement solutions. Crucial here are a creative mindset, an open approach and the reciprocal use of divergent and convergent methods in the**

**implementation of all these creative processes (Lützenkirchen, 2024). Therefore, the implementation of this methodical approach to identify initial and diverse ideas for getting started with sustainable solutions and AI applications can be regarded as successful, leading to a huge diversity of the workshop outcomes. The divergent phase of the creative process makes it possible to identify many heterogeneous and application-specific areas of use. Further, the relaxed atmosphere, the playful approach and the focus on the personal needs of the participants are conducive to the large number of ideas. Afterwards all ideas are prioritized in terms of feasibility and benefits in a convergent phase as a useful roadmap for the company.**

**This methodical approach can help employees to become partners in sustainable and digital transformation. The use of creative formats has shown in previous research, that a continuous and test-based approach makes sense to enable them to react flexibly to technological leaps. The employees (here "Domain Knowledge Carriers") are involved in the process from the beginning which leads to less resistance, more motivation and better fitting results. In addition, participants in SMEs often identified with the ideas derived from the process, developed clear ideas about solutions – even without IT and sustainable knowledge – and voluntarily took responsibility for implementations. This means that resistance can be overcome, even in companies whose employees have a negative attitude towards AI (Lützenkirchen, 2024) and sustainability (which occurs less frequently). Starting with easy and fast implementable applications and frequent testing contribute to the success of the applications.**

**It is particularly important that the moderators (in this case "Creatives") provide a convincing introduction to the creative atmosphere and different creative methods within the "Twin Transition Innovation Lab". The lab can only succeed if the moderator is able to enable a co-creative working environment, formulate targeted work assignments, open the idea space and prioritize the ideas in a structured manner. If moderators do not have the mindset of creatively trained people, it will take some practice to achieve satisfactory results.**

**Although applied design research has already been sufficiently described (Mareis, 2014; Wolf 2025; DMI, 2025), the application in SMEs in relation to digitalization/AI and sustainability is insufficiently discussed and could become highly relevant in the future. It is therefore advisable to pay more attention to applied design research even in the area of design for all.**

**In summary, the model of "Twin Transition Innovation Lab" gives companies a helpful and profitable start to the transformation process by developing their own individual approaches to digitalization/AI and sustainability.**

## Conclusion and Outlook

**Creative methods allow a constructive approach to the use of AI and sustainability in all areas of the company. Some topics are relevant for most companies, while others are company-specific and relate to the individual core business and needs of the respective company. At this point, the diversity and company-specific idea generation should be emphasized. The high benefit to employees through their involve-**

**ment in the development process and the company benefits are also of great value. Thanks to easy-to-use interfaces, a wide range of AI applications in the field of sustainability can therefore contribute to the topicality of the business model and the competitiveness of SMEs. Using creative methods, "Domain Knowledge Carriers" can identify which AI applications and sustainability issues make sense, and which applications will provide real value. This must be developed specifically for each company. Creative processes are helpful and useful for this. It should be improved if the open form of creative method can be transferred in other sectors, and which are the formats they must be supplemented.**

**This applied research proposed that creative processes in the form of Twin Transition can be used to identify specific potential for areas of application in SMEs in an agile manner. It remains socially and economically essential to provide employees and companies with a low-threshold introduction to AI applications and to involve them in participatory processes when getting started with AI. This is especially true when the participants come from as many different parts of the organization as possible. In summary, the article highlights a way in which digital sustainability solutions can be jointly developed and implemented in companies so that they are useful for employees, for companies and highly relevant for society.**

**Due to the constant further development of AI and the changing regulations and concepts in sustainability, it is particularly difficult for SMEs to keep up with the development processes in twin transition. It therefore remains an important task for policymakers to work out what low-threshold access to knowledge enrichment in the field of**

**sustainability and AI will be possible in the long term, especially for SMEs, e.g. through public funding.**

**In conclusion, as already mentioned in the WEF Future Skill Report (2023), the aim should be to consider creativity as a driver of socio-technical processes and to give it more weight in the application and teaching of digital and sustainable transformation.**

## Acknowledgments:

**The results presented in this model were obtained within a project funded by the German Federal Ministry of Labour and Social Affairs, the State of NRW, and the European Union. Special thanks are also to my colleagues and the companies involved in the development of this scientific model – their spirit of cooperation and curiosity were fundamental to the success of this project.**

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