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# Cultivating Design Thinking for Sustainable Business Transformation in a VUCA World: Insights from a German Case Study

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**Abstract:** Companies around the world are facing global challenges, such as internationally interwoven crisis situations and conflicts, climate change, the effects of the COVID-19 pandemic, and technological disruptions. While the UN has developed a global agenda (namely, the SDGs) to drive sustainability, at a political and economic level, global players seem to have a rather heterogeneous understanding of the situation. How can companies successfully adapt to the resulting turbulent market environments? Design Thinking, a method for finding answers to complex and wicked problems, is experiencing a renaissance wherein it is being used not only as a tool for product innovation but also for organizational and strategic transformation. By incorporating the principles of Industry 5.0 into company visions and integrating Design Thinking and ecodesign at the level product innovation, Design Thinking can help strengthen the adaptability of companies and create sustainable innovations in these VUCA environments. However, the factors that are necessary to realize the full potential of Design Thinking for sustainable business transformation remain unclear in science. This paper presents a case study that shares key factors, including a company DNA that consists of a targeted orchestration of diversity and the company's Love–Trust–Do mantra that, in combination, work transnationally in the company organization and can utilize the full potential of Design Thinking to foster sustainable innovation and thus strengthen the company's resiliency in times of VUCA.

**Keywords:** Design Thinking; dynamic capabilities; VUCA; turbulence; sustainability; SDG; dynamic capabilities; Love; Trust; Do; diversity; Ecodesign; innovation; organizational capabilities



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## 1. Introduction

With the 2030 Agenda, the United Nations has made a promise to work closely together to "secure the rights and well-being of everyone on a healthy, thriving planet" [1]. To facilitate fulfillment of this collective commitment, the UN member states defined and jointly adopted 17 Sustainable Development Goals in 2015 [2]. In 2023, the UN declared that the achievement of these goals is at risk [1], and so the Secretary General Mr. Guterres proclaimed at the 2023 SDG Summit that "the SDG Summit in September must be a moment of unity to provide a renewed impetus and accelerated actions for reaching the Sustainable Development Goals, SDGs" [3]. In its report, the UN states that the world has entered an "age of polycrisis" [1], where conflict, climate change, and COVID-19 are identified as the causes of several interrelated crises that threaten progress toward achieving the SDGs [1]. These global turbulences result in VUCA (volatile, uncertain, complex, and ambiguous) environments [4]. The term VUCA was transferred, by Johansen, from the military to the social sciences in 2013 [4]. It can be understood as an acronym that "captures essential elements of external environment of contemporary organizations" [5].

Describing business environments as volatile, uncertain, complex, and ambiguous, Johansen stated that the world was changing more rapidly and with greater threats than ever before [4], which causes "quick and chaotic changes, lack of standards, or the constant outdating of plans and projects" [6]. As causes of the accelerated development of VUCA environments, one could consider factors related to health, such as the COVID-19 pandemic that affected humans, societies, and economies within a short period, political (re-)actions to shifting business environments, and technological disruptions such as the breakthrough of artificial intelligence; these have opened up opportunities for some and risks for others. In this context, scholars discovered that, in contrast to previous thinking where strategies were developed for the long term and rigidly implemented, "the most successful business strategies in today's world are those that are flexible and adaptive" [7], and so adaptability to rapid changing environments is being demanded from companies and their managers [6] more than ever. Hence, companies are searching for approaches that help to address complex and wicked problems [8,9]. As precisely this potential has been recognized in the science and practice of the Design Thinking method, it is not surprising that the idea of Design Thinking is experiencing a renaissance, not only for the innovation of new products but also for the transformation of companies [10].

The idea of Design Thinking originates from the research into using organized creativity to solve problems [9]. It was developed into a process-based method by which problems are first analyzed, then solutions are identified, evaluated, and finally implemented as answers to human needs [9]. With a process understanding that is creative rather than purely analytical in nature, Design Thinking is nowadays understood as "an iterative innovation and problem-solving process, which is based on specific principles (such as a focus on user needs, multidiscipliniariy, etc.) and uses specific methods (such as creative thinking, visualization, experimentation, etc.)" [11]. The concept of Design Thinking is currently being applied to both product and business innovation [10]. However, there are still gaps in research with regard to the organizational factors required to utilize Design Thinking in companies, not just for product and service innovation but also for the adaptation of companies to rapidly changing market environments [11]. So, Rösch for example calls for further research around cultures and the composition of teams that enable utilizing the potential of Design Thinking [11].

We are interested in studying the capabilities of company organizations with which adaptability can be generated. Our paper is based on the following two hypotheses:

**H1.** *To survive in today's world of VUCA and turbulence, companies must be able to adapt sustainably to rapidly changing environments.*

**H2.** *Design Thinking is a method that enables companies to adapt to rapidly changing market environments and to transform sustainably at both product and company level.*

The research question of this paper:

Which organizational factors need to be cultivated in companies to utilize Design Thinking for sustainable innovation at both product and company levels?

Structure of this work:

- The following Section 2 highlights essential conditions that need to be created at international political level in order to enable sustainable transformations of companies;
- Section 3 presents how Design Thinking cannot only be used for product development but also for sustainable transformations of companies. It further demonstrates how the principles of Industry 5.0 and the idea of ecodesign can transform Design Thinking into a sustainable method;
- Sections 4 and 5 present a field study at E-Ventures, a company that operates as an operator for electric charging stations in various European countries. This field study identified a specific company DNA (consisting of a purposefully orchestrated staff diversity and a company mantra that affects all levels of the company);

- Section 6 illustrates that this specific company DNA provides organizational key factors to utilize the full potential of Design Thinking for sustainable company transformations and thus answers the research question of this paper;
- Section 7 summarizes the results and discusses the limitations of this study.

## 2. VUCA Dynamics and Their Development

Ultimately, Design Thinking is merely an instrument that can generate sustainable innovations only if the underlying intentions are also sustainable. This section examines important prerequisites for companies to generate sustainable innovations.

Naturally, there have been VUCA (volatile, uncertain, complex, ambiguous) times before, but not at this "scale, the intensity and the speed" [4]. In the search for an effective way to deal with VUCA environments, it is worthwhile to research their causes. Johansen cites climate change, global warming, and other challenges as examples of factors that contribute to a VUCA world. The SDG Report 2023 makes a similar observation and describes an age of polycrisis, which has arisen as a result of a convergence of climate change, conflicts, the COVID-19 pandemic, and other global challenges [1]. According to Johansen, the volatility and uncertainty resulting from this environment can best be addressed with a clear vision ("Volatility can yield to vision; in a VUCA world, vision gets rewarded disproportionately" [4]) and a comprehensive understanding ("Uncertainty yields to understanding, whether it's marketplace understanding, scientific understanding, or understanding of competition or consumers" [4]). This finding is supported by Nowacka, who also proclaims that the answer to volatility is vision [6]. She further states that "consequently, one of the main effects is the problem of defining and understanding the surrounding world by managers" [6]. So, a clear vision and a comprehensive understanding can be seen as fundamentally necessary for transforming companies sustainably.

At first glance, it can be noted that the UN has developed and initiated such a vision through the development of the 2030 Agenda, which can serve as a compass for sustainable economic activity and development. This trend toward greater sustainability can also be found in the mindsets of the global industry, where the idea of Industry 4.0 is evolving into a concept of Industry 5.0, described as "an open and evolving concept . . . moving towards a collaborative and co-creative vision of the World Industrial System of the future" [12] that inherits three characteristics, "human-centricity, sustainability, resiliency" [12].

However, if we look at the current reality, a different picture emerges. While there are "151 national governments having pledged to achieve net-zero emissions" [13], the reality is that "governments, in aggregate, still plan to produce more than double the amount of fossil fuels in 2030 than what would be consistent with limiting global warming to 1.5 °C" [13]. These countries are "literally doubling down on fossil fuel production" [13]. The same picture emerges at the level of global corporations. In a global study on the economics of the global oil industry (study sample: Shell, TotalEnergies, BP, Equinor, Eni, Repsol, OMV, PKN Orlen, MOL, Wintershall Dea, Petrol Group, Ina Croatia [14]), Greenpeace found that the global oil majors reported the "highest profits in history" in 2022, with 99.7% of their energy volume coming from oil and gas production and only 0.3% from renewable energies [14]. Now, one might think that this is just the status quo, and that this ratio will change with investments in renewable energies. Unfortunately, however, the situation in the oil and gas industry also looks similar, with an investment share of around 93% in the continued exploitation of oil and gas reserves and only around 7% in sustainable energy production [14]. This dissent in the assessment of the climate crisis and its causes could also recently be observed at the United Nations Climate Change Conference (COP 28). While Guterres emphasized the decisive influence of fossil fuels, "we cannot save a burning planet with a fire hose of fossil fuels. The 1.5-degree limit is only possible if we ultimately stop burning all fossil fuels. Not reduce. Not abate" [15], the President of the World Climate Conference in Dubai, Sultan Al-Jaber, doubted whether phasing out fossil fuels is even necessary to achieve the 1.5 degree target [16]. A look at the preservation of biodiversity (SDG 15 [17]) provides another example that raises questions

about the sincere conviction of the stakeholders for the Sustainable Development Goals. While the declared SDG is to "halt biodiversity loss" [17] and studies by official institutions such as the German Federal Agency for Nature Conservation have stated, already as far back as 2018, that "the use of pesticides containing glyphosate has a significant impact on biodiversity" [18], the EU Commission in November 2023 extended the approval of glyphosate for a further 10 years. These are just two examples that may raise the question of how far the SDGs actually represent a shared vision of the involved actors. The SDG Report 2023 is explicit in its assessment that 85% of progress toward achieving the SDGs is either "moderately or severely off track" or in "stagnation or regression" ("48% moderately or severely off track", "37% stagnation or regression", which means a "regression below the 2015 baseline" [1]). So, the UN report comes to a rather disillusioning conclusion: "At the midpoint of the implementation of the 2030 Agenda, a sobering reality emerges: The world is falling short of meeting most of the Goals by 2030" [1].

Considering that the SDGs were adopted by all UN member states eight years ago, this presents a questionable picture. Whether and to what extent these controversies may be caused by lobbyist activities and conflicts of interest cannot be answered in this article and this is also not its aim. However, to what extent the key players share the vision of the SDGs and the motivation to act can be questioned. With this regard, Bainbridge and Roco note "incentive problems in which decision-makers simply lack the motivation to act or confront severe disincentives when addressing future issues" as another trap that organizations fall into with these issues [19].

Therefore, considering Johansen's idea that "volatility can yield to vision" [4], in the absence of a shared vision among influential global players, such as politics and institutions, which can create the framework conditions for sustainable business, it can be assumed that volatility will continue to be fueled and intensify. In addition, the current picture of the acting nations poses the question of the extent to which the political actors, institutional players, and companies share the same understanding regarding the need for environmental sustainability. Johansen notes that "uncertainty yields to understanding, whether it's marketplace understanding, scientific understanding, or understanding of competition or consumers" [4]. At the very least, there seems to be differences in the understanding of the causes that trigger VUCA, such as climate change, as well as in the question of to whom or what to keep an eye on to secure one's own future viability. Does maximizing profits and growth ensure the continued existence of one's own company or are sustainable transformations the path to sustainable survival? Thus, as long as the understanding of these issues diverges at these influential levels, uncertainty will remain, and "the complexity and unpredictability of our world. . . are apparent to most of us" [19]. It can be assumed that political and economic actors continue to head in different directions, which leads to the assumption that the dynamics and turbulence of the VUCA world will continue to accelerate rather than slow down. Additionally, as long as the global markets do not value sustainable business transformations the way they should be valued, these circumstances hinder companies from sustainably innovating and transforming themselves by applying innovative methods such as Design Thinking.

However, practice also shows a silver lining in the fact that innovations based on sustainable visions and an understanding of the intrinsic value of sustainability can be successful in these times of turbulence. The study on the "100 most sustainable companies of 2023 still flourishing in tumultuous times" confirms demand for the products of the Global Top 100 sustainable companies and their success: "They've outperformed the market through these last few tumultuous years" [20].

Summarizing, this section highlights three fundamentally important observations:

1. A common understanding and a shared vision of the value of sustainability are a prerequisite to utilizing Design Thinking for the sustainable transformation of companies in times of turbulence and VUCA.
2. There are still considerable differences in the understanding of the need and value of sustainability at the international level. It is questionable whether the sustainable

vision of the SDGs is supported and consistently pursued by international politics and institutions. It can be assumed that this situation will further increase volatility on the markets and that uncertainty for companies will also increase rather than decrease. So, these differences remain a challenge for companies that want to transform themselves sustainably with the help of Design Thinking.

3. To enable sustainable transformation, it requires adaptable companies that can implement sustainable visions in these volatile and uncertain environments. Practice shows that adaptable and sustainably operating companies can still thrive in these environments.

## 3. Design Thinking for Product Development and Business Transformation

This section examines how Design Thinking can drive sustainable innovation not only at the product level but also on the strategic organizational level and what is needed to accomplish such sustainable transformations.

The future, "just as the present, will be full of "matters of concerns", for which adaptive and reflexive learning on the fly will be critical" [19]. This requires "situating yourself as an observer in the system, dissociating from this system your own interests, and thinking about your position amidst the things being considered" [19]. This applies not only to the convergence of technologies examined in this context but also to the complex interdependencies between humans and nature [9], for example, to the range and complexity of the United Nations' 17 Sustainable Development Goals. By addressing this complexity and sustainability issues, Design Thinking can be considered as an innovative, effective, and efficient human-centered problem-solving approach [9,21–23].

Thus, scholars also recognize the value of Design Thinking for management in general "as a problem-solving approach that enables decision-making in the face of wicked problems" [24] and as a trigger for sustainable organizational innovation [25]. Curious minds seek creative solutions and new insights by focusing on the question of "how things might be" [26], also reflecting on the problem itself by applying creativity "not only in developing new solutions, but also in interpreting and defining the problem addressed" [26]. In a small survey, Ardoin identified the five characteristics of Design Thinking to tackle sustainability issues: "Participatory and people-focused", "Inspires creativity", "Encourages diversity in thought and action", "Adopts a holistic, systems thinking mindset", and "Offers a streamlined, action-oriented process" [9]; see Figure 1.

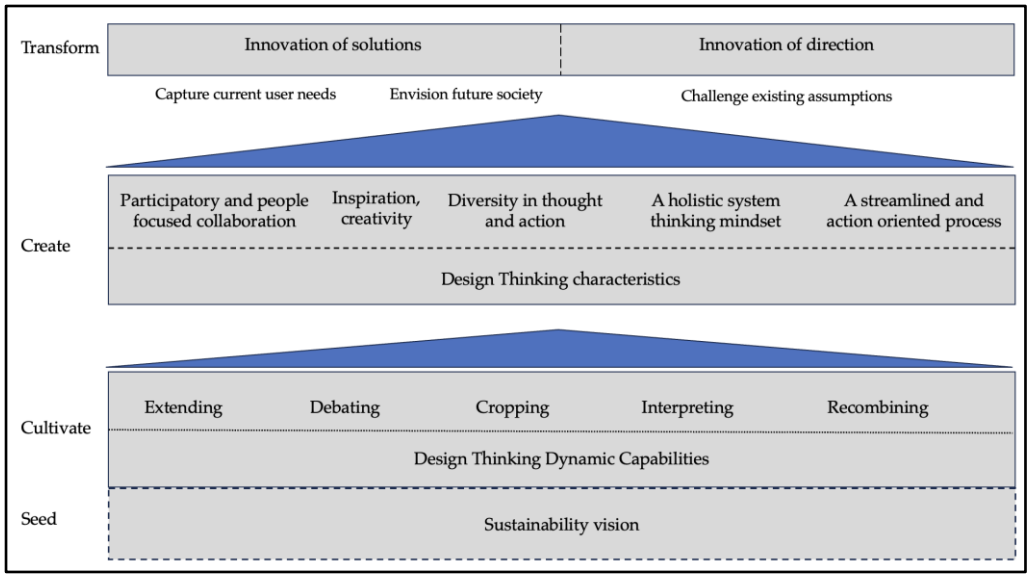



**Figure 1.** Sustainable transformation through Design Thinking based on [9,10,22].

Scholars acknowledge that Design Thinking not only provides value for product innovation but also for sustainable strategic and organizational business transformation [11,23]. Hence, Design Thinking is further scientifically developed into new concepts such as Hybrid Design Thinking, where Design Thinking is expanded by ideas from systems thinking, organizational learning, and action research [8]. This also helps in considering the interdependencies of ecological and social systems in the process of describing problems and finding solutions, thereby ultimately finding answers to the more comprehensive problems of environmental sustainability [8], which in turn can lead to the transformation of businesses. Design Thinking is thus gaining a new strategic role, "from designing novel products and services to delivering innovative strategies and supporting organizational transformations" [26].

Recognizing these developments, Magistretti compared the purpose of product and service innovation that he calls "innovation of solutions" [10] with the purpose of strategic and organizational transformation or "innovation of direction" [10]. For both use cases relevant for developing sustainable business, he asked what value Design Thinking could contribute to these use cases [10]. Based on data from 146 Design Thinking projects, he found that Design Thinking is especially effective in "capturing current user needs" and for "envisioning future society" in the area of product development ("innovation of solutions") [10], whereas "challenging existing assumptions" is of special value for "innovation of direction" [10].

At this point, the question can be raised as to which capabilities should be cultivated in companies to leverage the potential of Design Thinking to effectively capture user needs in envisioning the future society and challenging existing assumptions. To answer this question, we refer to the discoveries of the Design Thinking Dynamic Capabilities made in the context of digital transformation of organizations [22]. Even though Magistretti's study mirrors Design Thinking only in the case of digital transformation, we believe these capabilities are also compatible with the transformation goals of adaptability (to VUCA environments) and sustainability because complexity can be found regarding the challenges, digital transformation, and sustainable transformation in VUCA environments. Moreover, Design Thinking aims at "leading to more effective and sustainable solutions that address complex challenges" [23].

The five capabilities that need to be cultivated (Figure 1) are "Extending the knowledge base by gaining holistic knowledge through collaboration and close observation of different stakeholders", "Debating the artificial and human perspectives, by challenging the initial technological challenge and adopting a critical approach", "Cropping the alternative solutions and information, by empathizing with the user, thus transforming needs into relevant requirements", "Interpreting by framing the problem under the point of view of different stakeholders that can lead to the identification of new opportunities", and "Recombining artificial with human factors by associating all the clues within a holistic reframing" [22].

However, it can be debated whether Design Thinking, by itself, leads to sustainable solutions. Santa-Maria notes that "design thinking does not necessarily include sustainability considerations" [27]. Also, Habicher et al. state that although "especially for socially responsible firms, Design Thinking resulted to be very useful to encourage further socio-ecological transformation", Design Thinking does not promote social change per se [28]. This still-glaring dichotomy becomes particularly clear when looking at one of the core characteristics of Design Thinking. While human-centricity is often referred to in Design Thinking today, it should be noted that user-centricity is the original characteristic [9,26]. The idea of humanity, however, is not necessarily included in user-centricity. User-centricity does not always lead to sustainable development but can also simply be aimed toward generating new income streams or cost reductions. Ultimately, Design Thinking is an approach that is used to pursue the goals and visions set by its sponsors. So, here again, as seen in Figure 1, for a shared sustainable vision that, in addition to economic objectives, includes human and environmental objectives [21,23] and is shared by actors, a foundation

must be established for the development and implementation of sustainable innovations. In order to "shift away from a user-centric focus to a more systemic/holistic perspective" and thus strengthen a sustainable orientation [27], the inclusion of the three main characteristics of Industry 5.0, "Human-centricity", "Sustainability" (incorporating the SDGs), and "Resiliency" ("the ability of a system to keep or recover quickly to a steady state") [12] can foster the creation of sustainable visions, recognizing that humans are "intertwined with the natural environment and the ecological systems" [8].

This notion can also be reflected for the innovation of sustainable solutions. While researchers recognize the potential of Design Thinking to innovate sustainable solutions, they note that Design Thinking only leads to sustainable product and service innovations within a sustainable framework [29,30]. With this regard, the idea of ecodesign, "a systematic approach, which considers environmental aspects in design and development with the aim to reduce adverse environmental impacts throughout the life cycle of a product" [31] is gaining importance as a concept that, in combination with Design Thinking, leads to sustainable innovation of solutions. Ecodesign is understood as a product-centered concept [30], which is based on the idea of Life-Cycle Thinking, that can lead to environmentally friendly and resource-saving innovation of solutions, and can also result in cost advantages, new market opportunities, and a better image for companies [30–32].

"Life cycle thinking means the consideration of environmental aspects relevant to a product during its entire life cycle. This implies considering consecutive and interlinked stages, such as: material acquisition; design and development; manufacturing; delivery and installation; use (including reuse, maintenance, repair, remanufacturing, refurbishing and upgrading); end-of-life treatment; disposal" [31]. And so further standardizations, such as the ISO 59000 standards, which will be implemented in 2024 [33] "to harmonize the understanding of the circular economy" [34], are being developed in order to create a uniform understanding of sustainable innovation that will give more companies certainty to act [35].

However, it should be considered that companies also face challenges in the implementation of ecodesign standards, such as the perceived complexity and costly implementation of ecodesign tools and lack of knowledge regarding policy changes and information on the most significant environmental impacts [36]. In addition, companies see a hurdle in the demand for more "environmentally sound products" [36]. Landeta-Manzano et al. have drawn similar conclusions and call for changes at the economic and social levels; public and private institutions should use various instruments to promote the development of these practices, especially in large companies, so that they can have a pull effect on other companies [37]. The scholars see the promotion of public–private research so that more ecodesign tools are available to companies, the introduction of various types of eco-taxes or tax deductions, or the establishment of more demanding laws on environmental issues as instruments to supporting the diffusion of ecodesign in companies [37]. In this regard, it would be interesting for further research to accompany the establishment of ecodesign and, in particular, to investigate the extent to which the legal framework currently being developed supports the diffusion of ecodesign into companies through the development of standards and legal certainty or tends to hinder it through additional bureaucracy.

In any case, sustainable Design Thinking, which supports the transformation of a company on the basis of sustainable visions and merges with the concept of ecodesign at the level of innovation of solutions, can on the one hand support the achievement of the SDGs [38] and on the other foster the adaptability of companies and strengthen their resilience. Considering that in volatile markets characterized by uncertainty, rapid change, and complex challenges, a company's ability to adapt and maintain resilience is critical to long-term success, Design Thinking incorporating Industry 5.0 principles and product-level merging with the concept of ecodesign can strengthen companies in developing solutions that are flexible, sustainable, human-centric, and thus not only responsive to immediate demands but also strengthening of long-term resilience and adaptability in a constantly changing market environment.

Summarizing this section:

- Design Thinking can be utilized not only for product and service innovation, but also for organizational and strategic transformation.
- Design Thinking Dynamic capabilities need to be cultivated to utilize Design Thinking.
- The pursuit of sustainable visions and goals is crucial to establishing Design Thinking as a tool for sustainable transformation. Here, the integration of Industry 5.0 principles into company visions and goals enables sustainable organizational and strategic transformation through Design Thinking, which as a result can strengthen the company's resilience.
- The integration of Design Thinking with the concept of ecodesign fosters sustainable transformation on the product and service levels.

## 4. Research Methodology

The authors conducted field research on a company that aims to establish sustainable innovation in its markets amidst uncertainty and turbulence. In this research, the authors discovered important factors for utilizing Design Thinking for sustainable transformations; this is the research question of this paper: Management research is still missing "characteristics that have an influence on Design Thinking" [11]. In other words, research is still needed to identify factors that help Design Thinking "to unleash its full potential" [11].

Before presenting the findings from the field research and answering the research question in the following sections, in this section the authors explain how they identified a relevant research object and explain their research methodology.

### *4.1. Field Research Object*

In order to understand which organizational factors are required to facilitate adaptability to the rapid changes in VUCA environments and to transform businesses with the help of approaches such as Design Thinking, we sought out a research object where the possible solutions could be studied in practice. In this search for appropriate field research objects, we applied a research funnel consisting of four criteria [39]. In the first step, field research should focus on companies operating in megatrends, which describe complex change dynamics and affect all levels of society, thus influencing companies, institutions, and individuals [40] (the German Zukunftsinstitut discovered 12 megatrends that are defined as complex main global change dynamics. Megatrends can originate in all parts of the world [40]) because we assume that such companies are constantly within VUCA environments and thus constantly affected by turbulence through changing technological, political, societal, or environmental influences. The triggers of these influences are interconnected. For example, environmental changes can lead to political changes, or changes in the political framework can lead to new technologies flourishing, or anew in the case of existing technologies. Thus, we assume that companies operating in megatrends must constantly deal with and successfully manage rapid changes in order to survive. On the industry level, this research explored the megatrends neo-ecology and mobility, and their interplay, which results in the formation of the e-mobility trend [41]. The German Zukunftsinstitut describes this trend as the evolution of mobility, of which the biggest challenge is still the range of batteries and charging management and the digitization of transport systems; additionally, the increasing automation of mobility in the form of self-driving cars will further accelerate change [42].

Second, the search for a suitable field research object is focused on markets whose design parameters are not yet fixed, which implies exposure to market turbulence and great uncertainty for the companies operating there [39]. This is the case for the e-mobility market, whose market environment is characterized by various influencing variables that are not yet fixed and, thus, change which leads to new opportunities and threats. One of these influencing variables is government policies, which the Statista industry and market analysis identified as one of five major drivers of the e-mobility market [43]. Government policies include "tax exemptions or credits, grants, subsidies and non-financial incen-

tives" [43]. Additionally, the Statista market analysis describes the "lack of infrastructure (such as charging stations)" as one of five main challenges, which are as follows: lack of infrastructure (such as charging stations); high upfront costs; lack of consumer knowledge and wrong perceptions; pressure from oil companies and the car manufacturer lobby; and potential long-term effects of the COVID-19 pandemic [43]. This "limited availability of public charging infrastructure" includes "a lack of adequate business and financing models" [43]. However, in the meantime, the building activities of charging stations to remedy the lack of infrastructure in Germany have, for example, started and almost doubled within the last two years [44]. This, in turn, has caused problems for network operators, which have been faced with the challenge of accommodating the differently dimensioned charging points and ensuring trouble-free operation of the grid [45]. Hence, network operators have had to identify grid bottlenecks and derive their expansion requirements [45]. These grid bottlenecks have, in turn, slowed down the expansion of charging stations and thus lead to new uncertainties for market participants.

The chip shortage poses an additional risk to the development of the market. The Center of Automotive Management notes that "monthly new registrations of electric vehicles in Germany stagnated at a high level in the first seven months of the first half of 2022 as a result of the chip shortage" [46]. Furthermore, it can be observed that technology questions regarding the e-mobility ecosystem have not been conclusively answered, as "charging stations from different providers use different charging methods, making it even harder for consumers to know in advance how much it would cost to charge their EV" [43], and the lack of a standardized payment system is further included as a factor among the five biggest obstacles [43]. Finally, we can observe volatility in energy prices, which influences the market development. Where European energy prices were cheap prior to the Russia–Ukraine War, one could observe a dramatic increase in electricity prices for consumers that reversed the cost advantage of electricity over gasoline, with a baseline of 100 points in 2015 the index which increased by 11 points to 2021 and within just one year by another 22 points from 2021 to 2022 [47]. It can therefore be stated that the market for e-mobility consists of various unstable, interconnected, and influencing variables that will continue to fuel the turbulence in this VUCA environment.

Third, in the search for a suitable field research object, it should be emphasized that the growth of the market identified in step two is, at a minimum, characterized by acceleration dynamics, since it can be assumed that such an accelerating, turbulent market forces companies addressing wicked problems [8] to "rapidly adapt to changing factors" [39], which requires effective problem-solving approaches such as Design Thinking [8,11,24].

The e-mobility market is growing fast. Innosight have noted in its Corporate Longevity Forecast that "Currently, only 3% of new vehicles purchased worldwide are EVs. But that share is expected to reach 50% sometime between 2025 and 2030" [48]. Additionally, Statista expects a further phase of growth that is driven by vans and trucks [43]. Interestingly, the Corporate Longevity Forecast further notes that "the shift to renewable energy and e-mobility comes as we're seeing old-line energy companies either adapt or fall by the wayside" [48]. They work differently in every country [48] and can experience change due to the development of the market, political interests, and so on.

Finally, we searched for field research objects that are pure play companies that exclusively focus on a particular activity or product, since such companies are highly dependent on market developments and so disruptive innovations and changing market conditions can lead to immediate threats or opportunities for their own business [39]. "As a result, the company's activities, such as the adaptation of their activities to changing environmental factors, either lead to successful survival and further development or to a rapid death" [39].

Based on these considerations, we identified a carve-out of a major European utility based in Germany. The carve-out, referred to as E-Ventures in this paper, operates as a charge point operator (CPO) in seven European countries. E-Ventures focuses on the construction and operation of charging stations for its business customers and operates

more than 5000 public charging stations in Europe. It is affected by strong uncertainty regarding both the construction and operation of the charging stations and their long-term economic viability, which above all depend on adaptability, in addition to various other factors (e.g., financial resilience).

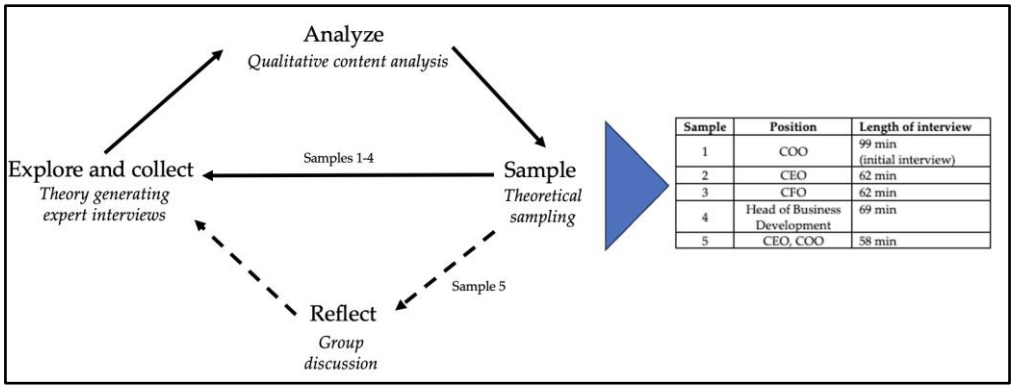
### *4.2. Field Research Design*

In this sub-section, we discuss the research approach we used to explore strategies that help E-Ventures adapt to its VUCA market environments and continuously innovate its business.

First, this work acknowledges Eisenhardt's recommendation to make use of the concept of case study research when exploring new approaches [49]. This was also considered by Magistretti, who confirmed in his field research on Design Thinking that the single-case study method is particularly suitable for exploring complex organizational contexts [25]. Furthermore, to explore the strategies that E-Ventures uses to adapt to VUCA market environments, we considered the experiences of Teece, who noted the need for in-depth qualitative research [50] when exploring organizational capabilities.

We assumed that the actors at E-Ventures may, on the one hand, try to use and further develop existing models to adapt and innovate their business and, on the other hand, create new approaches that help them successfully adapt to the complex markets. This led the researchers to a field research design that, on the one hand, considers models that have been developed in the past and, on the other hand, includes an inductive character by allowing a degree of openness [51] for new ideas and approaches. Theoretical structuring, hypotheses, and methodological procedures should not obstruct the view of essential aspects of the subject matter in the research process. It must be possible to expand, modify, and even revise them if it seems necessary [51]. We were especially interested in the actors' interpretive knowledge and to what extent their interpretive knowledge is also shared by other E-Ventures experts [52]. Here, experts are considered "people who—based on specific practical or experiential knowledge that relates to a clearly defined problem area—have created the possibility of structuring the concrete field of action in a meaningful and action-guiding way for others with their interpretations" [52]. Important in this context is our assumption that experts can expand their expert knowledge and experience across the board with the new experiences and insights they gain [52].

To unveil this expert knowledge in a systematic way, we first used the concept of the theory-generating expert interview, which is focused on the "subjective dimension of expert knowledge" [52] that includes action orientations, implicit decision maxims, action-guiding patterns of perception, world views, routines. . .in other words, the interpretive knowledge of the interviewees [52], followed by the concept of qualitative content analysis to analyze the interview outcomes [53]; see Figure 2.




| Sample | Position | Length of interview |
|---|---|---|
| 1 | COO | 99 min (initial interview) |
| 2 | CEO | 62 min |
| 3 | CFO | 62 min |
| 4 | Head of Business Development | 69 min |
| 5 | CEO, COO | 58 min |

**Figure 2.** Applied field research design (based on [39]).

For interview sampling, the concept of theoretical sampling was considered, where the researchers analyze the interview data and decide, in parallel, which data to collect next [54]. As a result, the field research started with interviewing the Chief Operating Officer (COO), followed by the Chief Executive Officer (CEO), Chief Financial Officer (CFO), and Head of Business Development (samples 1–4; see Figure 2). After analyzing these four expert interviews, the researchers additionally decided to let the experts reflect on their initial insights in a group discussion; see Table sample 5, Figure 2.

Summarizing this section:

- Through a research funnel consisting of four levels, the researchers identified with E-Ventures a suitable research object for which adaptability to uncertain and rapidly changing environments is essential.
- The researchers identified a company operating within megatrends and market environments characterized by turbulence, uncertainty, and acceleration, positioning itself as a pure play company.
- With the help of a case study methodology and theory-generating expert interviews, the researchers tried to find out how the company achieves adaptability.
- In their study, the researchers considered existing concepts while maintaining a degree of openness to identify new ideas.
- Five interviews were conducted with the company's board members. The theoretical sampling method was used for the interview sampling.

## 5. Results: The Company's Organizational DNA

This section presents the company DNA that the authors discovered in their field research. The presentation of the results in this section is important in order to provide a differentiated answer to the research question of the paper in the following section.

The level of openness we considered in our research design resulted in the discovery of the following rather unexpected answers to the question of factors that can support business transformation. These factors are discussed in the following two sub-sections. The first sub-section provides answers to the question of the diverse orchestration of teams. The second sub-section presents a company mantra that affects all levels of the company and fosters adaptability to VUCA environments.

### *5.1. Diverse Orchestration of Staff*

Upon being asked about the organizational capabilities that give their organization a competitive advantage and are hard for competitors to replicate, one of the board members pointed out,

> *"what my competitors don't have is our people, . . ., our management team, the rest you can fill in".*

He further described this as their "company DNA", which cannot be duplicated by their competitors.

At first glance, this might sound like a noble comment from a company CEO in expressing a genuine appreciation for his team. However, considering the request for research about the composition of teams with regard to the "degree of interdisciplinarity" [11], another possibility is that the management under study had recognized this importance of strategic staff composition, and so we were able to make field observations that contribute to answering this question.

E-Ventures' management recognized the need for diverse orchestration of their staff to create fertile ground on which ongoing transformations to cope with their VUCA environment could be achieved and this also works as an essential component for Design Thinking teams to define problems and generate ideas [11].

All the board members described the need for a diversified workforce. They described their idea of team diversity based on four types of diversity; see Table 1.

**Table 1.** Types of diversity identified.

| Quote From | Description of Diversity Sourcing (Quote Level) | Characteristic | Type of Diversity |
|---|---|---|---|
| CEO | It's a couple of elements: Young and senior, you see that here. You've a couple of young people which are thriving, doing great things but you also need some more senior people, you know to have that balanced off. So, that is one key element you see over here is what you see in the mixture is young vs. senior. | Age | Young and Senior |
| CFO | I think it's quite a mixture of also just people that have a very long standing experience, are very much experts in their area but also just a lot of young people who bring a lot of, kind of new ideas into it and are willing to also just go a new path and take new ways bascially that which are not told in the past that you've done if you've already been working like in an organization for the last 15 years and I think that brings together I think quite a good mixture of people who really can push the business forward. | Age | |
| CEO | - He is very good in processes, he knows everything in processes - . . .domain expert, he is the Wikipedia. If you wanna know anything about this business ask him, this is domain knowledge. -So, you walk around you will see a couple of people which are really domain experts because you can't operate in a market if you don't know anything about the market. If I wanna know:" Hey, how is the charger? I wanna be able to go walk to somebody and say:" Listen, how does the charger work?" So, you need domain expertise. | Domain Expertise | Domain expertise and management expertise |
| CEO | You also need managers who know how to manage. So, that's another element which is very key for me where I find a balance into it. So, you have domain experts and you managers. | Management Expertise | |
| CFO | I think one thing is, I think it's a mix really of people who are from the mother company with a background in the mother company because finally a spin-off basically but also people coming from elsewhere, not having a kind of the mother company background. | Corporate network | Corporate Experience and Independent mindset and experience |
| CFO | And as we are generally an organisation who wants to be stand alone. . .it's also important to have people that don't have that background and don't kind of also may be feel tied to the mother company and also question why for instance we should favor the mother company over some other supplier at the end of the day. | Independent mindset and experience | |
| CEO | - . . .Although we are arms length we have an own company, we wanna use them, like for their customers. . .So, that corporate experience is very important because we are part of it, although we are arms length.<br>- It's the real network into it but the other element is also very important, don't forget that. How do we keep the corporate far away from us. . .and that's why that corporate experience is so important because we couldn't do that if we didn't have that experience.<br>- We call it arms length. So, it really needs to be arms length and loosely coupled with and protected the people | Corporate network<br>Corporate experience | |
| COO | - We need to know how a corporate function works<br>- And I think, I fully agree, very important that we do that and separate ourselves from the corporate without losing the connection | Corporate Experience | |

**Table 1.** *Cont.*

| Quote From | Description of Diversity Sourcing (Quote Level) | Characteristic | Type of Diversity |
|---|---|---|---|
| COO | - . . .don't underestimate that factor. So, dealing with decision making in uncertain environment, dealing with the feeling of "it's our money that we are investing, it's my company" and the ownership and the feeling that is behind that. - . . .especially in a scale-up that we are that you have somebody with that entrepreneurial experience. - There you have the entrepreneurship, to inspire people, to be able to stand in the spotlight and everyone wants to work with him and wants to follow because of his way of doing things. . .to connect to partners, to connect to customers. When customer conversations become very difficult we him in and he breaks it open somehow. Because of his way of doing things and connecting to people. . . | Entrepreneurial Experience | Entrepreneurial Experience |

First, balance between young and senior team members to strike an appropriate balance between taking action and doing the right thing. Second, management adds biological age, which is, on the one hand, the time in which someone has developed specific expertise ("defined as the cognitive architecture created over years of work experience, training, and performance-related feedback" [24]) in the required field, from technical expertise to sales, finance, etc., and, on the other hand, an appropriate level of management experience to ensure that the organization in the VUCA environment is very clear about where they are going but very flexible about how they get there [4].

Third, considering that E-Ventures is a spin-off of a corporate organization, the management aims for the correct balance between employees with corporate experience and, with regard to corporate experience, employees who have already worked in the parent company and bring a network to the parent company in addition to employees who have basically gained corporate experience and therefore understand how a corporate organization works. The criterion for this type of diversity is essential for this situation. However, compatibility with other cases can still be discussed, as the need may also apply to companies whose main shareholders are corporate group companies. Finally, a need for entrepreneurship was identified in the interviews, especially for the composition of top management. For one, it was about experience in managing decisions under uncertainty and the ability to inspire and integrate people. This entrepreneurial ability was also acknowledged by Johansen, who stated that "a key managerial skill will be clarity. Getting that clarity right is not easy; it's not just about having a mission statement or something like that. It's about clarity that is compelling, clarity that is biting. It has traction. It pulls people in; it motivates them" [4].

This orchestration of diversity supports the company in developing holistic, systemic thinking and in properly understanding dynamic changes in VUCA environments. Moreover, if we consider the synergetic relationship between Design Thinking and the ideas of Industry 5.0 (discussed in Section 3), it becomes clear how the orchestrated diversity opens up different perspectives and approaches that help to overcome existing barriers in industrial work systems [12] and thus lead to more sustainable and resilient innovations.

### *5.2. Love–Trust–Do*

The second crucial factor to fostering sustainable and resilient business is E-Ventures' company mantra "Love–Trust–Do", which is not only a cultural description but also provides a purpose to constantly drive transformation, demands organizational flexibility, supports the development of organizational capabilities, and so constantly encourages the organization to adapt to changes in its VUCA environment.

#### 5.2.1. Love

On the one hand, love can be related to commitment. The CEO said,

*"...Look, you're going to spend at least 10 h/day here at the office or working. You need to love that... we all love doing this...So, if you ask the two other board members, they're all sitting here because we wanna do this. I wanna do this..."*

However, it could also be observed that love comes with a level of purpose (see Table 2)—you love what you do for a reason.

**Table 2.** Explanation of love.

| Actor | The Actor's Quotes That Explain the Idea of Love | Idea Behind |
|---|---|---|
| CEO | For me it's you need to love to work here. That's it you know. It's because you're passionate about this industry. | Passion and commitment |
| COO | We love what we do. We know we can only be successful when we have people who love what they do, they enjoy their work, going to work every day, that are having fun doing it | Love creates success |

Considering Euchner's observations on how to handle VUCA, "a lot of people cannot live with the current level of confusion", and if you stay frightened "you will freeze and lose the game" [4], turning confusion and fear into a form of active engagement that seeks out opportunities. In this context, the organization's definition of love helps, on the one hand, by finding the right people who can deal with this VUCA environment, since it so specifically searches for and hires people with a purpose, which can give them the necessary drive to succeed in this environment.

As the COO states,

*"We tried to select the people that fit into that mindset".*

In addition, love supports the organizational attitude of active engagement. Thus, the factor of love propels the organization to search for people that are driven by a purpose and fosters the organizational purpose. As a result, love supports the organizational vision, which can help every team member to maintain course within the noise of turbulence, and if this purpose has arisen out of a shared sustainable vision, the organization will drive sustainable innovation. Additionally, the resulting form of active engagement with the environment supports the organization to effectively sense [50] and understand its environment.

#### 5.2.2. Trust

Trust begins with a leap of faith. As the CEO states,

*"We need to build up trust. What I don't want is that, you know, we do things behind our back, into it. If there's something, we tell it. If there's something right, you tell it, if there's something wrong, you'll also tell it".*

The idea of trust is based on a combination of two ideas; see Figure 3. First, the organization E-Ventures establishes trust in all its members to act in its interests. The second is trust in the ability of every organizational member to draw the right conclusion and produce the right results.

As a result of this idea of trust, the organization aims to empower its members to take responsibility for their field of work, take decisions, and act. As the COO stated,

*"We want people who take responsibility, who take ownership and out of that ownership they do."*

| Actor | The actor's quotes that explain the idea of Trust | Idea behind |
|---|---|---|
| CEO | Trust also that the colleagues are doing the best they can. If you don't, ask about it. | Trust in best purpose and best efforts |
| CFO | But at the end of the day we also just put a lot of trust in our people that they're able a kind of to come up with the right results. | Trust in the ability to draw the right conclusions |
| COO | Trust each other that there judgement on the situation is right | |
| COO | We trust each other. We give a lot of freedom to our people but there's a lot of responsibiltiy that comes with the freedom | Empowerment |
| Head of Business Development | And I mean as we are developing as quickly as we are there's a lot of trust and with this trust empowerment of everyone to move ahead. | |

**Figure 3.** Explanation of trust.

This form of trust can support the organization in responding to dynamic changes in VUCA environments with an appropriate level of flexibility. This support is provided at the level of operationalization of adaptability, especially when considering Teece's assessment of the vulnerability of companies in the sensing process (sensing "...is about scanning, learning and interpretating across technologies and markets" [55]), that the "...enterprise will be vulnerable if the sensing, creative, and learning functions are left to the cognitive traits of a few individuals" [55]. Thus, implementing this idea of trust in the organizational DNA appears to be an effective way to counter vulnerability by empowering and requiring every organizational member to support organizational adaptability by actively sensing the environment and sharing insights.

#### 5.2.3. Do

As Johansen already noted, "confusion is part of the game. And actually, being frightened is part of the game, too. But you cannot stay frightened, or you will freeze and lose the game" [4]. The management attempts to establish exactly this attitude such that the organization can withstand turbulence, noise, and uncertainty, recognizing opportunities for its own further development in precisely these environments and acts.

The management is aware that, despite the uncertain market environment, a proactive attitude is necessary; see Figure 4. By accepting mistakes as part of the game, they also accept them among their employees. It is also important to them that employees join forces where necessary. This leads to the taking of responsibility at all levels and, as a result, to a do-mentality, where not only are ideas generated and prototypes developed, for example, but innovation continues until the desired transformation is achieved. As the CEO stated,

> *"Especially in this new market you have to pivot. The company we built last year will not be the company in 6 years I can definitively tell you that. That's a given because you pivot. But how do you pivot? It's not the company who is pivoting it's people who pivot. They do it...That's what I believe."*

E-Ventures' "Love–Trust–Do" mantra affects all levels of the organization. It strengthens the purpose to drive transformation and supports organizational flexibility to drive rapid action. Additionally, it creates requirements for the company's leadership, which is another important factor "in boosting innovation" [25] and for fostering sustainability in

companies. Values "such as integrity, transparency and accountability" and characteristics such as empathy, creativity, and openness to failure [11] are needed to encourage employees to actively seek and sustainably innovate together [11,23].

| Actor | The actor's quotes that explain the idea of Trust | Idea behind |
|---|---|---|
| CEO | It's a Do-mentality. Don't ask, Do. | Be active and take action |
| | Look, one of the things you need to do now is, what you need is, to do things because there's uncertainty in the market. | |
| | What we do as a management team, we have a different approach. We believe in ourselves, we listen to our people, we believe what we see and we go for it and we back each other on it. We do things. | Trust in yourself and do |
| | We are working with people because their nature...they will do sometimes things...which are not right. So, it happens but the thing is, as long 90% or 80% is fine, it's good. The other 20% what you do is, let them make the mistakes. That is also part of the do-mentality. Let them. | Accept failures as part of nature |
| CFO | You just do it. You just reach out to the person you think who is capable of helping you and supporting you and I think what we is that people are willing to help and support | Support each together and act aligned |
| COO | We want people who take responsibility, who take ownership and out of that ownership they do | Ownership |
| Head of Business Development | So, the business managers in the different regions they have a lot of empowerment to accelerate their business and to make the decisions and to do what's best for the business | Empowerment |
| | I think there's just a lot of trust and empowerment to give all of these people like the flexibility to act and not to always being slowed down by some processies | Empowerment first, processies can follow |

**Figure 4.** Explanation of do.

It is apparent that the responsible E-Ventures leaders must precisely exemplify these characteristics and values in order to live up to Love–Trust–Do. Thus, through this mantra, the company builds fertile ground for the effective use of approaches such as Design Thinking and ultimately establishes adaptability (the continuous creation of innovation of solutions or directions [10]) to VUCA environments and sustainable transformation.

Summarizing this section:

- The introduced company DNA consists of an intentional, diverse orchestration of staff, from different European countries, that balances young and senior, domain and management expertise, corporate expertise and independent mindsets, and entrepreneurial experience. This orchestration of diversity allows the company to foster holistic, systemic thinking
- Furthermore, E-Ventures' company DNA consists of the "Love–Trust–Do" mantra that transnationally impacts all levels of the organization. The mantra empowers the company to drive transformation and strengthens the company's ability to adapt to rapid changing environments

## 6. Discussion: How E-Ventures' Organizational DNA Can Drive Business Innovation through Design Thinking

Scholars call for research on the organizational factors required to utilize the full potential of Design Thinking in companies [11]. This section discusses the findings from the previous section, answering the research question of this paper around cultures and diversity that enable the utilization of Design Thinking. It discusses in particular how orchestrating a purposeful diverse staff and implementing the Love–Trust–Do mantra help to realize the full potential of Design Thinking.

Diversity is a "necessary prerequisite for a healthy reflexive discourse on our technological futures and must be preserved and appreciated" [19], understanding diversity as "significant human expertise. . .in all the domains that comprise the system" [19]. Tavanti also emphasizes the idea of diversity, especially for sustainability: "Sustainable leaders should work to build a diverse workforce that reflects the communities in which their organization operates, and that encourages diversity of thought, experience, and perspective" [23]. Then, in Meinel and Leifer, Ardoin broke it down for Design Thinking by finding,

in their survey results, that diversity is an important principle of Design Thinking when it comes to sustainability [9], which is underpinned by Santa-Maria, who points out the potential of Design Thinking to foster the integration of a diversity of perspectives through the inclusion of multidisciplinary and diverse teams, thereby generating sustainable innovation [27]. Hence, the importance of diversity for sustainable transformation through Design Thinking is indisputable. However, it is too late to start considering the aspect of diversity when staffing Design Thinking teams, since this would mean that the actors can only rely on the resources that are available to them. It is therefore more important to already pay attention to the staffing of the organization regarding the right level of diversity needed to meet the challenges faced by the company. E-Ventures uses four central criteria to find the right balance; see Table 1. In addition to the diversity criteria, the management also pays attention to the hiring process in identifying candidates who come with a purpose, match with the company's sustainable vision "building a sustainable world by providing green energy charging for everyone, everywhere", build trust, and perform as creators in uncertain and turbulent environments. These can be considered as further important factors that help to create a culture in which adaptability trough Design Thinking can be developed and fostered. As Rösch noted, Design Thinking requires "a culture that allows participants to be creative and considers failures to be important insights" [11].

Next, for a sustainable vision [21,23] that is shared by all actors, a foundation needs to be established for the development and implementation of sustainable innovations of solutions or directions. Based on their vision of "building a sustainable world by providing green energy charging for everyone, everywhere" in combination with their drive to operationalize their vision through a network of sustainable partnerships, E-Ventures already seeded the idea of a shared vision that consists of the main characteristics of Industry 5.0, "Human-centricity", "Sustainability" (incorporating the SDGs) and "Resiliency" ("the ability of a system to keep or recover quickly to a steady state") [12], and drives commitment through love in their company DNA. To what extent this set-up has also led to an integration of the idea of ecodesign could not be explicitly observed, but it can be noted that the company provides 100% certified green energy at its charging stations, which underlines the aim of resource-saving innovation. In any case, it could be observed that ensuring a common sustainable direction happens in the seed stage, even before cultivating the needed Dynamic Design Thinking capabilities; see Figure 5. This corresponds with the recommendations from research that sustainable development must be integrated into the entire business process "rather than merely adding 'sustainability' as an additional need" [29].

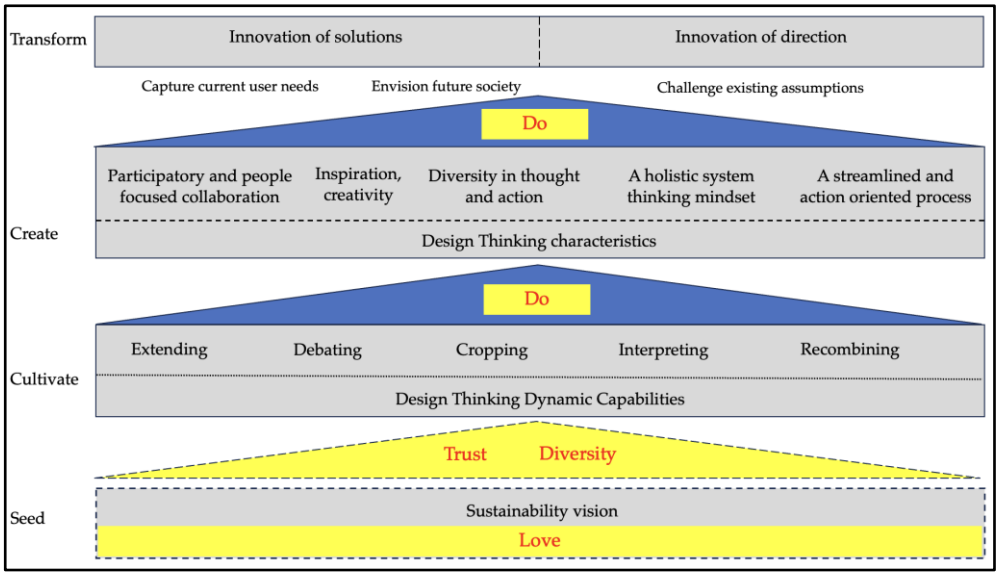



**Figure 5.** Fostering sustainable Design Thinking through the company's DNA.

Trust works in several ways, as an enabler and amplifier of Design Thinking Dynamic Capabilities; see Figure 5. First, a sound foundation of trust in the ability of the actors to draw the right conclusions, trust in best purpose and efforts, see Figure 2, cultivates the capabilities of extending, debating, and cropping [22] because in an age of complexity and ambiguity, the "discomfort of not knowing" [56] arises, and so the company leaders need to trust in the actors' ability to appropriately "re-frame problems, examine possibility, and make meaning" [56]. Conversely, the actors also need to be able to trust in their stakeholders' ability to observe and assess their environment. Second, to foster the Design Thinking Dynamic Capability of "recombining", both the Design Thinking actors and their sponsors need to trust in the designers' capabilities [57]. As the design leader Jon Kolko noted in his work for the Michigan Institute of Technology, "there is no visible connection between the input and the output; often, even the designers themselves are unable to articulate exactly why their design insights are valuable" [57]. Third, trust creates transparency, and the actors open up and share successes and failures, which leads to the foundation of iterative learning loops and, moreover, fosters a culture that considers "failures to be important insights" [11].

Finally, "a fundamental tenet of human-centered design is to do" [58]. By injecting do into its corporate DNA, E-Ventures supports its actors to trust in themselves, accept failures as part of the game, take action, and actively engage, which aligns support to create and win; see Figure 4. Through this mindset, actors can reach a mode of acceptance, relax their minds [59] and, as a result, create a Design Thinking framework where experimentation, learning, and recombination occur rapidly until the desired transformation into innovations of solutions or directions is achieved; see Figure 5.

Thus, Love–Trust–Do does not only help in seeding a sustainable vision and cultivating Dynamic Design Thinking Capabilities but also supports the operationalization of sustainable Design Thinking that leads to sustainable transformations. In turn, Design Thinking can also have a positive effect on the company mindset, especially for those with a high level of domain expertise [24], since "over time, expertise tends to become cognitively entrenched, leading to a loss of flexibility" [24]; thus, it allows for new experiences and learning from stakeholders, holistic thinking, and consideration of new perspectives for adapting to changing conditions [24]. When the establishment of Design Thinking focuses on its users instead of the dogmatic implementation of the method itself [24], it can help domain experts "tune their existing schemas to develop flexibility in expertise" [24].

Summarizing this section:

- The E-Ventures DNA, consisting of a purposefully orchestrated diversity of employees in combination with the company mantra "Love–Trust–Do", impacts all transnational levels of the organization, laying a foundation through which the full potential of Design Thinking can be realized
- The sustainable company vision, which considers the principles of Industry 5.0, is essential for the realization of sustainable transformations through Design Thinking.

## 7. Conclusions

This paper recognizes the potential of Design Thinking when based on sustainable visions and integrating the concept of ecodesign at the level of product innovation. By integrating Design Thinking into the cycle of continuous improvement of management systems, innovations of products, and transformations on the organizational and strategic levels, companies can enable sustainable transformations of their business. It can be concluded that Design Thinking offers a method for companies to innovate products and transform businesses sustainably, which can result in strengthening the companies' adaptability and resilience in turbulent environments. To leverage its full potential, certain organizational factors must be in place. This study contributes to identifying these factors, emphasizing the importance of diversity and team composition on the one hand and, on the other hand, presents an orchestration of diversity that can support utilization of the full potential of Design Thinking. So, this study underscores the strategic recruitment of employees who are

aligned with the company's purpose. It further points out how a balance between domain expertise, management experience, corporate work experience, and entrepreneurial spirit fosters the company's intended level of diversity. This diversity supports systemic thinking and human-centric innovation, enhancing resilience and adaptability.

Our research underscores additional factors crucial for harnessing Design Thinking's potential, addressing a gap in the literature regarding the cultivation of these elements. The concept of Love–Trust–Do emerges as pivotal in fostering a culture that underpins the organization's sustainable vision, encouraging fearless and proactive engagement with uncertainty and ensuring ownership across all levels. This approach, combined with the company's intended level of diversity and sustainable leadership, amplifies innovation and the company's sustainable impact, and can be seen as an essential foundation for sustainable Design Thinking.

This case study also has obvious limitations. On the one hand, it is limited to a young, growing company whose sustainable success will have to be demonstrated in the coming years. Nevertheless, it can be stated that this young company has already grown to having over 5000 charging points in several European countries in recent years.

In addition, the extent to which these results can be transferred to companies of other sizes and sectors as well as to other countries and cultures still needs to be examined. The fact that E-Ventures already operates in various European countries could be a first indicator of the transferability to other European companies of a similar size and with a similar business model.

Future research could accompany E-Ventures in its development and further explore the extent to which this mantra has sustainably strengthened adaptability and how this adaptability has, in turn, contributed to sustainable development and economic success.

In summary, it can be said that the findings of this case study based on a theoretical model developed in Section 5 provide insights into factors that help in realizing the full potential of Design Thinking for sustainable business transformation. Its practical applicability needs to be investigated in further research.

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