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Conceptualization of Agile Transformation in Industrial Companies: Illustrative Application of the Framework

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Abstract: The present study explores the process of agile transformation and the implementation of agile work practices in industrial companies, outlining an appropriate theoretical conceptual framework for the agile transformation of organizations. The purpose of this research is to discuss theoretical approaches explaining agile transformation and agile work practices in industrial companies, to present a conceptual framework, and to assess the effectiveness of the framework on the example of selected German industrial companies. For the research, a descriptive research design was chosen to substantiate the structural perspective of agile transformation and agile work practices in industrial

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companies and to reveal the interaction between these dimensions, while seeking to present the conceptual framework. A qualitative research strategy with semi-structured interviews was applied. This article proposes a concept of agile transformation of industrial companies, encompassing new insights. Agile transformation is referred to as the ability of companies to remain stable by employing agile work practices, preparing for and adapting to changes in the new environment while stressing the importance of the selected leadership style within the context of the organizational culture, and finally, using the experience gained to strengthen the agile transformation competencies and emphasizing the leadership of the managers as they perform a decisive role in implementing agile transformation in the company, managing the agile work practices and uncertainty. At the end of the article, a conceptual framework is presented that reflects the key structural parts. The conceptual framework was validated on the example of selected five strongest German industrial companies. Expert assessments revealed the choice of the leader as trainer (as the most suitable leadership type) and its effect on the implementation of agile transformation in the company, seeking to navigate to an agile way of working (when the manager helps identify the areas of improvement in agile work methods and processes). The experts also highlighted the effectiveness of agile work practice implementation (allowing to suggest expansion opportunities for industrial companies, enabling the effectiveness and sustainable competitiveness in the sector) and noted the interaction between the two dimensions.

Keywords: *agile transformation, agile work practices, conceptual framework, industrial companies*

1. Introduction

Companies have their daily traditional routines in business processes, but they are also increasingly facing new challenges such as short innovation cycles and digitalization. Industrial companies have to develop new technologies, such as sensor technologies in production environments, as well as enabling artificial intelligence or cloud solutions. Recent shocks to the global economy (disrupted supply chains, energy prices, and worker

shortages) have highlighted the complex interplay of various disruptive forces, particularly in manufacturing (Wallin, Pihlajamaa & Malmelin, 2021).

These new challenges cannot be solved by applying classical approaches. Therefore, the whole development process has to be constantly adapted and reverified. For this reason, it makes sense to introduce the necessary flexibility and agile work practices. The term 'agile' entails a variety of perspectives: agile can be used to refer to an approach, a method, a practice, a technique, or a framework. It can be pointed out that agile processes promote sustainability; also, agility in leadership has become a much-needed competency. Agile methods require agile teams that think differently and work in ways that support responsive delivery. An agile mindset and a set of shared values, principles, and often agile tools contribute to the success of agile teams. These elements of the agile concept serve us to analyze the object of our study—that is, agile transformation in industrial companies and agile work practices. It can be argued that agile transformation of the companies is a complex process of change: in addition to the level of technology/manufacturing processes, it also entails structural, process, and cultural levels, and requires shifts in attitude and behaviour from everyone involved. Agile working is seen as the integration of processes, people, and technology to create a dynamic workforce.

Traditional companies, however, are not designed for the dynamic development of the changing economy; instead, a company's ability to change becomes a critical success factor. Agile work practices create the opportunity for companies to act and react flexibly within short timeframes, therefore the agile transformation of companies is a prerequisite to be able to overcome the challenges. Agile transformation implies that the entire company, including all business units (from those who define a business strategy to implementing operations), work agile.

Following the document *Agile Practice Guide* (2017), the concept of agile emerged as a response to the shortcomings experienced in traditional software development processes. The traditional approach involves sequential steps and all requirements are defined upfront. However, such practices may not be practical or allow for the team to be flexible and make rapid adjustments. Agile ways of working allow teams to keep up with the constantly shifting technology and business requirements. Some of the fundamental differences between traditional and agile ways of working are that the traditional methods assume predictability, attempt to minimize changes, and exert control over schedules.

Several researchers (Ng *et al.*, 2023), discussing agile transformation in work environment, present the following concept of Agile Ways of Working: (1) scaled agile practices; (2) advantages, success factors, and barriers to the application of scaled agile practices; (3) agile ways of working in industrial companies; and (4) human-centred design of agile team management in industrial companies.

Modern companies are accustomed to relying on teams to address challenges in creativity and innovation. The active role of leadership and the understanding of team dynamics that might facilitate creativity and innovation are becoming increasingly relevant when assessing how team organization and composition should evolve over time and vary depending on the team's development, and creative and innovation processes. It can be stated that the role of leadership in agile company transformation and agile work practices is very important.

Corresponding to the evolving but not yet sufficient scientific literature focusing on how industrial companies can apply agile work practices in the agile transformation framework, the authors of this article emphasize that successful agile transformation is a complex, long-term process, requiring the support of all people in the organization. Agile work approach requires methodological knowhow as well as agile principles and values that are respected and followed by everyone involved. While agile frameworks can provide orientation, their full potential is realised only when they are tailored to the individual dynamics in the company. There is a lack of applied studies on the conceptual framework being constructed and tested in industrial companies.

Based on these research gaps, the research problem addressed in our study focuses on the development and validation of a robust agile transformation framework that is capable of guiding industrial companies through the intricacies of adopting agile practices at every level of operation. To ground the conceptual relationship between two dimensions (agile transformation and agile work practices), the general research question is constructed: *How do agile work practices manifest, and how do they influence agile transformation in an industrial company?*

The aim of this study is to develop and empirically validate a conceptual framework for agile transformation in industrial companies operated in Germany. This framework is intended to guide such companies through the multifaceted process of adopting agile methodologies across all aspects of their operations, thereby enhancing their adaptability, innovation capacity,

and overall competitiveness in a rapidly evolving economic landscape. To achieve this aim, the following research tasks were formulated: (1) to explore and analyze the multifaceted dimensions of agile transformation within companies, focusing on the theoretical underpinnings, practical methodologies, cultural shifts, necessary for successful implementation; (2) to provide a conceptual framework that can be adapted and applied by companies across various industrial sectors willing to become agile; (3) to validate the framework, performing interviews with experts and gathering valuable insights into the practical aspects of agile transformation in industrial settings.

The structure of the paper is as follows: Section 2 deals with the theoretical foundation on agile transformation and agile work practices and reviews empirical studies on the application and impact of agile transformation in German companies. Section 3 proposes a conceptual framework designed to guide industrial companies through the agile transformation process. Section 4 presents the methodology and findings from semi-structured interviews conducted with experts from German industrial companies. The final section summarizes the main insights derived from the theoretical analysis and the empirical investigation and offers recommendations for future research.

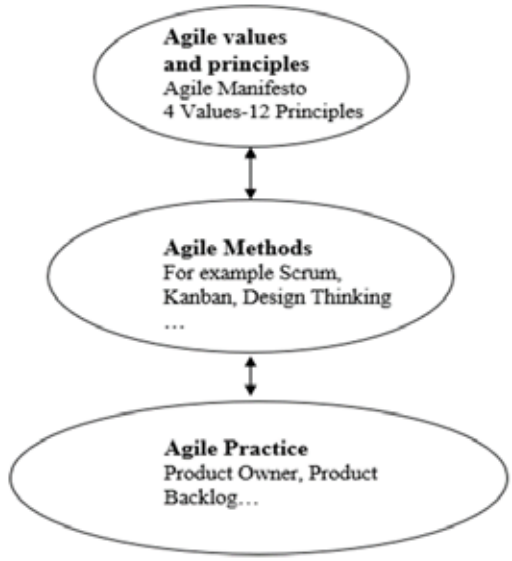
2. Theoretical foundations of agile transformation

2.1 The concept construction and main characteristics of agile transformation

Agile transformation is defined in various contexts as the process through which a company modifies its operations to adopt an agile working approach, thereby boosting its competencies. Adopting agile methodologies for project management alone is not sufficient for a complete agile transformation; it also necessitates cultural shifts, specifically the internalization of agile values and attitudes (Denning, 2015; Young, 2013). Holbeche (2015) highlights the critical role of mindset, noting that an agile approach transcends mere tools and techniques. True transformation demands personal shifts in values, expectations, rituals, and behaviors, thus requiring a systemic overhaul of the organization's structures, processes, and systems. According to Kane *et al*. (2016), applying the agile approach is valuable because its characteristics have been shown to increase organizational mobility, which helps to find a solution to how an organization can embed organizational change while ensuring competitiveness and resilience.

Figure 1 illustrates agile transformation approach.

Figure 1. Agile transformation approach.



It is important to note that values describe the requirements of the agile way of working at a conceptual level, while principles describe the behavior that is desired when executing a project with agile work. Agile transformation follows four core values: prioritizing people over processes (individual and interactions over processes and tools); working software over comprehensive documentation (solutions over documentation); customer collaboration over contract negotiation; and responding to change over following a plan (adaptability over strict planning) (Beck *et al*., 2001).

Following Beck *et al*. (2001), agile transformation is reinforced by 12 principles: the highest priority is to satisfy the customer through early and continuous delivery of valuable software; business people and developers must work together daily throughout the project; build projects around motivated individuals; the most efficient and effective method of conveying information to and within a development team is face-to-face conversation; working software is the primary measure of progress; agile processes promote sustainable development; continuous attention to technical excellence and good design enhances agility; simplicity—the art of maximizing the amount of work not done—is essential; the best architectures, requirements, and designs emerge from self-organizing teams; and at regular intervals, the

team reflects on how to become more effective. It can be seen that the principles emphasize the importance of customer satisfaction through iterative delivery, encouraging change, fostering collaboration, empowering individuals, and encouraging continuous improvement for the development of sustainable, high-quality software. Agile methods help to move towards implementation in practice (from software development to business: representatives of Scrum, DSDM, adaptive software development, Crystal, feature driven development, pragmatic programming, and others supporting an alternative to heavy-weight linear software development) allowing us to understand how the internal and external focus of agile practices reflects on becoming an agile company, with an emphasis on the need for continuous monitoring.

Agile transformation can be implemented in two ways—using the "big bang" or the "step-by-step" approach. When an urgent and elaborate cultural shift is desired, a "big bang" approach is the best option. In these situations, top management needs to be completely on board and show ongoing support for the transformation (Dikert, Paasivaara & Lassenius, 2016). The "step-by-step" method, on the other hand, is ideal for gradual transformation in large organizations, facilitating pilot testing and process optimizations throughout the transformation phase.

When aiming for a gradual increase within certain domains of the organization, the incremental approach is the best way forward. Leadership and strategy play vital roles in the transformation process, requiring not just technical proficiency but also strategic implementation, change management, collaboration, and communication. Agile transformation can fundamentally reshape an entire organization, necessitating strong leadership to develop and implement the transformation vision and strategy (Westerman, Bonnet & McAfee, 2014).

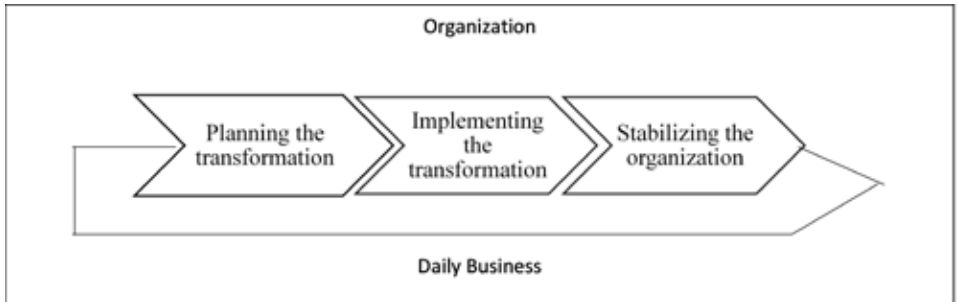
The importance of leadership change has also been highlighted by other researchers (Kohnová & Salajová, 2020), who have argued that an agile organization is primarily about the deployment of self-directed teams. Hoda, Noble and Marshall (2010) present in their research an effective way of organizing autonomy teams in an agile environment. Stray, Moe and Hoda (2018) define barriers that may restrain the performance of agile teams. Regardless of whether initiated from the top-down or bottom-up, the shift towards an agile mindset is paramount. Nowotny (2017) describes the agile mindset as a departure from profit-centric thinking, hierarchies, and control towards a culture of purpose, networking, empowerment, experimentation, and transparency. Implementation of agile practices in an industrial

company requires advance planning, clear communication, and structure. Ciric *et al*. (2018) have noted the importance of agile project management, arguing that agile has become a cutting-edge method practiced mainly, but not only, in the software industry, and is making inroads into other areas.

According to Gareis (2010), agile transformation takes place in three stages (see Fig. 2):

1. Planning the transformation.
2. Implementing the transformation.
3. Stabilizing the organization.

Figure 2. The process of transformational change.



Source: Authors' contribution, based on Gareis, 2010.

Organizational change can occur in various forms, depending on the organization's readiness for change, need for development, or radical new positioning. Attention to cultural change during the transformation is crucial (Gandomani & Nafchi, 2016; Wendler, 2016). Agile transformation is characterized not only by the adoption of agile methods but also by a shift in organizational culture, requiring strategies to address challenges and mitigate the risks of negative impacts on the transformation.

The process of adopting management innovations in organizations is typically divided into initiation, decision, and implementation phases, marking a progression of orderly sequential stages (Hecker & Ganter, 2013). Agile organizations focus on customer satisfaction, adaptability in the face of uncertainties, competitiveness through collaboration, and leveraging key employees and information (Goldman, Nagel & Preiss, 1995). In today's fast-paced and competitive market, agility enables companies to respond swiftly to new customer demands, requiring a shift towards customer-centric strategies, decentralized decision-making, and a reassessment of leadership

roles, company values, and communication practices (Meredith & Francis, 2000).

Agile transformation often begins with pilot projects that emphasize the principles of "early and regular delivery" and "inspect and adapt." This approach allows organizations to gradually introduce agile concepts, leading to broader application based on positive experiences from initial pilots. Large corporations, despite their hierarchical structures, must embrace customer alignment and decentralized decision-making to remain competitive. This necessitates a reimagining of processes, leadership roles, company values, work practices, and communication channels to ensure a successful transformation.

Rigby *et al.* (2019) propose a comprehensive framework for agile transformation, emphasizing changes to the organizational structure, financial processes, delivery processes, performance measures, and the strategic mandates provided by managers to product teams. This framework underscores the shift towards a product-oriented team structure, dynamic budgeting aligned with strategic goals, iterative project implementation, and a focus on team and value measures for evaluating performance.

Agility fosters a perpetual state of change, advocating for sustainable organizational change infrastructures and fostering communities of stakeholders (Jick & Sturtevant, 2017). The need for more research into agile culture transformation frameworks and sustainable change practices within organizational cultures is evident, pointing towards the development of pragmatic and comprehensive strategies to cultivate an organizational culture conducive to agile transformations.

The discourse around agile methodologies highlights the importance of adopting effective methods and reevaluating work practices. While agile procedures are implemented in projects, they seldom aim to transform the organizational structure. As a result, hierarchical and agile project structures coexist, leading to isolated implementations of agile methods. Agile transformation transcends mere methodologies, embodying values and principles that instigate a shift towards self-managing teams and necessitating a reorientation across the entire organization, not just among project or team members. This approach fosters an agile mindset, essential for evolving into an agile organization.

Berkani, Causse and Thomas (2019) assert that agile transformation extends beyond simple practice adoption, with some organizations aiming to evolve into "agile enterprises." Despite the burgeoning interest in agile

transformation, research in this area remains limited, and the concept itself appears ambivalent. Measey (2015) eloquently states that "agile is a journey, not a destination," emphasizing the ongoing nature of the process and the need for resources and leadership focus on cultivating teamwork methods and values such as trust and a unified approach.

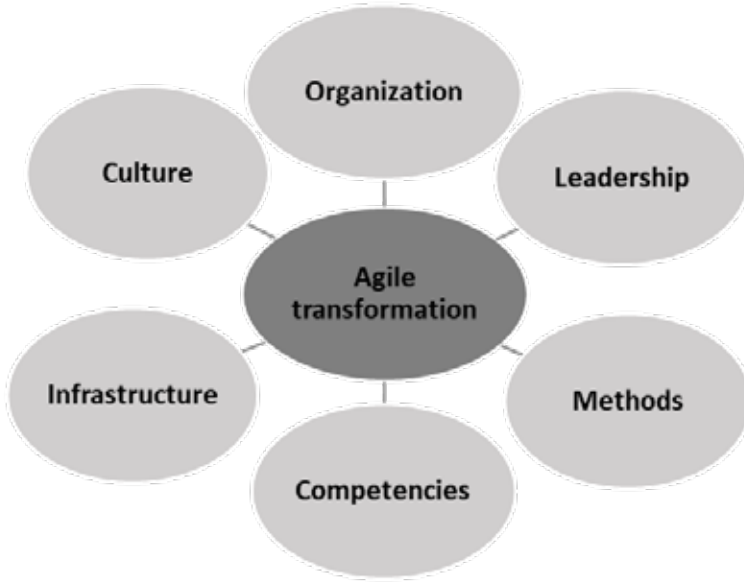
Implementing agile methodologies can present significant challenges, particularly due to existing cultural resistance to change (Campanelli & Parreiras, 2015). Küpper *et al*. (2017) have identified a research gap in agile organizational culture, particularly concerning systematic strategies for change. Completing an agile shift across an entire organization typically involves a comprehensive transformation of the corporate culture, a task Denning (2015) describes as both large-scale and challenging. A culture of feedback, openness to failure, and learning from mistakes is crucial for continuous improvement. This iterative process of improvement, however, may conflict with existing mindsets that discourage failure (Johnston, 2017). Today's digital evolution acts as a catalyst for agile transformation, necessitating adaptation to rapidly changing market conditions, such as shorter production cycles and evolving digital landscapes (Greening, 2013).

The implementation of an agile approach impacts the entire organization, requiring a shift in organizational mindset towards trust-based employee relations, goal alignment, and resource allocation. Such changes demand individual learning, adaptation to new tasks, and the fulfilment of emerging requirements, reflecting the dynamic nature of contemporary professional landscape (Solikin & Farid, 2018).

The journey towards agility is underscored by the necessity of a competent team to guide the transition, adjust processes, and address infrastructural needs. Sommer (2019) points out common challenges in transformation, such as resistance to agile methods due to perceived limitations or misunderstandings of their essence. Gobble (2018) suggests that solutions tailored to specific cases can serve as a blueprint for broader organizational change. Dikert, Paasivaara and Lassenius (2016) discuss the scaling of agile methods in large projects, highlighting challenges such as requirement analysis and coordination among agile teams.

In the course of the theoretical discussion, the authors of this article have identified the main characteristics that influence agile transformation (see Fig. 3).

Figure 3. Characteristics influencing agile transformation in companies.



Source: Authors' contribution.

The influencing characteristics include:

- *Organization*: Self-organized teams and employees, decentralized steering, and the way of working with focus on networking between agile teams.
- *Leadership*: Managers function as coaches. New employee development schemes, high autonomy given to employees and decision-making within teams.
- *Methods*: High levels of self-empowerment and self-organization. Support and further establishment of teamwork, agile working methods.
- *Competencies*: Broad competency development of all employees regarding agile methods. Qualification and development of agile coaches and management.
- *Infrastructure*: Reconfiguring office space, allowing the introduction of new collaboration tools.
- *Culture*: Customer-oriented processes. Transparency throughout the company. Open communication.

Shaping and implementing the agile transformations requires a highly qualified and motivated workforce, which generates new proposals through

a continuous exchange. The engaged behavior of managers as well as of teams, therefore, have a decisive influence on success.

Agile transformations typically commence with pilot projects, adhering to the principles of "early and regular delivery" and "inspect and adapt." This phased approach allows organizations to gradually introduce and expand agile methods based on the successes of initial pilots, demonstrating that a step-by-step introduction of agile concepts through pilot projects or specific areas can lead to broader organizational adoption and transformation.

A model of agile process is being implemented in recent years, in addition to the usual structured processes. Agile processes have proven themselves in various companies, however, not every company can quickly adopt and apply the agile approach, often because of the large size of a company or of the approach that the company has been entrenched in up to now. For companies that mostly work on a project basis, agile transformation often means moving from individual projects or teams working with frameworks such as Scrum to entire departments or even the whole company's working in an agile way. If individual teams or projects in a company work successfully with agile approaches, the question often arises as to how these approaches can be used across projects or departments or even for large projects.

In summary, agile transformation encompasses a comprehensive shift in organizational culture, processes, and structures, guided by agile principles and values. This transformation journey is marked by challenges, requiring dedicated leadership, a willingness to embrace change, and a strategic approach to embedding agile methodologies across all facets of the organization.

2.2 Agile transformation experiences in German companies: A research review

A review of numerous surveys on agile transformation in German companies shows a growing importance of agile methods. This trend is attributed to technological advancements, digitalization, and the need for organizational adaptation. In a study by GPM (2019), for example, over 600 individuals from more than 20 countries reported a noticeable improvement in results and efficiency with the use of agile methods, particularly when applied consistently. Notably, while a significant portion of respondents have been employing agile methods for over four years, only a fraction has adopted these methods in their purest form.

The University of Applied Sciences in Koblenz (Komus & Kuberg, 2017) reported an 85% efficiency gain from agile approaches, with Scrum being the predominant method. Despite the widespread adoption of agile methods, the corresponding agile mindset has yet to fully permeate the employee, management, and organizational culture levels. The *Future Organization Report* by Peters *et al.* (2019) explores the opportunities and challenges of agility from various stakeholder perspectives, highlighting the benefits of agility in responding to customer demands, market entry speed, and overall organizational effectiveness.

Agile environments prioritize constructive error management and view failures as opportunities for optimization. The agile change process, fraught with uncertainties and the need for adaptive competencies, often clashes with traditional organizational mindsets, making the transition a lengthy endeavor. To overcome these obstacles, the recommendation is to commence with a clear transition plan and secure support from all stakeholders.

The LEGO Group is already undergoing an agile transformation process, expecting to increase the functionality of digital deliveries and to reduce significantly project delivery time. There are three stages in the process of making changes (CEB Global, 2016) that were applied by LEGO:

1. Create a new strategy and new vision. Employees and leaders develop together the change strategy.
2. Implement a plan. An employee implements the plan and in case of the need for an advice from a leader, the leader can coach and support the employee.
3. Communicate and sustain change. Employees should be involved in planned, top-down campaigns from early on.

According to the study by GPM (2019), agile approaches have been widely accepted in practice. Scrum has the greatest general importance of all approaches. Of the agile participants, 55% rated the approach as very important and 29% as important for their area, with only about 14% of the participants rating it as unimportant or of little importance (GPM, 2019).

The reluctance of corporate culture to embrace change is particularly noted among respondents from traditionally oriented sectors (Hernstein, 2018). Research indicates significant disparities in the implementation status and practical application of agile methods. Schröder (2018) suggests that the adoption of agile methodologies necessitates a preliminary definition of the framework and objectives, entailing not just procedural changes but also alterations in roles and responsibilities within the development process.

The decision on whether agile projects should be executed internally or with the assistance of external consulting specialists is pivotal, with pilot projects often serving as the ideal testing ground. Project management emerges as a crucial factor, orchestrating the necessary framework and guiding the transition process. Roghé, Scholz and Schudey (2017) in their *Future of Organization* study, which surveyed approximately 1,100 executives and non-executives across ten industries in over 40 countries, analyzed success factors and their impact on corporate economic performance. The findings reveal that agile companies frequently outperform their counterparts, achieving higher margins and exhibiting faster growth. Notably, the study underscores the prevalence of agile methodologies, such as Scrum and Kanban, within German firms, yet points to the sporadic integration of the agile mindset within corporate cultures.

If a company applies an agile way of working, it does not mean that the agile mindset is concurrently existing as well. The agile mindset is not integrated in a corporate culture. Thus, agile structures and approaches are predominantly introduced in specific areas. The topic of sustainability is important, but a long-term roadmap is either non-existent or selectively present. A study conducted by Karabulut and Ergun (2018) revealed that a significant majority of respondents (81.2%) felt adequately prepared for their current roles, although many (75.4%) acknowledged the necessity for ongoing skill development. The study also highlighted the value of teamwork and the essential role of coordination in achieving success. Interestingly, managers perceive themselves as more agile compared to how their team members did, underscoring a potential misalignment in perceptions of agility within organizations. Only 19.2% of managers indicated that mistakes in the company are not used against the person, so this factor could be an obstacle to agile transformation. The main reasons are the fear of making mistakes and a lack of communication. Agility does not have to be measured using one's own key performance indicators (KPIs), but rather serves to achieve other goals more efficiently, according to the authors of the study. However, a review and adjustment of the previous KPIs is necessary because agile organizations create different framework conditions. So, companies lack a strategy and a roadmap, intermediate goals, or desired results. Transparency and traceability are challenges in agile transformation.

An ACE (2016) survey of around 500 top managers across Europe identified the apprehension of making mistakes and the ensuing lack of communication as barriers to agile transformation, suggesting the need for a cultural shift towards embracing errors as learning opportunities (ACE, 2016). The study

further indicated that nearly all top managers in Europe view agility as a key differentiator and are eager to enhance their companies' agility, linking it to innovation and industry leadership.

Weckmüller (2017) found that a significant proportion of agile method users consider their companies to be more successful than others, attributing this success to improved organizational efficiency facilitated by agile practices. Specifically, 34% of the users of agile methods rated their company more successfully than other companies, and 70% indicated that the organization has improved its efficiency through the application of agile methods. Leadership plays a critical role in fostering an agile culture, with a shared responsibility model marking a departure from traditional management structures.

In contrast to traditional companies, in which responsibility is taken over by a disciplinary manager, in agile companies there is an equal sharing of responsibility; all stakeholders are included in the field of agile transformation.

The synthesized empirical research on agile transformation within German companies revealed a growing adoption of agile methodologies, driven by digitalization and the need for organizational adaptability. The findings underline the importance of not only adopting agile practices but also fostering agile thinking at all levels of the organization. Despite the challenges, the benefits of agility in terms of improving responsiveness, efficiency, and competitiveness are evident.

3. Conceptual framework for agile transformation in industrial companies

This section outlines our conceptual framework tailored for industrial companies embarking on, or aspiring to initiate, an agile transformation to enhance their business management and bolster organizational resilience amidst uncertainty. The discourse on resilience is pivotal, as resilient organizations are distinguished by their strategic foresight, viewing success not merely as happenstance but as the fruit of meticulous preventative preparation (Bartusevičienė, Rakauskienė & Valackienė, 2022).

Bartusevičienė, Rakauskienė and Valackienė (2022) define resilience as an organization's ability to adapt to new conditions caused by crises, promoting

growth through continuous learning from new situations and experiences. These authors also outline the primary dimensions of resilient organizations and propose a benchmarking model to gauge organizational resilience under uncertainty, identifying four tiers of resilience maturity: fragility, robustness, resilience systems, and antifragility.

On the other hand, organizational resilience is modelled as the result of an organizational capacity to "bounce back" and "bounce forward." Another study (Bartusevičienė, Butkus & Schiuma, 2022) sought to model organizational resilience structure and confirmed three models that could be adopted to assess organizational resilience. According to this study, networks and learning, leadership and culture have an endogenous effect on the resilience of organization.

The literature acknowledges the necessity for organizations to amplify their learning phase, facilitating growth through incessant learning from new situations and experiences, and fostering human resource systems and leadership conducive to ideation and implementation (Dirani *et al*., 2020; Batistič *et al*., 2022; Bartusevičienė, Butkus & Schiuma, 2022). The discourse extends to the requisite leadership competencies during and after crises, and the role of human resource development professionals in supporting their organizations, with a pronounced emphasis on continuous learning as a lever for resilience and agile transformation.

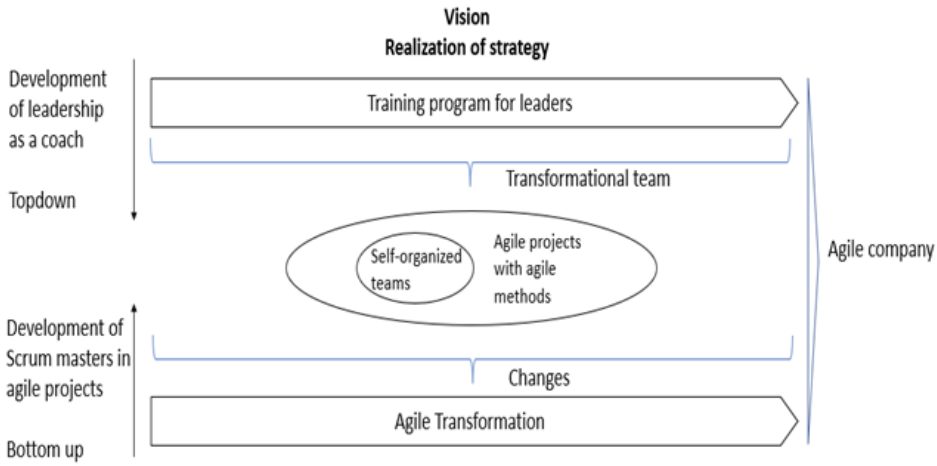
The various studies proposed in management literature once again show the relevance of this social phenomenon. As noted by Deksnys,

> organizational agility is especially important in the context of high-growth companies. Normal growth organizations adapt to changes in environment and adaptation is reactive to the environmental triggers (competition, change in technology or consumer tastes, etc.). If the environment is relatively static, an organization is not pressured to adapt quickly. However, in high-growth companies, in addition to external pressures, change and adaptation are also forced from within the organization and agility becomes pro-active. Often led by success and growth in sales revenues, profits, and market share—high-growth companies undergo considerable internal changes as well. Therefore, during high-growth periods, organizational agility is crucial in adapting to fast changes from both internal and external influence. Thus, making high-growth companies especially suitable context to study organizational agility. (Deksnys, 2018, p. 11)

Our study endeavors to bridge the theoretical and practical gaps in analyzing organizational resilience structure and agile transformation. It seeks to elucidate the interplay between agile transformation stages and organizational performance in high-growth industrial companies in Germany, addressing how to engage all personnel in change processes and identify factors affecting organizational agility. In order to reveal such an approach, we have developed a conceptual framework, the validity of which we will try to confirm through the interviews with experts. The theoretical analysis carried out and the review of research in German companies show that agile work practice encompasses two domains: agile methods and agile project management, while agile transformation encompasses agile values, collaboration, and a willingness to change.

We expect the developed conceptual framework (see Fig. 4) to be useful as a guiding framework for high-growth industrial companies in initiating agile transformations.

Figure 4. The conceptional framework for industrial companies seeking to start with an agile approach to improve their business management.



Source: Authors' contribution.

The proposed conceptual framework indicates important aspects in the transformation. Before adopting an agile approach, companies should formulate a new vision, setting a direction and core values. This vision sets out for all employees a direction on how the company wants to be and what kinds of values should be implemented in the company. The strategy that

can be derived from the vision provides concrete steps for action towards realization, including leadership training programs. Transformational teams, composed of leaders and employees, work cross-functionally to identify areas for agile improvement and facilitate the transformation process. Self-organized teams employing agile methods contribute to the agile transformation process through project-based changes. The changes that arise in the project flow contribute to the agile transformation process.

4. Empirical testing of the conceptual framework

4.1 Research methodology and methods

Drawing upon the extensive review of the literature and subsequent empirical analysis of the current conditions, the status quo, and demands, this study employs a descriptive research design. Given the exploratory nature of our research questions and the aim to validate theoretical constructs, we conducted a case study focusing on German industrial companies. This approach enabled us to investigate the implementation of agile work practices and the process of agile transformation within these entities, specifically examining the influence of these processes on leadership styles.

We chose a qualitative research methodology to capture the complexity and depth of agile transformation processes in industrial organizations. This approach allows for an exploration of the nuanced interplay between agile practices, organizational culture, and leadership dynamics, offering rich, contextually grounded insights. The exploratory nature of the qualitative approach is particularly suited to the aim of our study, enabling us to uncover and understand the multifaceted aspects of agility in the workplace. To further enrich our exploration, we opted to conduct semi-structured interviews with experts in the field. The experts' insights played an important role in validating our conceptual framework and enrich our understanding of the agile transformation process, specifically focusing on the role of the leaders in the implementation of agile work practices and agile transformation.

Our article aims to find answers to the following research questions:

RQ1: How to involve all employees in the change process through the implementation of agile working practices and to strengthen leadership? What type of leader is the most effective?

RQ2: What factors influence the organizational agility in high-growth industrial companies in Germany?

With the purpose of acquiring more comprehensive and concrete knowledge from practice, from June to July 2022, we conducted five interviews with experts from selected large industrial companies in Germany. Each interview, conducted by phone, took around an hour. The informants reported their experiences concerning their engagement with or exposure to this transformation initiative: in the process of change through the implementation of agile working practices. All interviews started with a couple of exploratory and engaging questions to make the interviewees comfortable and avoid cognitive bias, followed by structured, open-ended questions, and concluding with enquiring data about the companies.

Based on the research questions, the interview was constructed by drawing four scenarios, which allowed the interview questions to be divided into four sections:

- Agile work practice;
- The current situation on agile transformation in these companies;
- Prevalent leadership styles in these companies;
- Areas for improvement of the system (working methods and processes).

Also, it was decided that additional questions may be asked in case of necessity. Non-probability purposive sampling was applied in the selection of informants. To be an expert, the interviewee had to meet the following requirements: have substantial knowledge of the processes in project management, especially in agile project management and agile implementation in the company; have decision-making power within the role; have more than ten years of the relevant work experience; and significant daily involvement in the agile way of working.

Table 1 describes the interviewed leaders from three big companies.

Table 1. The list of interviewed specialists in companies.

Specialist no.	Profession	Working experience	Company
1	Leader of Manufacturing Factory	25 years	Siemens
2	Manager of Business Excellence	11 years	Siemens
3	Senior Manager in Consulting	16 years	Audi
4	Head of Manufacturing in Technology Excellence	29 years	Audi
5	Head of Strategy	18 years	Liebherr

The interviews were audio-recorded, transcribed verbatim, the interview responses anonymized, and the data then analyzed using a coding process, in which the data was divided into themes related to the theoretical categories. The coding framework was developed iteratively, starting with a set of preliminary codes derived from our research questions and literature review. This initial framework served as a guide for the first round of coding but was adapted and expanded upon as new themes emerged from the data. During the coding process the data was analyzed to identify significant phrases and ideas, aiming to categorize data. The themes were derived through an iterative process of comparing codes, identifying patterns, and grouping related codes under broader thematic categories. The interpretation of data was closely tied to the thematic analysis, where we contextualized the findings within the broader theoretical and practical implications of agile transformation in industrial companies. This involved discussing how the emergent themes relate to our research questions, the existing body of knowledge, and the practical implications for industrial organizations undergoing agile transformation.

4.2 Findings of the semi-structured interviews

In our exploration of agile work practices within industrial companies, the experts were invited to share their perceptions and observations of processes in their organizations, alongside highlighting the principal obstacles encountered during agile transformation. The insights, supported by a literature review, suggest that agile work practice can be quantitatively assessed through two principal factors:

- The application of agile methods.
- Agile project management.

The interview findings revealed a diversity in the definition and implementation of "agile transformation" across different companies, underscoring the absence of a universal blueprint for successful transformation. Each company's approach to agile transformation is marked by unique elements that, while effective in their original context, as the literature analysis revealed, may not necessarily be transferrable or effective in a different organizational setting.

Experts outlined several challenges impeding agile transformation:

1. A gap in understanding and the application of agile methodologies exists, primarily when management (especially at the top level) emphasizes strategic execution, new ideas, and key performance indicators without ensuring a comprehensive understanding of agile principles among employees and assuming that employees know how to work. Many people in the company talk about the agile approach, but do not really understand the principle and methodology behind it. This often leads to a superficial adoption of agile terminology without understanding agile methods and the ways to apply them properly in practice.
2. The shift towards a product-oriented way of working necessitates a reconfiguration of team structures and responsibilities for existing projects. Resistance to this change, stemming from varying levels of commitment to team spirit, self-organization, and collaborative goals, presents a significant hurdle. Still there are employees who want to pursue their own goals and increase their status or even their power, and there are employees who are not even interested in collaboration.
3. Change is not always perceived positively because it may mean a shift in tasks and power relations. Staff members may feel that they cannot influence change in large organizations. This is compounded by a lack of transparency and ignorance of new approaches, dampening the willingness to embrace change.
4. A notable deficiency in leadership support for instilling agile values as a long-term mission was identified. Leaders often prioritize immediate, measurable outputs over fostering an agile mindset among employees.

Summarizing the results of our research, the following elements emerge as essential in measuring agile transformation:

- The presence and integration of agile values within the organization.
- Collaboration among employees and strong leadership.
- Collective willingness to embrace change.

Comparing the literature with our empirical findings shows that agile transformation is an extended, structured process that unfolds over multiple stages. The transformation in a large organization, especially one with thousands of employees, is inherently gradual.

It was theoretically justified and empirically tested that leadership plays a critical role in influencing both individual performance and team dynamics. Effective leadership within an agile environment is indispensable. Our interviews identified three prevalent leadership styles within the companies:

- The "leader-coach," who supports and guides the team, similar to a trainer or coach.
- The "leader-servant," a leadership style emerging from agile practices, characterized by serving the needs of employees. This type of leadership has emerged as a result of agile working.
- The "autocratic leader," who unilaterally makes decisions and exerts control over employees, a style still observed, particularly in strategic or crisis contexts.

Our research indicates that the authoritarian type of leadership (where the manager makes the decisions alone and only informs the employees) is still present in companies, especially when strategic decisions or decisions in global strategic projects have to be made. This style is often applied in crisis or emergency situations, in which quick decisions are usually required.

The study highlighted a growing demand for the "leader-coach" model, particularly due to the increasing complexity and need for expert collaboration across various fields. This leadership style is more commonly found at the operational level. The leader-coach makes agreements with the entire team and makes sure that the decision is followed by all. However, this also means that the manager confronts the employees with problems if necessary and they develop solutions together. It is important for the leader to remain predictable and accessible to all, to clearly set the course and make cooperative agreements with all employees within the given framework. In case of difficulties, the leader should help or support the team in the best possible way.

With regard to the agile way of working, the interviewees arrived to the following point: the agile way of working continues to be promoted and the "leader-servant" type of leadership is becoming more and more prevalent as it promotes creativity and innovation. The "leader-servant" type is more common in startups and its practical implementation in large, traditionally

organized companies remains challenging with the existing rigid organization of the latter. Our findings suggest that the "leader-coach" model significantly influences the nexus between agile work practices and agile transformation. Leadership, as revealed by the experts, is also dynamic, with responsibilities and hierarchies constantly adjusting to project demands and organizational needs, emphasizing the fluid nature of leadership in agile environments.

The proposed conceptual framework is constructed for the industrial companies that have already started or consider starting implementing agile approach to improve their products, reduce their delivery time, and decrease their costs. However, the outcomes of implementation for various companies will be different because the companies initially have different perceptions of the desirable changes, regarding the speed of implementation of agile transformation and different expectations for the outcomes of the transformation. The insights from the interviews shed some light on the multifaceted nature of agile transformation and the intrinsic challenges therein. Despite the variability in the definitions and implementation of agile transformation, common challenges and leadership styles have been identified that significantly impact the process and should be taken into consideration by companies intending to implement the agile approach. Also, the research revealed that the companies should be well acquainted with agile methodologies, have leadership support for cultural change, and be willing to adapt leadership styles in order to foster a truly agile organizational environment.

The proposed conceptual framework could also serve as a guiding framework for building research models for the new studies of agile transformation in the future.

6. Conclusions

This study embarked on a journey to develop, implement, and empirically validate a conceptual framework of agile transformation tailored for industrial companies, aiming to navigate the complexities of adopting agile practices across all operational levels. The conclusions drawn reflect the research questions and help answer the research tasks. The literature analysis, the review of applied research, as well as the interviews with experts from German industrial companies helped to illuminate the multifaceted dimensions of agile transformation, the application of agile work practices,

and the significant role of leadership in facilitating these processes within the context of German industrial companies.

The literature analysis revealed that the definition of agile transformation is vague, and no measurable characteristics have been defined. In our study, we elaborated on the characteristics of important elements (organization, leadership, methods, competences, infrastructure, and culture) of industrial companies that practice agile working. The empirical research revealed the main elements that can be used in measuring agile transformation: the presence and integration of agile values within the organization, collaboration among employees, and a collective willingness to embrace change.

The review of previous studies showed that the implementation of agile transformation is highly variable and confirmed that there is no one-size-fits-all approach, and that various strategies are needed. However, the study confirms that agile approach and agile transformation can be extremely beneficial to organizations, especially during periods of crisis, as this approach offers a flexible and rapid response to crises. Since crises are exceedingly frequent nowadays, the speed of response to them is infinitely important, as it provides decisive advantage over competitors. Agile transformation process also creates an appropriate framework for dealing with the uncertainty of volatile market, as it suggests flexible methods. However, our analysis also revealed that successful agile transformation requires deep organizational change, affecting organizational culture, attitudes and behaviours of the leaders and employees. Challenges to agile transformation, according to the experts, stem from a deep-seated misunderstanding of agile principles, resistance to structural and cultural shifts, employees' reluctance to change, and insufficient leadership support for fostering an agile organizational mindset.

The development and application of a conceptual framework allowed further insights into companies that are implementing or intending to implement agile work. The conceptual framework emphasizes the importance of leadership styles, agile values, and employees' involvement in the change process to achieve successful transformation. Semi-structured interviews conducted with experts shed light on the practical challenges of agile transformation.

The findings underscore the critical role of leadership and the necessity of a supportive culture for agile methodologies to thrive. The beginning—and possibly also the end—of agile transformation lies in the alteration of the

lived understanding of leadership. The research revealed that although large industrial companies, represented by the interviewed experts, are currently undergoing agile transformation processes, autocratic leaders still persist within them. Agile work practice necessitates a shift in leadership from being a thought leader to becoming an impulse generator within networks. The convergence of diverse types of employees, talents, and levels of knowledge fosters its own dynamic that cannot be managed through concrete guidelines. The "leader-coach" and "leader-servant" models emerge as effective leadership styles that foster creativity, innovation, and a collective willingness to embrace agile methodologies. Therefore, investments in leadership development, fostering an agile mindset, and encouraging collaboration across all levels are essential steps toward a successful agile transformation.

While non-probability purposive sampling is well-suited to the exploratory nature of qualitative research, especially when seeking nuanced understanding from highly knowledgeable sources, this approach presents limitations concerning the generalizability of the findings. Given the selective criteria used to identify experts, our sample does not represent the full spectrum of experiences and perspectives present across various industrial companies, both within and beyond Germany. Consequently, the insights derived from these interviews may reflect specific organizational cultures, industries, and operational contexts. Therefore, the findings should be interpreted with consideration to these factors.

Future research will be directed towards assessing the generalizability of the proposed framework across different cultural contexts and industrial sectors. It will examine how regional and sector-specific factors influence the processes of agile transformation and provide additional empirical substantiation for the created conceptual framework. To achieve these objectives, the geographical scope of the investigation will be broadened to include various European countries. We will apply the quantitative research strategy, facilitating the validation of the efficacy of the identified leadership styles and agile practices. The research team anticipates that subsequent studies will engender a more nuanced comprehension of the complexities inherent in agile transformation and that future research will contribute significantly to the continual refinement and evolution of agile methodologies in industrial companies.

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