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Implementing Organisational Ambidexterity for a Successful Transformation of the Automotive Supply Industry Towards a Green Future

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Abstract: **Background:** Customers demand more sustainable mobility solutions and shift to electric vehicles and Mobility-as-a-Service offers. Because of these shifts, automotive suppliers must improve their corporate social responsibility (CSR). Especially in Germany, where they play a dominant role in the economy, they need to assume their responsibility towards the green future and seize new growth opportunities within and outside the traditional automotive industry to ensure their competitiveness.
Research objectives: The article aims to determine the role of ambidexterity, the competencies required from employees at all levels, and the success measurement of the transformation in the automotive supplier industry in working towards a green future.
Research design and methods: The research is based on 12 expert interviews with top managers from German automotive suppliers, consultants, ambidexterity experts, and employee representatives.
Results: The trends (electrification, autonomous driving, digitalisation and new mobility services pose unprecedented challenges for automotive suppliers. To deal with these challenges and improve their CSR performance, automotive suppliers must follow an ambidextrous approach to make their core business more efficient while at the same time seizing new growth opportunities towards a green future.
Conclusions: The organisational ambidexterity combined with CSR allows firms to improve their environmental performance. However, organisational ambidexterity is not only a structural design choice but a task that requires specific competencies.
Keywords: automotive supplier industry, transformation, organisational ambidexterity, corporate social responsibility, competencies, Germany
JEL Codes: L62, M14

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1. Introduction

The automotive industry is facing the greatest transition of its history (Proff, 2019). Megatrends such as electrification, autonomous driving, digitalisation, and new mobility concepts pose unprecedented challenges for the industry. In the context of the current COVID-19 pandemic, digitalisation is accelerating, and changes in customer behaviour are observable (Klein and Todesco, 2021). Even before the pandemic, customers started to demand more sustainable

mobility solutions and shifted to electric vehicles (EVs), and Mobility-as-a-Service (MaaS) offers (Matzler et al., 2016).

The automotive industry plays an especially dominant role in the German economy. In 2020, 817,000 people worked in the automotive industry (Statistisches Bundesamt, 2021), of which 310,000 were active in the automotive supplier industry (VDA, 2020). Automotive suppliers, in particular, are severely affected by current transformation trends as they account for approximately 75% of the value added to the automotive value chain (VDA, 2020). Automotive suppliers with a strong focus on the Internal Combustion Engine (ICE) face substitution risks since many components they produce are no longer needed (Fraunhofer IPT, 2019). This is the result of the declining global vehicle production (OICA, 2021) and the diminishing core business with ICEs due to the electrification of the propulsion system (ACEA, 2021). At the same time, suppliers must make considerable upfront investments, for example, in electrification, which can exceed the company's financial strength and technical capabilities (Lazard and Roland Berger, 2020).

Furthermore, automotive suppliers must improve their corporate social responsibility (CSR) to account for the changes in customer behaviour and increases in environmental regulations (Khan et al., 2021). This is particularly relevant due to the automotive industry's economic, social, and environmental impact (García-Madariaga and Rodríguez-Rivera, 2017). The environmental impact comes from production processes harming the environment and air pollution from car use (Svobodová and Bednarska-Olejniczak, 2021). The economic and social impact stems from protecting the number of jobs in the automotive industry (Statistisches Bundesamt, 2021).

To deal with the challenges of this transformation and be prepared for the requirements of a green future, automotive suppliers must make their core business more efficient while at the same time seizing new growth opportunities within as well as outside of the traditional automotive industry. According to Shafique et al. (2021), this "organisational ambidexterity" (Tushman and O'Reilly, 1996; Raisch and Birkinshaw, 2008) combined with strengthened CSR practices, allows firms to improve their environmental impact. Organisational ambidexterity is likely to motivate suppliers to pursue green innovation by aligning exploitative and explorative innovation (Shafique et al., 2021). Likewise, Tuan (2016) found that organisational ambidexterity positively affects firms' entrepreneurial orientation and that this effect should be strengthened through CSR initiatives.

Because of the importance of organisational ambidexterity for CSR efforts and the suitability of this model to target the challenges of automotive suppliers in the current transformation, the following article examines to which extent automotive suppliers already pursue an ambidextrous approach. However, organisational ambidexterity is not only a structural design choice but also a leadership task that requires specific competencies from both leadership and the workforce (O'Reilly and Tushman, 2008).

Since automotive suppliers are currently in the middle of the transformation process, there are no clear guidelines on how organizational ambidexterity is successfully implemented. Thus, based on 12 expert interviews with top managers from German automotive suppliers, consultants, ambidexterity experts, and employee representatives, this article aims to determine the role of ambidexterity, the competencies required from the leadership and the workforce, and the success measurement of the transformation in the automotive supplier industry in working towards the green future.

2. Literature review

Electrification

Driven by policy changes and increasing environmental awareness, the EV market is constantly growing (Müller et al., 2015). While in 2010, there were only around 17,000 EVs on the roads worldwide (IEA, 2020), in 2020, this number surpassed 10 million (IEA, 2021). The continued adoption of EVs will not only be driven by policies and incentives but also by decreasing battery costs (IEA, 2021). Deloitte observes that the COVID-19 pandemic further accelerated the trend towards more electrification (Deloitte, 2020). Despite the pandemic, electric car registrations still rose in most markets in 2020 (IEA, 2021).

The ongoing trend towards more electrification has a strong impact on the automotive supplier industry. While a conventional ICE requires substantial know-how and consists of around 2,500 individual parts, an electric motor consists of only about 200 individual parts. This means that the manufacturing process is less complex, the depth of value added is drastically reduced, and industry know-how accumulated over decades loses significance (Fraunhofer IPT, 2019). In addition, the increasing automation in the manufacturing of electric motors will result in a higher demand for skills related to setup, operation, monitoring, maintenance, testing, inspection, and quality management (Hans-Böckler-Stiftung, 2012).

Autonomous driving

Progress in artificial intelligence, especially in machine learning and deep neural networks, is speeding up the development of autonomous driving (PwC, 2017). In the context of the worldwide COVID-19 pandemic, the importance of autonomous driving continues to grow as people desire increased autonomy in their mobility (Lazard and Roland Berger, 2020).

On the one hand, autonomous driving poses a threat to automotive suppliers as it opens the door to companies from outside the industry. On the other hand, autonomous driving offers new opportunities. Deloitte estimates that suppliers driving innovation in autonomous driving and electrification will likely experience up to 300% growth compared to suppliers in segments such as ICEs or brakes (Deloitte, 2019). However, it must be noted that not all suppliers will be able to enter the field of autonomous driving due to the necessity of high upfront investments in R&D (Strategy&, 2020).

Digitalization

For automotive suppliers, autonomous driving and connectivity trends have led to an increased demand for software solutions. Therefore, employees must acquire more IT competencies (Fraunhofer IAO, 2020). However, Gairing (2020) points out that technological competencies are context-specific and can quickly become outdated. Thus, employees must to adopt a continuous learning approach to keep up with changing requirements and promote key competencies rather than specific knowledge. Consequently, cooperation, creativity, and problem-solving competencies should represent the core of employee learning rather than specialised knowledge.

New Mobility Services

Population growth and urbanization as well as increased environmental awareness have led to changing customer preferences and call for new forms of mobility (Wedeniwski, 2015). Shared mobility, one such new form of mobility services, poses a novel threat to original equipment manufacturers (OEMs) and automotive suppliers. According to Deloitte (2020), it could

threaten 23% of potential sales in the automotive industry. As OEMs are already closer to the end user and have access to the end product car, it is easier for them to make this shift from product provider to MaaS provider. This makes it difficult for suppliers to keep up with current trends and suppliers must consider partnerships with OEMs and other players outside the traditional automotive industry (Lazard and Roland Berger, 2020).

Organisational ambidexterity & CSR

Organisational ambidexterity refers to the ability of companies to innovate and enter new markets, while at the same time making their core business more efficient (O'Reilly and Tushman, 2008; Birkinshaw and Gupta, 2013). O'Reilly and Tushman (2013) emphasize ambidexterity as a tool for change: "Ambidexterity is (…) about developing the capabilities necessary to compete in new markets and technologies that enable the firm to survive in the face of changed market conditions."

Duwe (2018) explains the need for organisational ambidexterity through the S-curve model used to describe the maturity of technologies. When a new technology emerges, a lack of experience, processes, and know-how results in slow adoption. In the growth phase, experience is gained, performance is improved, and technology establishes. In the maturity phase, the technology reaches its performance limit and is often displaced by other technologies. The need for ambidextrous organisations stems from the transition period at the intersection of two technology S-curves. While the proven technology is still in the phase of performance enhancement, the life cycle of a completely new technology, which has the potential to substitute the previous solution, begins.

At the heart of the concept of organisational ambidexterity lies the distinction and balance between exploitation, the expansion and evolutionary development of the core business, and exploration, the development of new business models and new markets (Duwe, 2018). To be successful, a company needs to implement both exploitation and exploration. However, these two modi operandi compete for scarce resources, e.g., investment in the core business versus new growth areas, differentiation versus low-cost production, etc. (Gibson and Birkinshaw, 2004). Hence, organisations must maintain a balance between these two aspects and implement processes to allocate resources to stay relevant in the future efficiently. Consequently, ambidextrous companies need to optimise their core business to create financial scope for investment in R&D for new growth areas (Duwe, 2018).

According to Shafique et al. (2021), organisational ambidexterity is an essential indicator of the environmental orientation of firms and if it is combined with CSR, it allows firms to improve their environmental performance. In this context, CSR is understood as "a voluntary obligation of companies to behave in a responsible way to the environment of society and the environment that affects their functioning" (Svobodová and Bednarska-Olejniczak, 2021).

Because of the responsibility of automotive suppliers towards society, CSR plays an important role and requires firms "to operate a company innovatively, deliberately incorporating ecological, economic, and societal concerns in activities and approaches of company activity" (Khan et al., 2021). As CSR is related to the responsible behaviour of companies towards their stakeholders, it facilitates efforts to produce environmentally friendly products and be more sustainable (Shafique et al., 2021). This CSR focus is necessary for companies as customers increasingly demand environmentally friendly products and services (Khan et al., 2021).

Since organizational ambidexterity is likely to allow suppliers to balance the competing demands of the core and of the new business and is shown to have a positive impact on CSR,

the following research aims to determine how suppliers can best leverage organisational ambidexterity to achieve a successful transformation.

O'Reilly and Tushman (2013) distinguish three ways ambidexterity can be implemented in an organisation: sequential ambidexterity, structural ambidexterity, and contextual ambidexterity.

Sequential ambidexterity

Sequential ambidexterity can be described as a periodic reorientation of a company to adapt to changing market conditions. This means that organic structures follow mechanistic structures in the exploration and exploitation phases. While sequential ambidexterity might be sufficient in a stable, gradually changing environment, a simultaneous pursuit of exploitation and exploration is required in a fast-changing environment (O'Reilly and Tushman, 2008).

Structural ambidexterity

For a company in a fast-changing market, a structural separation between exploration and exploitation aims to allow for free experimentation in explorative areas while still enabling efficiency gains in the core business processes (Rost et al., 2014). This is supported by Fojcik (2013), who found that small and medium-sized automotive suppliers follow structural ambidexterity if the rate of technological change is high. In addition, he relates the type of ambidexterity to the company size, finding that larger automotive suppliers tend to follow structural ambidexterity.

Contextual ambidexterity

Whereas structural ambidexterity integrates exploitation and exploration at senior management level, contextual ambidexterity aims to balance both within the same organisational unit (Gibson and Birkinshaw, 2004). Thus, the challenge of ambidexterity is not solved by a structural separation of exploitation and exploration but rather through a "behavioural capacity to simultaneously demonstrate alignment and adaptability across an entire business unit" (Gibson and Birkinshaw, 2004). Contextual ambidexterity aims to create a balance between exploitation and exploration on an individual basis by providing the right business context, rather than a structural or temporal separation. Individual associates are encouraged "to make their own judgements as to how best divide their time between the conflicting demands for alignment and adaptability" (Gibson and Birkinshaw, 2004). If contextual ambidexterity is achieved, Rost et al. (2014) state that it minimizes information shortfalls. In practice, Kauppila (2010) points out that many companies implement a hybrid model of ambidexterity through a combination of structural and contextual means.

Competence requirements

The implementation of ambidexterity inside a company requires specific competencies from the leadership and the workforce (Renzl et al., 2013). For employees in an exploitation context, competencies such as reliability, the performance of one's duties, resilience, and willingness are needed. In an exploration context, on the other hand, adaptability, self-awareness, self-initiative, risk-taking, and unconventionality are required (Renzl et al., 2013).

In the context of transformation, Erpenbeck (2012) considers competencies to be the abilities needed to cope with complex situations in a self-organised and creative way. Concerning individual competencies, Erpenbeck distinguishes between four dimensions of competencies, namely meta-competencies, basic competencies, key competencies and cross-sectional

competencies. Erpenbeck defines meta competencies primarily as the ability to self-organize and direct, demonstrating openness to values or identifying situations and contexts. The second dimension, basic competencies, is subdivided into personal, action-related, professional-methodological, and social-communicative competencies. Personal competencies refer to the ability to reflect on actions and develop personal solution-oriented values and attitudes that foster creativity. Action-related competencies refer to the ability to implement insights and findings in a self-organised and committed manner. For the transformation, this includes employees courageously approaching new, previously unknown solutions with the flexibility to adapt to new tasks (Gairing, 2020). The professional-methodological competencies can be characterised as the knowledge of respective state-of-the-art technical and methodological knowledge as well as the presence of individual, unique knowledge. Social-communicative competencies include optimising cooperation and communication processes on an interpersonal level. The third and fourth dimensions of Erpenbeck's model are key competencies and cross-sectional competencies. These consist of specific bundles of the four basic competence groups described above (Erpenbeck, 2012).

For leaders, the required competencies differ, creating a framework that is conducive to ambidexterity being of the utmost priority. Responsibility must be handed over to employees (empowerment) and a culture that allows failure must be established. Only if mistakes are accepted as part of innovation and creativity, can employees develop new ways of thinking and explore successfully (Gairing, 2020). In an innovation context, leaders must constantly adapt and give up their emotional attachment to their position. They need to promote social interaction between individuals in the organization (Duwe, 2018). Especially at the top management level, good cooperation and constant information exchange are important (Lubatkin et al., 2006). Gibson and Birkinshaw (2004) argue that top executives can best influence employee behaviour towards ambidexterity by being role models, modelling the desired behaviours, and rewarding employees.

Although there are suggestions on how to implement ambidexterity in an automotive supplier company (Renzl et al., 2013; Fojcik, 2013), implementing an ambidextrous approach remains a major challenge and there is currently no consensus regarding which type of ambidexterity is the most successful (Müller and Stephan, 2020).

3. Research design and method

The aim of our research was to identify the role of organizational ambidexterity in the transformation process of the automotive supplier industry towards a green future. Since automotive suppliers are currently in the middle of the transformation process, there are no clear guidelines on how organizational ambidexterity is successfully implemented. In such "under-researched areas of knowledge", an exploratory research approach is appropriate (Stokes and Wall, 2014). The following questions were used to guide this approach:

– What role does organisational ambidexterity play, and what recommendations for action can be derived?
– Which competencies are required from leadership and the workforce for a successful transformation process?
– How can leadership determine whether or not the transformation (especially of the workforce) is successful?

To find answers to the research questions, 12 expert interviews were conducted with key stakeholders. The aim was to combine different perspectives and thus provide a holistic view of the transformation in the automotive supplier industry.

Due to its very competitive and dynamic environment, and the lack of data published about this topic for this segment so far, the emphasis was placed on the German automotive supplier industry. The experts interviewed included top level managers from automotive suppliers such as Bosch, MAHLE, and Mann+Hummel, partner-level consultants from BCG and Kearney, employee representatives from Bosch and the "Bundesagentur für Arbeit", and ambidexterity experts (see Table 1). To validate the findings internationally and highlight potential differences, additional interviews were carried out with top managers from automotive suppliers in the US and China.

The interviews were semi-structured and based on an interview guideline to make the interview results comparable (Bortz and Döring, 2006) and ensure that certain questions were asked in each interview (Gläser and Laudel, 2009). To be able to analyze the interviews with a qualitative content analysis, the interviews were, with the consent of the interviewees, recorded (Bogner et al., 2014) and subsequently transcribed (Bortz and Döring, 2006).

Table 1. Overview of the interview partners

Name	Company	Position	Work experience	Expert role
AL-SIBAI, Jumana	MAHLE GmbH	Member of the Management Board, Corporate Executive Vice President and General Manager Thermal Management	> 18 years (different companies)*	Supplier
CENTMAYER, Sebastian	Knorr-Bremse AG	Head of Strategy	> 14 years*	Supplier
DANNENBERG, Matthias	Robert Bosch GmbH	Senior Vice President Finance & Controlling (Automotive Electronics) (previously Head of Mobility Strategy)	> 19 years	Supplier
DEWITZ-GRUBE, Anke	Robert Bosch GmbH	Bosch Inhouse Consultant (previously Lean-agile Transformation Coach)	> 25 years	Ambidexterity expert
DUWE, Dr. Julia	TRUMPF Werkzeugmaschinen SE + Co. KG	Head of product development	> 15 years*	Ambidexterity expert
FOUQUET, Dr. Klaus Peter	Mann+Hummel GmbH	Shareholder representative	> 35 years (different companies)	Supplier
HIEBEL, Andreas	Robert Bosch GmbH	Deputy chairman of the Works council (Feuerbach); retired	> 41 years	Employee representative
JAIN, Sujit	Robert Bosch LLC	Regional President – North America	> 39 years (different companies)* 15 years as Regional President	Supplier
KLINK, Dr. Götz	Boston Consulting Group	Managing Director & Partner	> 24 years*	Consultant

Name	Company	Position	Work experience	Expert role
KRUBASIK, Stephan	A.T. Kearney GmbH	Partner	> 17 years*	Consultant
RAUCH, Christian	Federal Employment Agency (Bundesagentur für Arbeit)	Managing Director of the Baden-Württemberg Regional Office	> 14 years*	Employee representative
WANG, Weiliang	Bosch Automotive Diesel Systems Co. Ltd.	Regional President – China	> 30 years	Supplier

* Additional research.

For the analysis of the interviews, the qualitative content analysis based on Mayring was chosen. To do so, a category system was developed to make the analysis comprehensible and transparent to others. For the subsequent analysis, a combination of summarising and structuring the material was used. The summarizing of the material seeks to reduce the material to the relevant content and can be further broken down into an inductive category formation, which only considers certain aspects of the material that fall into specific categories. The inductive category formation requires several steps. In the first step, the category definition and level of abstraction are determined. Then, the inductive categories are formulated step by step. The material is paraphrased, and irrelevant parts are left out. Next, the material is generalised according to the level of abstraction. The first reduction removes parts that do not significantly contribute to the content. In the second reduction, the remaining aspects are reduced to categories. The categories are revised after between ten and 50% of the material has been analyzed before the remaining parts are evaluated (Mayring, 2015).

Structuring the material aims to filter out certain aspects of the material according to predefined criteria. It can be further divided into formal, content-related, typifying, and scaling structuring. Subsequently, content-related structuring is applied (Mayring, 2015). Unlike the inductive approach, in the deductive category application, the categories are not formed based on the material but are formulated ahead of time-based on the theory and hypotheses or the interview guideline (Kuckartz, 2018). The first step of the deductive category application is the extraction of categories from the theory and the interview guideline. Definitions of the different categories are formulated, and coding rules for the categorisation are determined. The categories, definitions, coding rules, and anchor examples are collected in a coding agenda. The coding rules serve as a tool to clearly differentiate between subcategories and allow for a comprehensible assignment of categories. Similar to the inductive approach, the categories and the coding agenda need to be revised (Mayring, 2015).

To answer the first research question on the role of ambidexterity in the automotive supplier industry, the deductive categories *importance of ambidexterity, type of ambidexterity, role of business area, resource allocation, the role of leadership* as well as the inductive category balance were considered. For the second research question on the competencies of leaders and employees, the deductive categories *competencies* and *competence development* as well as the inductive category communication were analysed. The deductive category *velocity* is identified as an additional success factor. For the final research question regarding the success of the transformation process, the deductive category *success measurement* was evaluated.

4. Results and Discussion

Role of ambidexterity

Importance of ambidexterity

Most experts agreed that ambidexterity plays an essential role for automotive suppliers in the transformation process: "This plays a very, very large role" (KRUBASIK), "It is the only model of thought and action that I have found in science and in practice, for this period of transition" (DUWE), The consultant KLINK added that in 70 to 80% of his current projects he deals with ambidexterity.

RAUCH, however, argued that the importance of ambidexterity depends primarily on the type of supplier. For suppliers that are highly dependent on the ICE business he agreed that ambidexterity is essential. However, for suppliers that are already diversified and whose core business is mostly independent of the ICE, ambidexterity plays a subordinate role. CENTMAYER alone mentioned that for autonomous driving, in the context of his company's offering, there is no ambidexterity as this is more like "an extension of our core portfolio".

Type of ambidexterity

In alignment with the theory (Müller and Stephan, 2020), there is no clear consensus among the experts as to which type of ambidexterity is most successful. KRUBASIK offered a three-step process including: first, formulating the goals that are to be achieved; second, weighting the goals; and third, deriving the optimal ambidexterity setup. The main factors for the decision between structural and contextual ambidexterity include type of growth, proximity to the core business, customers, and company size (see Table 2). While this matches Fojciks (2013) findings that large suppliers tend to follow structural ambidexterity, the experts highlight other factors in favor of a structural separation aside from the rate of technological change. The main reason for structural separation being the entrance of new customers (FOUQUET, JAIN, WANG).

Table 2. Rationale behind structural and contextual ambidexterity

	Structural	Contextual
Type of growth	Acquisition (structural separation already given) (KRUBASIK)	Organic (KRUBASIK)
Proximity to core business (in terms of product and service)	Far from the core business (KRUBASIK)	Close to core business (KRUBASIK)
Customers	Different units are needed to serve new customers (FOUQUET, JAIN, WANG)	–
Company size	Large (RAUCH)	Medium-sized (RAUCH)
Incentive systems	Easier to reward future-oriented leaders (KLINK)	–
Main advantages	Speed (DANNENBERG, DUWE) Adaptability (DANNENBERG) New positioning of business area (KRUBASIK)	Synergy effects (DANNENBERG, DEWITZ--GRUBE, KRUBASIK, RAUCH) Scaling and mass-production (DANNENBERG) Motivation of employees (AL-SIBAI) Enrich existing products with digital components (DUWE)

A useful tool to achieve this structural separation are incubators. Bosch, for example, has created the incubators Kick-starter and Grow. Knorr-Bremse recently introduced the eCUBATOR, which functions as a think tank for electrification topics (CENTMAYER). Bosch, however, also has areas with contextual ambidexterity to benefit from resources and competencies in the core business. An example is the fuel cell components that are developed and manufactured at former diesel R&D centers and existing diesel sites (DANNENBERG). Consistent with Kauppila (2010), two suppliers use a hybrid approach of structural and contextual ambidexterity.

Lastly, KRUBASIK proposed including a product's life cycle into the decision-making process. At the beginning of a new idea or initiative, it can make sense to keep this business area separate to "*protect this business*". This reasoning was supported by DUWE, KLINK, RAUCH, and WANG. KLINK took the life cycle idea even further, stating that in the beginning an idea originates from within the company or from a leader. Then, the new idea must be spun off into an incubator. Finally, the idea needs to be reintegrated to scale the business. However, several experts agreed that reintegrating a different idea into the core business is very challenging (DEWITZ-GRUBE, DUWE, KLINK). KLINK suggested that within ten years, companies would need to be able to integrate core business and new business in one unit.

Role of business area

In the context of the transformation, different roles were identified for the core and for the new business (see Table 3). Similarly to Duwe (2018), the experts agreed that the core business is needed to finance both the company and new initiatives (DANNENBERG, DUWE, FOUQUET, JAIN, KRUBASIK). The new business in turn serves as a space for innovation and creativity (DANNENBERG, DEWITZ-GRUBE, DUWE, RAUCH), with a view to generating revenues in the future (CENTMAYER, DUWE, FOUQUET, KRUBASIK).

Table 3. Role of core and new business

Core (exploitation)		New business (exploration)	
Finance the company and new initiatives	DANNENBERG, DUWE, FOUQUET, JAIN, KRUBASIK	Compensate for shrinking business areas and generate revenues in the future	CENTMAYER, DUWE, FOUQUET, KRUBASIK
"*Cash Cow*"	DUWE, KLINK, RAUCH	Serve as room for innovation and creativity	DANNENBERG, DEWITZ-GRUBE, DUWE, RAUCH
Must be run in the most efficient way	CENTMAYER, DEWITZ-GRUBE, JAIN	Two dimensions: space for innovation and time to experiment and innovate	RAUCH
Must be cost-efficient	DEWITZ-GRUBE	Learn, fail, and adapt procedure	DEWITZ-GRUBE
Must be cost-competitive	AL-SIBAI	"*Tube to conquer the market*"	WANG
Must deliver on time	DEWITZ-GRUBE		

Balancing of exploitation and exploration

Having determined the roles of the core and the new business, the following evaluates how a balance can be achieved between the two competing business areas. RAUCH pointed out that on lower levels of the hierarchy there is no balancing, rather associates either exploit or explore. However, the higher one goes within the hierarchy, the larger the need for ambi-

dexterity and a balancing of efforts becomes (DANNENBERG, DUWE, RAUCH). Up to a certain level, a person must be an innovator, above this level, a person must be enabler of innovation. For RAUCH, this intersection, where the enablement of innovation starts, is the point at which the need for balancing begins.

DUWE warned that, in practice, the future is often neglected in favour of the core business. The thought process is that the core business must continue to be promoted as it will remain relevant for at least another ten years (AL-SIBAI, JAIN, WANG). KLINK emphasised the contrast between start-ups and automotive suppliers. Start-ups are great at innovation, but usually less so at scaling. Established suppliers are great at scaling and efficiency but need help with innovation. Successful suppliers should be able to implement both aspects. WANG suggested that differing orientations can achieve this balance for the two businesses. The core business needs an outward orientation, which implies focusing on the market and customers, while the new business can be future-oriented. DEWITZ-GRUBE considers balancing the core and new business, and the respective mindsets required for both businesses, a very challenging task. To successfully manage this balancing, several steps are needed. First, leaders need to be aware that they are operating in an ambidextrous environment (DUWE). Then leaders must assign the right employees to the right business, "*and to assign this well, in my opinion, is the art*" (DEWITZ-GRUBE). Leaders must have a profound understanding of their team to determine "*who can do which job*" (DEWITZ-GRUBE). WANG agreed, adding that assigning who is future-oriented or not is based on experience. For this process to work well, leaders must be transparent with their employees (JAIN), set clear strategic guidelines, and clarify the contribution of the associates to the entire company (DANNENBERG).

RAUCH described this balancing in two dimensions: portfolio management and the attitude of leaders. He suggested a form of calendar-management to help leaders better allocate their time to the different tasks of optimisation of the core business and long-term innovation. KRUBASIK described the balancing from a different perspective and explained that he wants "*dissent*", "*a constructive clash of the old world and the new world*". This means that there should be no simple consensus that everything must be done differently and that all success patterns are transferable to the future. Leaders can achieve this through an "*integrated vision, integrated target picture, but differentiated control mechanisms*" (KRUBASIK).

Resource allocation

To achieve this balancing between core and new business, resource allocation plays a crucial role. The resources that need to be allocated include personnel, R&D expenditures, and general investment. Several experts stated that resource allocation is a strategic process that depends on the future vision of the company (DEWITZ-GRUBE, DUWE, KRUBASIK) and thus needs to be constantly adapted (DUWE). Concerning the resource allocation to the core business, no major changes are required (JAIN, WANG). However, suppliers must continue investing in the core to keep it alive (DEWITZ-GRUBE) and increase its efficiency to save resources. WANG pointed out that suppliers are very experienced in the core business and have developed concrete mathematical models for the resource allocation. The distribution of resources between the core business and the new business can be divided into general resources and R&D expenditure. The overall resources reside mainly in the core business (AL-SIBAI, DANNENBERG). WANG explained that 80% of overall resources are still allocated to the core business, while only 20% are allocated to the new business. Regarding R&D expenditure, the situation is different. At MAHLE, 90% of the central research budget is invested in new topics (AL-SIBAI).

WANG indicated that in his company, 63% of R&D expenditure is allocated to the new business areas. It is evident that suppliers will reduce investments in the core business in the future and allocate more and more resources to the new business (AL-SIBAI, DANNENBERG, JAIN). A clear strategic target can help in setting proper allocations. WANG explained that his company allocates the resources based on five-year plans. Before resources are allocated, these plans are further broken down into one-year increments which clearly define what the company wants to achieve in the following year in terms of product development, market share, profitability, and competence.

For the allocation of financial resources to the new business, DEWITZ-GRUBE proposed the method of effectuation[1]. This allows the company to incrementally invest in new areas where little knowledge is available. Regarding personnel allocation, CENTMAYER suggested that for the model of structural ambidexterity, associates should be selected based on personal strengths. RAUCH added that for the scaling of a new business, and when the new product is market-ready, experienced associates from the core business should be transferred to the new business area. HIEBEL, offering the perspective of an employee representative, encouraged a people-to-position allocation of employees based on their respective profiles. KRUBASIK was more critical when it comes to internal staff reallocation, stating his opinion that for the new business "*a certain degree of highly positioned new people is required. Always*." It needs people who are free of the "*dogmas*", "*beliefs*", and "*success patterns*" of the core business. In conclusion, KLINK stated that resource allocation is a crucial leadership task as it "*will always be a bottleneck*."

Role of leadership

As described by O'Reilly and Tushman (2013), leadership plays a central role in mediating between exploitation and exploration. The experts interviewed agreed with the theory: "*The topic of leadership is the decisive factor for me and a clear strategy of where we are headed*" (AL-SIBAI) and "*leadership is a very, very essential element*" (KLINK). DEWITZ-GRUBE further defined leadership as "*leading myself, leading my team, and leading others*", seeing leadership as not only an intellectual task, but also a highly emotional one. The expert interviews highlighted three central motives for leaders' characteristics: a 'caring leader', an 'appreciative leader', and a 'motivational leader' (see Figure 1).

It is crucial for leaders to appreciate people in the core business as well as in the new business areas (AL-SIBAI, DUWE). According to DUWE, "*If you put too much emphasis on the new*, (…) *people in the core business may feel neglected*." Gibson and Birkinshaw (2004) went one step further and highlighted the need to reward employees versus just appreciating them.

These caring, appreciative, and motivational leadership styles are necessary to prevent losing the employees and to better engage them in the transformation process (DUWE, RAUCH). KRUBASIK emphasized the relevance of who is selected for the leadership role, as this sends a clear message to the organization. This follows up on his previous argument that new people in high positions are required for the new business areas. DUWE distinguished between two types of behavior for the core business and the new business. In the core business, leaders need a 'closing behavior'. This means that leaders must inform, give answers, and pay attention

[1] The concept of effectuation was first introduced by Sarasvathy and represents the opposite of causation logic. She defines it as: "Effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means." (Sarasvathy, 2001). A key principle is that decisions are made based on the available resources and the loss one is willing to accept, rather than expected returns.

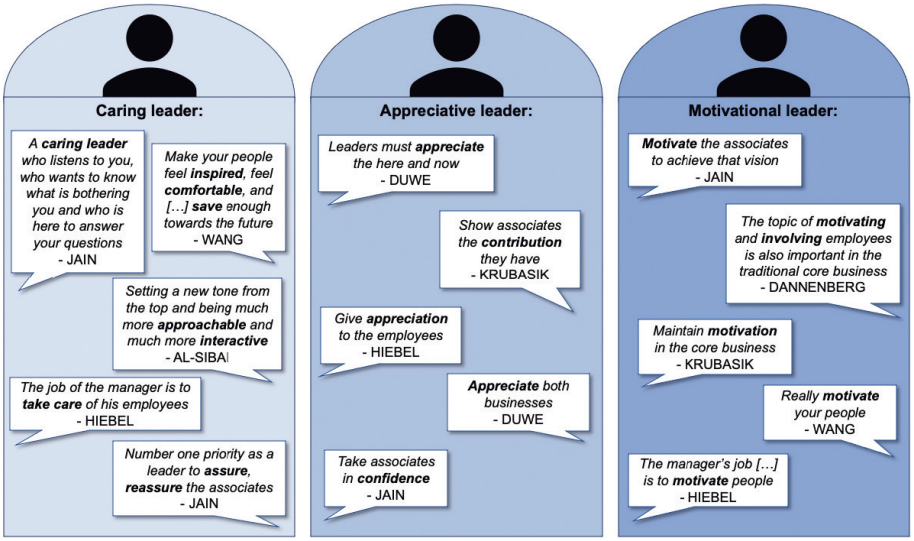

Figure 1. Three roles of leadership

to efficiency and speed. In the new business area, on the other hand, leaders need an 'opening behavior'. They must create room for innovation, ask questions, and connect people. Lastly, JAIN pointed out that a leader's role is also to instill an entrepreneurial mindset in future leaders. He encourages his next generation of leaders to "*Think that you own this business and what will you do if you own this business*."

Competencies

In the following, the competencies are examined based on three dimensions: competencies for leaders versus competencies for associates, competencies for the core versus competencies for the new business, and professional competencies versus soft skills. For this examination, professional competencies are understood as professional-methodological competencies as defined by Erpenbeck (2012). Soft skills consist of the remaining basic competencies as well as the meta competencies in Erpenbeck's model.

For leaders in the core business, the main professional competence identified was cost management, i.e., the ability to manage the business as efficiently as possible while keeping the costs to a minimum (AL-SIBAI, DUWE, RAUCH) (see Table 4). A soft skill that was identified for leaders in the core business is agile working (KLINK, KRUBASIK, RAUCH). However, the experts mentioned this skill not only for leaders in the core business, but also for leaders and employees in the new business (AL-SIBAI, KLINK, KRUBASIK, RAUCH).

The soft skill that was mentioned most often for leaders in the new business is an entrepreneurial or start-up mindset. This competence was mentioned by five experts (CENTMAYER, DANNENBERG, DEWITZ-GRUBE, JAIN, WANG). However, this entrepreneurial mindset was not only mentioned for leaders, but also for employees in the new business (CENTMAYER, DEWITZ-GRUBE, JAIN). Another very important leadership competence for the new business is customer orientation (DANNENBERG, FOUQUET, JAIN, WANG). WANG pointed out that "*you not only need to understand the technology, but you also need to understand how a customer will use the technology and what is the expectation of the new customers and the new customer require-*

Table 4. Main competencies

Position	Business area	Type of competence	Competence	Mentions*
Leader	Core	Professional	Cost management	3
		Soft skills	Agile working skills	3
	New	Professional	n/a	n/a
		Soft skills	Entrepreneurial mindset/startup mindset/experimentation	5
			Agile working skills	4
			Customer orientation/understanding	4
			Ask questions	3
			Storytelling	3
			Resoluteness (willingness and ability to enforce decisions)	3
			Communication	3
			Flexibility	3
			Collaboration skills	3
Employee	Core	Professional	n/a	n/a
		Soft skills	Willingness to change/openness	3
	New	Professional	Software knowledge (vehicle software)	5
			Digitalization skills	4
			Electrification/power electronics	4
			Connectivity/network knowledge	3
		Soft skills	Willingness to change/openness	4
			Agile working skills	3
			Entrepreneurial mindset/startup mindset/experimentation	3

* Number of experts who mentioned this competence.

ments." For JAIN customer orientation is also a competence for employees, as "*leaders are not the only ones who are dealing with the customers*." Other soft skills identified for leaders in the new business include asking questions, flexibility, collaboration skills, and communication. Three experts mentioned communication explicitly as a competence, however, due to the variety of sub-items, the category *communication* was determined using an inductive approach and is therefore examined separately.

Additionally, 'resoluteness' was identified as a competence. This means that leaders must enforce decisions and end innovation projects earlier, if it is foreseeable that they will not be successful. Another important skill of leadership is storytelling. AL-SIBAI stated that leaders need "*to tell the story in such a way that the employees understand it and want to hear it*." KLINK quoted Antoine de Saint-Exupéry to describe storytelling: "*Do not talk about building a boat. Talk about the great expanse of the sea*." For employees, both in the core and in the new business, the main soft skills are openness and willingness to change (AL-SIBAI, DEWITZ-GRUBE, DUWE, HIEBEL). This expands on the findings of Renzl et al. (2013), who emphasise adaptability primarily in an exploration context.

Concerning the professional skills of employees for the new business, software knowledge was the competence most frequently mentioned by the experts (AL-SIBAI, DANNENBERG, JAIN, KRUBASIK, WANG), followed by digitalisation skills, electrification, power electronics knowledge, connectivity and network knowledge. Other interesting competence suggestions from the experts include project management skills for leaders and employees in the new business (KLINK). AL-SIBAI expressed her belief that employees in the new business must have an economic and business understanding to be able to determine the economic viability and potential marketability of new product innovations.

Regarding the interplay between professional competencies and soft skills, KLINK stated that "*of course you need software and so on and so forth. But that is the easy part.*" He suggested that if companies need people who can work with software, they can usually get these people very fast. This supports Gairing's (2020) reasoning that key competencies should be promoted rather than specific knowledge, since specific knowledge can quickly become outdated. While KLINK believes that both competencies are equally relevant, he thinks soft skills require more attention. Concerning the distribution between professional competence and soft skills, KLINK remarked that for leaders, it is around two-thirds soft skills, and one-third professional skills, while for the employees it is the other way round.

Communication

Communication plays a crucial role for the creation of an ambidextrous company and a successful transformation towards a green future (AL-SIBAI, DUWE, JAIN). "*I have to* (…) *communicate, communicate, communicate*" (JAIN). Successful communication is carried out using multiple channels and needs to be repeated (see Figure 2). This is consistent with Lubatkin et al. (2006), who state that a constant exchange of information is important especially at the top management level. To address the concerns of employees and have them engage with the transformation journey, communication must be transparent and open. Furthermore, communication must also be adapted to the respective country and culture: "*You cannot tell a German story in China*" (WANG).

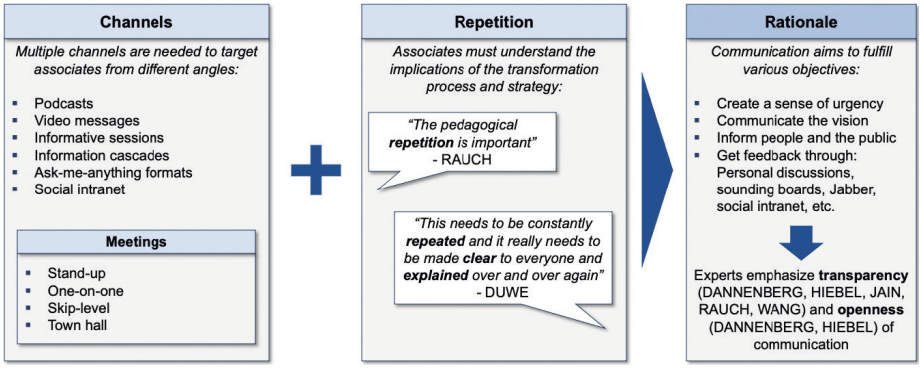

Figure 2. Characteristics of successful communication

While personal communication is the most effective way of communicating according to HIEBEL and RAUCH, digital communication is faster and allows for one-to-many communication. Communication also serves to communicate the purpose and vision (KLINK, KRUBASIK,

RAUCH) and is needed to create a sense of urgency for the workforce. At Bosch for instance, innovation challenges, pitch nights, and failure culture nights are carried out to increase the urgency and awareness of the transformation (DANNENBERG).

WANG explained the importance of external communication in that the public, the state, and especially the customers need to be aware of the progress a company is making in the new business areas. The external communication also allows suppliers to communicate CSR efforts to its stakeholders.

Competence development

Suppliers generally have two possibilities to obtain the necessary competencies analyzed in the previous paragraphs. They can get or develop the competencies externally or develop them internally. Because of the general market conditions and demographic changes, in the future it will not be possible to get all new competencies from the market. Large suppliers will be able to fill their competence gaps by hiring, while small suppliers will have to place a much greater emphasis on re-skilling and up-skilling (RAUCH). Because of the link between organizational ambidexterity and CSR, following an ambidextrous approach can improve CSR, which in turn has been shown to increase organizational attractiveness if communicated to job seekers. Thus, following an ambidextrous approach has the potential to result in a higher number of job applications, helping suppliers fill competence gaps (Waples and Brachle, 2020).

Even though large suppliers might be able to fill competence gaps by hiring, competence development programs are seen as very important: "*I think this is super important*" (DUWE), "*extensive training programs at all levels* (…) *are also required*" (KRUBASIK). However, KLINK noted large differences in the level of development programs between automotive suppliers. Mann+Hummel for example "*did not need it*" (FOUQUET), Knorr-Bremse also does not have any broad qualification programs, and MAHLE is "*working on* [it] *right now*" (AL-SIBAI). Bosch on the other hand has already introduced a program called 'Passion to move' that aims to support the transfer of engineers from the ICE business to electrification (DANNENBERG). While Knorr-Bremse currently gets the new required competencies from outside of the company (CENTMAYER), FOUQUET and JAIN stated that it is first attempted to develop the competencies internally and only after, if necessary, are they acquired externally.

Success factor Velocity

Regarding the time frame of the transformation process and how it can be accelerated, several experts agreed that velocity is essential for a successful transformation process (FOUQUET, JAIN, WANG). However, KRUBASIK pointed out that the decision of acceleration versus deceleration also depends on the scope of action the supplier has. Therefore, the right velocity must first be determined before accelerating. This can be achieved through benchmarking against competitors (AL-SIBAI, CENTMAYER, KRUBASIK). CENTMAYER suggested focusing on the suppliers' core competencies, as this allows the supplier to advance more quickly. DUWE stated that the velocity of the transformation can be increased by improving employee engagement. To do so, JAIN creates a sense of urgency among his employees, with KRUBASIK concurring that you need to "*create symbols for change*".

WANG creates speed in his company through detailed five-year plans that have been approved by shareholders, people, and management, so that during the transformation process less coordination and reconciliation is needed. KLINK and KRUBASIK further suggested that the transformation process can be accelerated externally through collaborations with

other companies or consulting and agile coaching. DUWE and KRUBASIK also proposed the sale of certain core business areas, if the transformation needs to be accelerated immediately.

In an analysis of Toyota's speed of entry into the EV business, Kawai (2022) found that the speed was insufficient due to a lack of dynamic managerial capabilities. One of the main reasons that prevented the necessary changes was the absence of a strong sense of social responsibility for global warming. This links back to the important connection between organizational ambidexterity and CSR.

However, not all experts agreed with an acceleration of the transformation process, DEWITZ-GRUBE asking *"do we want to accelerate at all?"*. AL-SIBAI and HIEBEL stated that they would rather slow it down and improve employee engagement. The strategic goal of the transformation must be clear before a supplier tries to accelerate the process: "*To paraphrase Mark Twain: When they lost sight of the goal, they increased the speed*" (AL-SIBAI).

Success measurement of transformation

The measurement of transformation success is currently a significant challenge. The interviewees described it as a "*tricky question*" (KLINK), a "*huge difficulty*" (DUWE), and something that is "*measure*[d] *far too little*" (DEWITZ-GRUBE). Regarding the actual measurement of the transformation success, KLINK and RAUCH both stated that it is not possible without looking at traditional key performance indicators (KPIs) such as revenue, profitability, and market share. "*For a change without KPIs I always have the image: die in beauty*" (RAUCH). However, these traditional KPIs are not sufficient for the measurement of the transformation success, as it takes time before success in the marketplace can be evidenced using traditional KPIs (DUWE). DEWITZ-GRUBE also pointed out that numbers are used "*too much to control and too little to read as an indicator of where there is room for improvement*."

In response, DEWITZ-GRUBE, DUWE, and RAUCH suggested a combination of the traditional, quantitative KPIs and new, qualitative success criteria. For the automotive suppliers who were interviewed, this represents an area with clear potential for improvement as the focus currently still lies on the traditional KPIs: "*No, so far, we have really focused on the quantitative targets*" (CENTMAYER) and "*we* (…) *do not yet track holistically* (…) *on the topic of workforce transformation*" (DANNENBERG). DUWE proposes to start with qualitative criteria and look at the quantitative KPIs at a later stage of the transformation process. KRUBASIK did not differentiate between qualitative and quantitative criteria, but between input-oriented and output-oriented, i.e., result-oriented metrics. While output-oriented metrics are represented by the traditional KPIs and depend heavily on the target setting, input-oriented metrics serve as early indicators to show if suppliers are on the right track.

Concerning the qualitative success criteria, DEWITZ-GRUBE noted that "*employee satisfaction needs to get better*" and AL-SIBAI added "*I have not yet seen that there are metrics for employee satisfaction*." HIEBEL and RAUCH, both offering the employee representative perspective, emphasised employee satisfaction as an important qualitative success criterion. DUWE added customer satisfaction as an essential factor to consider. According to DUWE, the main role of any company is to fulfil customer wishes and thereby generate profits. "*With all transformation, you always have to keep in mind what you are doing it for, namely for the customer*" (DUWE).

DANNENBERG, DEWITZ-GRUBE, and KLINK consider the objectives and key results (OKRs) method as an alternative to traditional KPIs and a valuable tool to measure transformation success. DEWITZ-GRUBE highlighted that this method allows companies to respond to changes faster. Finally, DANNENBERG pointed out that there is always a balancing between too many

and too few success criteria: "*It is always a challenge between lean reporting* (…) *versus holistic tracking in a complex KPI system*."

The following table shows a proposal of a complete model for the measurement of transformation success (see Table 5), considering both quantitative and qualitative criteria to determine the general business development as well as workforce transformation. Further quantitative analyses are needed to verify the theories developed on transformation success measurement.

Table 5. Transformation success measurement model

General business	Success criterion	Area	Negative	Neutral	Positive
	Revenue decline	Core	> Market	= Market	< Market
	Revenue growth	New	< Market	= Market	> Market
	EBIT (Profitability)	Core/New	< Average	= Average	> Average
	Market share	Core/New	Declining	Stable	Growing
	Project acquisitions	Core/New	< Market	= Market	> Market
	Project acquisition hitrate	Core/New	< 50%	50–60%	> 60%
	Dependency on ICE	Core	> 40%	40–20%	< 20%
	Change in dependency on ICE	Core	< Market	= Market	> Market
	R&D Investment	Core/New	Core > New	Core = New	Core < New
	Time–to–market	Core/New	< Market	= Market	> Market
	Customer satisfaction	Core/New	Dissatisfied	Satisfied	Very satisfied
Workforce	Employee distribution	Core/New	Core > New	Core = New	Core < New
	Personnel adjustment/new hires	Core	> Revenue decline	= Revenue decline	< Revenue decline
		New	External recruitment	50% external 50% internal	100% internal
	Employee reskilling (if needed)	Core	< 40% reskilling of employees in core business	40–60% reskilling of employees in core business	> 60% reskilling of employees in core business
	Employee satisfaction	Core/New	< 70% satisfied	70–85% satisfied	> 85% satisfied
	Clarity of transformation target/ vision	Core/New	< 60% aware	60–90% aware	> 90% aware

5. Conclusions

In conclusion, it is evident that the trends electrification, autonomous driving, digitalization, and new mobility services pose unprecedented challenges for automotive suppliers. These trends have been further accelerated by the COVID-19 pandemic. To deal with these challenges and improve their CSR performance, automotive suppliers must follow an ambidextrous approach to make their core business more efficient, while at the same time seizing new growth opportunities towards a green future. Since no clear guidelines exist regarding how this setup can successfully be achieved, this article provides a first approach that automotive suppliers can follow.

Summarising the findings of the research, the following practical recommendations are derived. Leadership of automotive supplier companies must realize that they are operating in an ambidextrous environment. The strategic direction of the company needs to be determined before the appropriate type of ambidexterity setup. Therefore, management must understand the skills of employees and assign the right employees to the right business areas if possible. In doing so, leadership must be transparent, set clear strategic roles, and clarify the contribution of the associates to the entire company. To successfully integrate both business areas into a functioning business, an integrated vision and target picture are needed. Control mechanisms, however, must be differentiated between the two business areas. To best manage the competition between the two business areas, leadership can allocate time using calendar-management. They also must ensure they act as caring, appreciative, and motivational leaders. For the core business, a 'closing behaviour' is most appropriate, i.e., leadership informs, gives answers, and pays attention to efficiency and speed. An 'opening behaviour' should be adopted for the new business area. This means that room for innovation is created, questions are asked, and people are connected with one another. The required competencies for employees are more technical and include software, digitalisation, and electrification knowledge. However, employees also need openness and willingness to change in a volatile environment such as the automotive supplier industry. On the other hand, leadership needs an entrepreneurial mindset, agile working skills, and a strong customer focus. To ensure employees are engaged with the transformation journey and prevent losing them along the way, intensive communication and constant repetition are needed.

An additional factor for a successful transformation is velocity. However, leaders must ensure that they engage employees in the journey at all times. Lastly , no holistic and complete models currently exist to measure the transformation process and determine what a successful transformation looks like. Although the search for new success criteria is gaining importance, the focus still lies on traditional KPIs. Further studies are needed to develop a holistic model for the measurement of transformation success.

Since the results were collected using a qualitative approach, further quantitative studies are needed to validate the theories developed. In addition, the findings depict the situation of large automotive suppliers based in Germany and must therefore be applied with caution to the global automotive situation. However, since the suppliers interviewed are active on a global scale, this study is still representative. As the question on success measurement in the transformation process has shown, currently no holistic models to indicate what a successful transformation looks like and which criteria should be considered exist. This increases the challenge of separating successful from unsuccessful recommendations.

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