Sophie Heim, Maren Gierlich-Joas*

The Mutual Interaction of Employee Empowerment and Digital Innovation: A Case Study About an Employee-Initiated AR/VR Sales Tool at a German Trade Fair Company**

Abstract

In times of digital transformation, the voice and participation of employees become increasingly important since employees and the knowledge they provide are recognised to be the main asset of every firm, driving innovation. Hereby, digital technologies can have a strong impact on employee empowerment as new means of engagement become feasible, triggering digital innovation. Despite this development, we observe a lack of research on the mutual interaction of employee empowerment and digital innovation. The reason for this is that prior studies predominately focus on one efficient direction: either digital technologies affecting empowerment or employees affecting the innovation process in the course of employee-driven innovation (EDI). This study, therefore, aims to contribute to an understanding of the interface between the two above-mentioned directions. To investigate the research topic, the Adapted Structuration Theory (AST) of DeSanctis and Poole is used as a theoretical lens. We conduct a structured literature review, followed by an in-depth case study of an employee-initiated augmented reality / virtual reality (AR/VR) sales tool. The findings emphasize the strong mutual interaction between employee empowerment and digital innovation on the different levels of employee, management and organisation. The study holds contributions to theory and practice by extending the adapted AST and by offering guidance on how to facilitate employee empowerment in the digital age.

Keywords: employee empowerment, employee-driven innovation, digital innovation, Adaptive Structuration Theory (AST), case study research
(JEL: J54, O31, O33)

* Sophie Heim (corresponding author): Technical University of Munich, Department of Informatics, Chair for Information Systems and Business Process Management, Garching, Germany. E-Mail: sophie.heim@tum.de
Dr. Maren Gierlich-Joas: Ludwig-Maximilians-Universität München, LMU Munich School of Management, Institute for Digital Management and New Media, München, Germany. E-Mail: gierlich@lmu.de, maren.gierlich-joas@uni-hamburg.de

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Introduction

"When I can lead my employees through my leadership style and the initiation of reasonable projects to grow beyond their borders and their skills, to be creative themselves and to develop their new ideas […] - That is empowerment".[1]

Perceptions of empowerment are of personal significance, as this statement from an interview conducted in the course of this research shows. In an organisational context, employee empowerment is considered a win-win situation for both sides, i.e. employees and managers (Lashley, 1999). Employee empowerment, therefore, has a positive impact on organisational performance and firm innovativeness (Berraies et al., 2014; Kmieciak et al., 2012). Studies on the arising concept of employee-driven innovation (EDI) stress the benefit of employee empowerment when striving for innovation (Amundsen et al., 2014; Kesting & Ulhøi, 2010). Employee empowerment can be understood as an integrating concept for employee involvement and participation (Herrenkohl et al., 1999; Honold, 1997). Although employee voice and empowerment are often used as synonyms in practice, and although their conceptualisations partly overlap, they are not the same (Wilkinson & Fay, 2011). Employee empowerment is either defined as the empowerment act per se, which is referred to as "structural" or as the psychological state of being empowered, which is referred to as "psychological" (Conger & Kanungo, 1988; Fernandez & Moldogaziev, 2013a; Menon, 2001). Employee voice, on the other hand, expresses "the desire and choice of individual workers to communicate information and ideas to management for the benefit of the organization" (Barry & Wilkinson, 2016, p. 262). Employee voice can be expressed formally and informally, as well as directly and indirectly, addressing various domains and topics, such as working conditions and working modes. Employee voice can be conceptualised along various factors, for example, its level of analysis, type of employees, type of input being voiced and the alternatives to voice. Furthermore, employee voice differs greatly depending on industrial relations, human resource management and organisational behaviour. In our study, we take an industrial relations perspective on employee voice and analyse the collective consisting of workers who might have conflicting interests with the management's controlling voice (Wilkinson et al., 2020).

As prior studies illustrate, employee voice can be strengthened by the moderating role of empowering leader behaviour (Gao et al., 2011). The two concepts are thus closely related (Wilkinson & Fay, 2011). The empowerment of employees might impact employee voice in a positive manner since structural and psychological propositions that come with employee empowerment (Robbins et al., 2002) lead to several benefits for the organisation. The benefits are, for example, increased loyalty, productivity and innovation (Mohapatra & Mishra, 2018). These benefits, especially (digital) innovation, can only be established by employee voice and, in this context, active communication from the employees' side (Barry & Wilkinson,

1 This and all other quotes were translated from German by the authors.

2016; Gressgård et al., 2014). In our study, we, therefore, want to focus on employee empowerment and its interaction with digital innovation, as this will result in employee voice. In the following, we illustrate those interactions.

Starting with employee empowerment: Due to numerous organisational structures, employee empowerment does not happen naturally (Honold, 1997). Therefore, it is important to determine and control the influences on empowerment. One of the factors that impact employee empowerment, as well as digital innovation in general, is the technology push (Trott, 2017). Tools based on information and communications technology (ICT) support EDI, being defined as organisational changes initiated by regular employees in the sense of employees at the bottom of the power hierarchy without any managerial responsibilities (Kesting & Ulhøi, 2010). EDI can only be successful if the ICT is aligned with organisational structures and professional role conduct (Gressgård et al., 2014). This indicates that employee empowerment can contribute to the necessary foundation for the generation and implementation of digital innovation. Furthermore, digital innovation enables new means of encouraging empowerment.

In academic literature, there are studies that either focus on digital technologies affecting employee empowerment (Mueller et al., 2016; Orlikowski, 2000) or on employees affecting the innovation process (Bäckström & Bengtsson, 2019; Hirzel et al., 2017; Kesting & Ulhøi, 2010; Mao & Weathers, 2019). However, very few studies stress the mutual interaction of employee empowerment and digital innovation (Fernandez & Moldogaziev, 2013a). Furthermore, either employee empowerment or digital innovation is mentioned as a concrete concept, and the respective other is circumscribed with another similar but not identical term. Kesting and Ulhøi (2010), for example, name five drivers of *employee participation* in innovation, whereas Hirzel et al. (2017) speak of *continuous improvement (CI)* instead of digital innovation in their case study on the role of employee empowerment in CI.

With this study, we thus aim to expand the scope of previous literature by focusing on the specific role of digital innovation in the context of employee empowerment. This topic can be related to research on the mutual influence between digitised work environments and work relationships, which, according to Kirchner and Matiaske (2019), is considered to be still at its beginning. By referring to our findings above, we share Kirchner and Matiaske's (2019) opinion that there is still a need for building a holistic and complete picture of digital work environments. Thus, following research question has been examined in this paper: *How can digital technologies be applied to empower employees to generate and enhance digital innovation?*

To approach the above-mentioned research question, this paper consequently refers to the manner of mutual interaction between employee empowerment and digital innovation that are initiated or improved via digital technologies. In the following study, the concepts of employee empowerment, EDI and digital innovation are

introduced first. Next, DeSanctis and Poole's (1994) Adaptive Structuration Theory (AST), which is based on Anthony Giddens's (1984) structuration theory, serves as a suitable concept to examine the adaption process of the structure of technology and the structure of social action, in this case, employee empowerment. In the following section, the method of qualitative case studies is outlined, followed by the description of the data collection and analysis. We present our results along carefully selected dimensions before reflecting critically on them in the discussion. Practical and theoretical implications and limitations, as well as an outlook for further research, complete the picture.

With the practice-oriented research design, our study holds multiple contributions to theory and practice. From a theoretical point of view, this study contributes to the extension of the AST and serves as a starting point for research at the interface of digital innovation and employee empowerment. Examining the interplay between employees and technology may bring us new theoretical foundations and insights for research on the future world of work. From a practical perspective, we shed light not only on the adaption process and social interaction but also on their outcomes when bringing employee empowerment and digital innovation together. We thus aim to give recommendations on how employees, management and organisations should manage the tension between employee empowerment and digital innovation. Practitioners can benefit from this holistic picture by understanding dynamics and complex interrelations that may not be obvious in everyday work.

Theoretical Foundations

Employee Empowerment

Starting with the theoretical concepts, employee empowerment is a relatively long-known concept derived from Edward E. Lawler's concepts of employee involvement and employee participation (Herrenkohl et al., 1999; Honold, 1997). The literature about employee empowerment does not have a clear consensus about the definition of the term nor an explicit concept origin (George & Zakkariya , 2018; Herrenkohl et al., 1999). Certain scientists argue that for most companies, employee empowerment is even more of a rhetoric concept, as it is often stated publicly that employees are empowered but asked privately why it cannot be seen (Argyris, 1998; Greasley et al., 2005). This statement already suggests that there is a broader concept behind the term empowerment. Indeed, most of the researchers in this scientific field mention two main conceptions of empowerment: the structural (also called relational, multi-dimensional, situational or managerial) approach on a macro level, which focuses on the empowerment act, and the psychological (also called motivational or individual) concept on a micro level, which highlights the psychological state of being empowered (Conger & Kanungo, 1988; Fernandez & Moldogaziev, 2013a; Greasley et al., 2005; Men & Stacks, 2013; Menon, 2001; Yang & Choi, 2009).

Furthermore, empowerment is positively related to innovation and organisational performance (Berraies et al., 2014; Fernandez & Moldogaziev, 2013a, 2013b).

According to the well-established study by Bowen and Lawler (1992), the structural approach covers four major factors: firstly, *information about organisational performance*; secondly, a *reward system*; thirdly, *knowledge and skills for understanding and contributing to the organisational performance*; and fourthly, the *decision-making power* for influencing the direction and performance of the organisation's strategy. In the latter case, employees should be directly involved, not just collaborating (Baird & Wang, 2010). The definition highlights the crucial role of organisations in empowerment processes. Chiles and Zorn (1995) argue "that empowerment may be more of an organizational issue than a personal/interpersonal issue" (p. 21) since it would be difficult for a manager to empower his/her employees if the organisation only provides a disempowering environment.

Several researchers, for instance Petter et al. (2002), extended Bowen and Lawler's four key elements of employee empowerment by adding the following four dimensions: *general power*, which is given to the employees; *autonomy* for employees doing their job; work-related *initiative and creativity*; and empowerment as *responsibility* (Petter et al., 2002). Due to the reputation of the research and comprehensibility, as well as the inclusion of employee voice, for this paper, we decided to focus on the eight key elements for the structural conceptualisation of employee empowerment.

In terms of defining and explaining psychological empowerment, there are three particularly important and often cited researchers. The first were Conger and Kanungo (1988), who based their definition on the motivational self-efficacy theory for a behavioural change introduced by Bandura (1977). Secondly, Thomas and Velthouse (1990) instead focused on intrinsic task motivation and the relevant cognitions *meaning*, described as the value of a work goal or purpose; *competence*, defined as the employee's belief in his/her capability for job performance; *self-determination*, described as the choice to initiate and regulate actions; and *impact*, which covers the individual's influence in the organisation. Thirdly, Spreitzer (1995) derived a conceptual measurement model for these four dimensions. He argued that they are not constructed equivalent and therefore contribute to the overall concept of psychological empowerment. In this study, we follow the definition of Robbins et al. (2002). They created a process model that presents the above-mentioned influencing factors and streams of definitions for employee empowerment in a comprehensible manner and integrates both the psychological and the structural points of view.

Digital Innovation

For the second theoretical concept, we highlight the concept of digital innovation. The application of digital technologies in an organisational setting leads to digital innovation, which then triggers organisational changes (Wiesböck & Hess, 2020).

Due to the accessibility and ubiquity of digital technologies (Yoo et al., 2010), everyone can participate easily. Moreover, digital technologies are characterised by three main characteristics: re-programmability, homogenisation of data and self-referential nature of digital technologies (Yoo et al., 2010). Hereby, re-programmability describes the process of enabling a digital device to be a physical container with various content and services, like a tablet or smartphone with different apps. Homogenisation of data as the second characteristic describes the capabilities of a device to transmit, process and store data via digital networks as binary numbers. Thirdly, the self-referential nature characterises digital technologies' need for digital innovation, which then stimulates positive network externalities. This is the basis for even more digital outcomes, for instance, devices and services. (Yoo et al., 2010)

Orlikowski (2000) further argues that technology can be considered as an artefact as well as a technology in practice, as every single user experiences and uses technology differently due to various understandings and experiences with it. The interaction is thus recursive, as users and digital technologies influence each other mutually, which, in turn, provides innovation, learning and change potential. At the same time, this is why technology is never fully complete (Orlikowski, 2000). Based on that understanding, technology in practice contains three enactment types. The first one, inertia, describes the use of technology for established practices, whereas the second one, application, is about the technology use beyond known means. Change, as the third enactment type, contains the alteration of existing practices through technology (Orlikowski, 2000). In all three types of enactment, barriers and difficulties can occur that have to be carefully dealt with to gain advantage and new possibilities in various areas (Yoo et al., 2012). Since the action potential of technology for an organisation, i.e. its self-styled technology affordance (Majchrzak & Markus, 2013), is paramount, the focus should therefore rather be on revisiting the use of technologies and not on the technology per se (Kane et al., 2015; Orlikowski, 2000).

Digital innovation builds on the advent of digital technologies. Therefore, digital innovation can be defined as the process of developing and implementing new combinations of digital and physical components (Yoo et al., 2010) or, according to Nambisan et al. (2017), as the innovation process under the prerequisite of the usage of digital technologies. The convergent and generative character of innovation resulting from digital technologies form the foundation of digital innovation (Yoo et al., 2012)

Driven by the technology push by new digital technologies and the technology pull from the market side, two digital artefacts arise, namely innovative digital solutions and complementary and indispensable digital business concepts (Wiesböck & Hess, 2020). These two digital artefacts form digital innovation. The effect of several digital innovations in an organisational context leads to digital transformation (Hinings et al., 2018). Overall, digital technologies enable the process of digitisa-

tion, which, in turn, brings about digital innovation as part of a firm's digital transformation. The whole process of transforming a business and its products, services and organisational processes due to digital technologies is then called digital transformation (Hess, 2019; Matt et al., 2015). However, digital transformation needs to be differentiated from digitalisation as "the use of digital technologies to change a business model and provide new revenue and value-producing opportunities" (Gartner, n.d.).

Employee-Driven Innovation

The term EDI serves as a connecting concept between the two interacting sides of digital innovation and employee empowerment. The innovativeness of employees and its value also stands at the centre of research about EDI (Aaltonen & Hytti, 2014; Alasoini, 2013). Furthermore, important foundations are the delegation of authority and the employees' autonomy (Amundsen et al., 2014; Gressgård et al., 2014), which represent the connection to employee empowerment, although it is barely mentioned in this context. This might be why EDI is a relatively new research field (Amundsen et al., 2014; Holmquist & Johansson, 2019), which has mainly been explored in Scandinavian countries thus far since a number of governments put it on the research agenda and as a policy for organisations (Hansen et al., 2017; Lindland, 2019).

Kesting and Ulhøy, whose research about EDI is often cited in EDI literature, define the term "as deliberate changes to a firm's bundle of routines or parts thereof that have been 'driven' by 'ordinary' employees, who have no formal authority" (2010, p. 72). Based on this definition, every employee, regardless of his/her position or educational level, should be involved in and concerned about innovation (Aaltonen & Hytti, 2014; Amundsen et al., 2014). EDI is an integral part of working and learning processes with a focus on workplace learning since the learning and innovation processes are inseparably intertwined (Høyrup, 2012). Furthermore, EDI can be considered as a bottom-up process, a top-down process, and also as a mixture; thus, three types of EDI can be distinguished. The first type of EDI contains the bottom-up process based on innovations of employees in their everyday life. Second-order EDI constitutes a mixture of bottom-up and top-down processes if the management systemises and formalises the employees' innovations. The third form reflects a top-down approach if the management integrates employees for their innovativeness in specific projects (Høyrup, 2012).

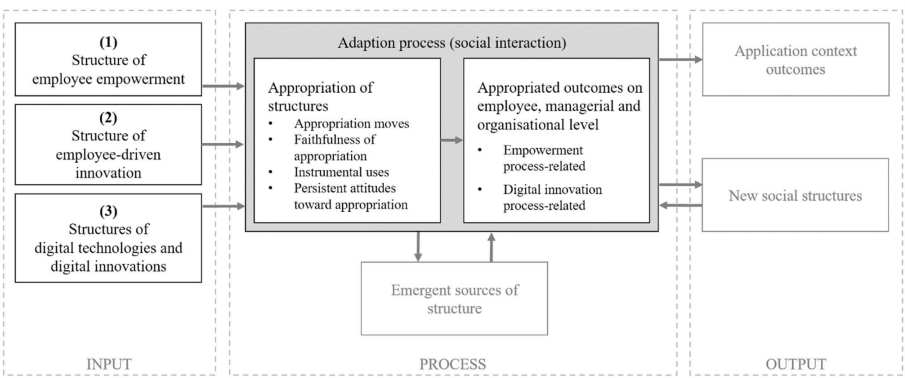
Adapted Structuration Theory

To analyse the described interplay between the two concepts of employee empowerment and digital innovation, we apply the AST. The AST originates from the field of social sciences and "provides a model that describes the interplay between advanced information technologies, social structures, and human interactivity" (De-

Sanctis & Poole, 1994, p. 125). Fundamental to this is structuration, which is based on the British sociologist Anthony Giddens's (1984) structuration theory and appropriation. Combined, structuration theory and appropriation illustrate the process of incorporating technologies into people's workplaces (DeSanctis & Poole, 1994). According to Jones and Karsten's (2008) extensive literature review and analysis, Giddens's structuration theory serves as a foundational theory and significant research opportunity connecting the fields of sociology and information systems, which is the focus area of this paper. The structuration theory is well established and has frequently been applied in the field of social science and information systems to investigate recent phenomena like the adaption of agile methods (Cao et al., 2013) or the interplay of structure and information and communication technology (Crowston et al., 2001). Recently, AST has gained in popularity in the human resources (HR) discipline to study concepts like e-leadership (Avolio et al., 2000; Turner et al., 2019). The theory enables us to take a processual perspective on the adaptation of digital innovation and organisational features, thus fostering a deeper understanding of the interplay of digital innovation and empowerment. Therefore, it is a suitable model for exploring the interaction between employee empowerment and digital innovation in a holistic view.

By relating the interacting concepts, their processes and impacts, the technology-organisation complexity and the processual perspective will become evident (DeSanctis & Poole, 1994). The perceptions from AST influence the manner of technology usage and consequently mediate its impact on outcomes.

Figure 1. Adaptive Structuration Theory by DeSanctis and Poole (1994). Adapted by the Authors



Following the composition approach of Fuchs (2019), the AST model can be divided into three main steps: input, process and output. Fuchs, as well as other researcher teams, adjust the input variables and processes after the appropriation of structures according to their research topic (Fuchs, 2019; Maznevski & Chudoba, 2000; Salisbury et al., 2002; Speier & Venkatesh, 2002). In the context of this

paper, the three input variables that have been chosen in connection with digital innovation are the structure of employee empowerment, EDI and structures of digital technologies (see Figure 1).

Furthermore, the second part of the adaption process has been changed into appropriate outcomes on an employee, managerial and organisational level since those are the three central levels in employee empowerment and EDI found in a structured literature review following the approach of Webster and Watson (2002). In total, eight focus areas have been identified in the three levels: attitudes, enactment, idea generation, influencing factors, involvement, preconditions, process and outcome. A short definition of each of the eight focus areas can be found in Table 1. The areas serve as a basis for the following case study and the investigation of the *appropriation of structures*.

Table 1. Overview of the Eight Identified Focus Areas in Previous Literature

Focus area	Definition
Attitudes	Settled manner of thinking or feeling about empowerment and digital innovation process-related outcomes
Enactment	Process to socially construct the reality when actively using or interacting with technology
Idea generation	Process of generating new ideas, in this context, digital innovation ideas
Influencing factors	All possible factors affecting the empowerment and digital innovation process
Involvement	Inclusion of employees in the digital innovation process
Outcome	Results or consequences of the empowerment and digital innovation process, for example, a change in corporate culture
Preconditions	Requirements that must be fulfilled to enable employee-driven digital innovation
Process	Procedures that happen in an organisation with a digital innovation idea to its realisation

Methodology

Case Study Introduction

Utilising the body of prior knowledge and to fully answer the research question on the mutual interaction of employee empowerment and digital innovation, the empirical model of a single-case study has been chosen. Due to the research's aim of analytic generalisations when it comes to theoretical propositions (Eisenhardt & Graebner, 2007; Yin, 2014), the single-case study is an appropriate research method in that context. Specifically, for performing a case study on a qualitatively high level, we followed Yin's (2014) recommendations for rigorous qualitative case study research, taking construct validity, internal and external validity as well as reliability into account. To address the study's rigour, systematic processes have been applied

to the literature review as well as the case study following Eisenhardt (1989) and also Eisenhardt and Graebner (2007).

The research design that has been applied to this case study follows the approach of Yin (2014). All six sources of evidence/data have been covered to facilitate data triangulation: communication via email (documentation) since December 2018, usage of organisational charts (archival records), interviews, direct observation on site, participant observations and physical artefacts, which is the augmented reality / virtual reality (AR/VR) sales app. Nevertheless, the interview as a source of evidence was at the forefront and was specifically focused on due to the targeted topics and personal views. For the evidence, the four data collection principles by Yin (2014) have been complied with. In the following, the data collection and sampling, as well as the data analysis, are outlined.

The case concerning an employee-initiated digital innovation took place at a German trade fair company throughout the year 2019. The case focused on an AR and VR solution for the sales process of individual booths and event room constructions. With the help of AR, booths and event room constructions can be shown in the real world via simulated cues, whereas the VR function allows customers to be totally immersed in a synthetic world, in this case, a trade fair booth or event space (Milgram et al., 1994). By collaborating with a service partner, the AR/VR sales tool has been developed, supporting a 3D, AR on-table and AR life-size view of trade fair booths and event spaces by the time of the research. The planned VR extension should enable meeting the customer in a virtual environment and walking through the booth model/event space. Although the project's direct return on investment (ROI) has not materialised at the point of observation, it contributes to the image of the trade fair company using AR and VR in their daily operations. Furthermore, the project supports especially the process of pitching a booth model to expand the imagination of a room for the client as well as the designer himself/herself. Nevertheless, inspired by working with the technologies AR and VR, new ideas arose, such as the offer to visit a trade fair's or event's digital showrooms independently. Furthermore, the switch between the normal presentation and the AR/VR presentation turned out to be disturbing in the pitching process, which is why employees developed the idea of doing the entire presentation in an AR/VR environment.

When applying the case to the topic of this paper, AR and VR stand for digital technology, for all ideas around the project and for further digital innovation project development. Furthermore, an employee initiated the digital innovation, which is an example of EDI resulting from empowerment. The usage of the AR/VR sales tool constantly led to novel innovation by employees, which would not have been feasible with only the management being involved. In total, the case displays the interaction forces and thus highlights many accompanying difficulties in practice. That is why we selected this information-rich case for further analysis.

Moreover, by the time of conducting the case study, the trade fair company was in an internal transformation phase, reinforcing the corporate culture and work environment. Various initiatives, such as an innovative idea contest with a reward system on a regular repetition, are drivers of this transformation. In the course of the digital strategy as a means to build up agility and digital focus in an intensified and smaller environment, a new business unit for digital topics (BU Digital) was established in 2017. Another example is the New Work initiative that started at the beginning of 2018. This initiative involves a program for the digital transformation of places (mainly the office environment), people (e.g., HR campaigns for agile project management) and tools (for instance, the implementation of the collaboration application Microsoft Teams). The overall objective of this initiative was to gain more cross-departmental collaboration in an international and digital characterised surrounding. These projects enrich the environment for digital innovation and employee empowerment and thus broaden the context of the single-case study.

Data Collection and Sampling

We applied the purposeful sampling strategy of theory-based sampling since we aimed to select an information-rich case from which to draw conclusions with regard to the adapted AST. Consequently, the trade fair company, its booth construction subsidiary and many departments of both companies were involved. The different departments within the firm were the unit of analysis. Furthermore, the area of employee empowerment and the focus on the three units of analysis (employee(s), management, and organisation) required a diverse range of interviewees to shed light on different facets of the topic. We, therefore, decided to sample five units of data collection, which, again, were separated into two groups, one by company/department and the other by function (regular employee, manager with staff responsibility) such that every respondent always belonged to two groups. All the interviewees were selected intentionally by a team of researchers and two persons working at the trade fair company and involved in the project of the AR/VR sales tool. With this approach, we ensured that all respondents had something to say about the topic.

After the sampling process of the interviewees, a semi-structured interview guideline, which followed the basic setup from Myers and Newman (2007), was chosen. This setup of the interviews allows for flexibility during the data collection but ensures the comparability of the results. After the introduction (including the request to refer to the AR/VR sales tool where possible) and before the main part, the interviewees were asked to rate the company's digital maturity with the four options beginners, conservatives, fashionistas and digirati (cf. Fitzgerald et al., 2013), and to assess the operation direction between top down and bottom up (cf. Høyrup, 2012). The reason for this approach was to query the general attitudes towards the company, which may influence the main part.

The questions in the main part were classified into three blocks: one for employee empowerment, one for digital technologies and innovation and the third for mutual interaction. Each block contained three to four questions from which the main question was selected. The main question should be answered and given precedence if the interview situation does not meet the rough expectations. To further explore the adaption process of the adapted AST, the questions themselves were, on the one hand, based on the eight focus areas that have been derived from the literature review with regard to the appropriated outcomes on an employee, managerial and organizational level, and, on the other hand, oriented towards the appropriation of structures. Furthermore, the formulated questions have been prepared with regard to the three units of analysis (employee(s), management, organisation) but often left room for the interviewee to choose and highlight one or more units and for the interviewer to ask again and dig deeper. In total, 18 interviews were conducted in September 2019. The interviews were conducted in German, with a duration of between 17 and 45 minutes each. Most of the interviews were conducted on-site, except for three conversations via telephone/video call. All interviews were audio recorded and transcribed in an anonymised manner. Table 2 gives an overview of the different interview partners, their companies, functions and responsibilities.

Table 2. Overview of the Interview Partners per Company and per Function/Responsibility

	Trade Fair Company (parent company, ~ 1,000 employees)	Booth Construction Company (subsidiary, ~ 100 employees)	Total
Managers	■ 1 Top Manager ■ 5 Middle Managers (HR, Organisation/Strategy, IT, Project Management, Event Technology) ■ 2 IT Managers	■ 1 Top Manager ■ 1 Middle Manager	8
Regular Employees	■ 1 Business Developer ■ 1 HR Employee ■ 1 Digital Strategist ■ 3 Project Managers	■ 2 Designers	10
Total	14	4	**18**

Data Analysis

To analyse the data of single cases, we started with a within-case display as recommended by Myers and Newman (2007). The analysis, therefore, followed four main steps. Firstly, the early analysis was achieved by applying pattern coding based on patterns derived from the literature review and the adapted AST. Examples of the applied coding scheme can be seen in Table 3. Secondly, the data was visualised in a systematic manner for the exploration and describing phase. By applying this approach, it was possible to identify certain strains and dilemmas. In the third

phase, the strains and dilemmas were examined in an explanatory manner. Fourthly, clustering was chosen as a method for the connection and abstraction to make sense of and complete the data analysis. However, when interpreting the results and presenting our findings in the following, we suggest keeping in mind that it is mostly based on 18 interview partners as well as the observations and material selected during our fieldwork.

Table 3. Examples of the Applied Coding Scheme

Example	Code(s)	Description
"I'm still struggling to fully understand the monetarization [of digital innovation]. This is something … I don't see how we will earn money with that. But maybe, we don't even need to earn money with it directly".	NC2	This citation describes a decision dilemma (NC2) between the possibilities of digital innovation and the return on investment (ROI) of a digital innovation that might not be directly measurable.
"So if it [a new digital innovation] makes sense for me and helps me with my work, I'd definitely be willing to familiarise myself with it".	AS1, LR4	■ The citation shows an appropriation move (AS1) if a digital innovation idea has a personal surplus value for the person. ■ The personal surplus value that is a must for certain employees can be considered an influencing factor (LR4) for digital innovation projects.
"I always say: First of all, let's try it out – we can still evaluate it afterwards".	AS1, AS2, LR2, NC3	■ It fits into the codes of appropriation moves (AS1) and faithfulness of appropriation (AS2) because, on the one hand, the culture of experimentation, to try it out, is an appropriation move, whereas the evaluation of the appropriation move can be regarded as a method of assessing the faithfulness of appropriation. ■ The phrase is also suitable for code enactment (LR2) since people need to become active. ■ That digital technology or innovation should not be evaluated before being tried out is a recommendation for action (NC3).

Findings

With the explorative and explanatory data analysis method as well as the clustering and validation process, the verbal information of the interviews was broken down and analysed with regard to different aspects of the investigation. The areas of focus – in this case, emergent sources of the structure according to the adapted AST (cultural aspects, work environment and operations) that will be presented in the following – were the result of the clustering in the last data analysis step.

Cultural Aspects

When reviewing the findings in the area of culture, it becomes evident that they are all interconnected and affect each other. The *unknowingness of certain regular employees* when it comes to possibilities of empowerment can be traced back to the

mission and vision that are not clearly communicated or understood by the employees. Furthermore, employees might step back from empowerment, as it implies a *strong self-initiative and generally embodies on-top work*. A possible reaction to this would be to shut oneself off from such possibilities as this comment shows:

> *"Ultimately, it's always like this: We're so busy that everything that comes on top […]; everything needs to be realised on top of our working time. I mean, if you're working in a department where you twiddle your thumbs all the time, you may be happy if something new comes up and you have something to do again. But that's not the case for us".*

(Interview with a project manager (regular employee) at the trade fair company in Sep. 2019)

In this instance, someone who works on an idea that is not part of his/her daily work routine is afraid of being considered as not fully utilised in his/her specific responsibility. Presumably, the fair company, therefore, *works on the transparency of processes* regarding digital innovation ideas that involve different initiatives. Nevertheless, due to capacity restrictions, it is not possible to administer every idea. Consequently, projects like the AR/VR sales tool have *supporters as well as resistors*. The added value of each idea is therefore estimated in a very subjective manner by each employee, based on the employee's own benefit and the impression of the customer or company benefit. Furthermore, the negative influence of digital technologies and related issues, such as data privacy and tracking possibilities, may be a reason for a number of employees to be more on the side of the resistors. Moreover, in common parlance, digital technologies and innovations are sometimes considered inventions that may replace the employee's labour.

When asking about the personal significance of each interviewee when it comes to employee empowerment, one precondition has been highlighted many times: the need for a *culture of experimentation* associated with a certain error tolerance. Certain interviewees mentioned this precondition, especially in connection with the feeling of *intimidation due to high expectations* either from supervisors, colleagues or themselves. These circumstances influence not only regular employees but also their managers:

> *"For me, it's important how employees see themselves. Do they think, 'Okay, I already have a project that I'm supposed to carry out. Do I want to be actively involved in shaping the business, too? And, am I prepared to make mistakes?' Because, especially for new topics, new services, building new digital bridges – there is a high possibility of failure".*

(Interview with a top manager of the booth construction subsidiary in Sep. 2019)

In this instance, even if presumed unintentionally, the possibility of failure was directly related to becoming a digital role model. Nevertheless, especially the interviewed employees at the trade fair's subsidiary did not express any strong push from the management side. On the contrary, most of them even highlighted that by *applying the AR/VR sales tool when communicating with the customer, they express their culture* of being an agile team that also wants to learn more and

develop their solutions as customer-focused as possible, although the solution or presentation with AR/VR is not perfect yet. At the mother company, acting agile is mainly limited to the Business Development and IT departments as well as the BU Digital. All the interviewees, therefore, strongly supported the establishment of the BU Digital in 2017. Nevertheless, since those *"innovation islands"* are segregated and concentrate on (digital) innovation, whereas others are supposed to focus on their responsibility in the main business, several interviewees criticised the small interfaces with these drivers of innovation and the condition of digital tools they use as a basis for their work. Since there is also *no company-wide flagship initiative* inviting all employees to become involved in digital innovation and bring in their own ideas, it leads to employees not knowing about innovation formats or possibilities for prototyping. By not having a flagship initiative that every member of the company is aware of, employees are *limited in their decision-making authority*. Many employees emphasised in the interviews that there are fixed processes and boundaries for decision-making with regard to their work area but rarely beyond that.

Work Environment

The big differences between the trade fair company's business units can also be observed when examining the outcome that relates to the connection between culture and work environment. The *"New Work" and remote working possibility are just partially offered*:

> *"I still don't have a mobile phone to check my mails in my absence. Then, […] there are convertibles that are distributed to many employees … That has also not reached me yet. Therefore it varies very significantly, who gets what first and which possibilities those other people have".*

(Interview with an HR employee at the trade fair company in Sep. 2019)

This statement points to the work environment having a strong influence on the feeling of inclusion (or exclusion). Furthermore, the statement also points to the possibility of insufficient communication and roll-out generating a class society.

Operations

When referring to the operational area, there are *differences in function and responsibility.* Especially when asked to rate the company's digital maturity and operation method based on their personal appraisal, the employees' assessments varied significantly. Although no great differences between the two companies and between the managers and employees could be observed, the responses covered almost all possible answers. The reason for this might be generally *protracted control processes and the headiness in middle management*:

> *"The famous 'layer of clay' that often exists in the middle management because the people feel that something will be taken away or that it'll get uncomfortable and there may be no obvious benefit for themselves … So, I think it is a real challenge to show the middle management that there is a benefit for*

them as well – in a company that is well off economically, where what is done now has been done for years in the past".

(Interview with an IT top manager at the trade fair company in Sep. 2019)

This leads to the conclusion that there might be a difference not only in function and responsibility but also between an employee's supervisor and his/her leadership and attitude.

According to the interviewees' opinion, a possible reason for the long processes and headiness, independent of culture, can be the elusive ROI, which is crucial for managers. The trade fair company and its subsidiary, therefore, *seek another measurement method or objective indicator* for digital innovation. For certain managers, an increasing advertising effect and staying up to date is an indirect return that is justified by the nature of the trade fair business:

"I know that technology cycles are incredibly fast. I know that we cannot get very far with stability, especially in our business, because we don't have contracts that last 30 years or so. We must acquire customers again and again so that they come and exhibit at our house ... and visitors, that they come – the same process, every year anew".

(Interview with an IT middle manager at the trade fair company in Sep. 2019)

Area of Tension between Employee Empowerment and Digital Innovation

When applying the summarised outcomes to the research question in the context of this case study, certain areas of the trade fair company have already been transformed or were about to be transformed to foster the mutual interaction between digital technologies and employees. Nevertheless, a functioning IT environment that provides possibilities for technologies and prototyping plays a crucial role. Furthermore, a functioning business (development) environment that offers training and support for preparing an idea for its implementation process as well as other factors are important and often of cultural nature: transparent communication, supportive leadership, a flexible and comfortable work environment, time and space and flat hierarchies for autonomy and collaboration that is granted to every organisational member regardless of his/her level. All these factors are strongly related to the understanding of employee empowerment that most of the interviewees mentioned. Further to the scientific definition of empowerment, the empowerment through the exchange with customers, a safe workplace and for managers, the possibility to enable subordinated employees, loom large. Nevertheless, there are several decision dilemmas, especially for managers. One of the interviewees in the role of a manager expressed it as follows:

"We need such topics - otherwise the risk is too high that sometimes … nobody needs the stuff we do anymore. And, on the other hand, I need to secure my main business, of course. The risks would be, okay, that I focus too much on innovation and forget about earning money at the same time".

(Interview with an IT middle manager at the trade fair company in Sep. 2019)

Those decision dilemmas are, however, not only relevant for managers but also concern regular employees:

> *"Yes, of course, this [digital innovation project] would be nice and necessary. I would be looking forward to it and would be open for it. But depending on who introduces it [digital innovation project], it becomes a capacity topic quite quickly".*

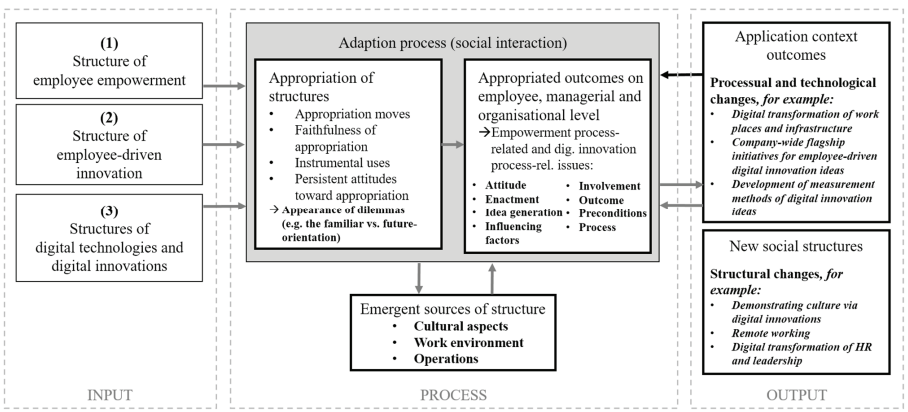
(Interview with an HR employee at the trade fair company in Sep. 2019)

Here, we once again realise that digital innovation is strongly intertwined with not only employee empowerment but also cultural aspects, the work environment and operations as emergent sources of structure.

Discussion

By reviewing the adapted AST bearing in mind the findings in theory and practice, insights have been gathered not only for the adaption process but also for the emergent sources of structure, the application context outcomes and new social structures, as shown in Figure 2.

Figure 2. Adapted AST With Findings From Theory and Practice (Shown in Bold)



With this qualitative explanatory approach, we shed light on the mutual interaction between employee empowerment and digital innovation. The AST is applicable if employee empowerment, digital innovation, and our results are in line with previous research. Firstly, the exploratory data analysis phase highlights potentials but also dilemmas that arise when employee empowerment and digital innovation interact. These challenges influence the *appropriation of structures* and its four components, i.e. appropriation moves, the faithfulness of appropriation, instrumental uses and persistent attitudes towards appropriation. This finding goes along with the contribution of Ciriello et al. (2019), stating that certain paradoxes of digital in-

novation artefacts are classified by stability/control versus flexibility/change (Ciriello et al., 2019). A similar example from the case study is the dilemma between the familiar and the future orientation. The dilemma may also influence broad disparities in the staff's persistent attitudes towards the appropriation. Based on this research, it can therefore be assumed that the four integral parts of the appropriation of structures are highly relevant when trying to apply digital technologies to empower employees for the generation and enhancement of digital innovation.

Secondly, when investigating the *appropriate outcomes on an employee, managerial and organisation level*, the strong interaction between the two concepts of digital innovation and employee empowerment is emphasised. At the outset, we grouped the outcomes into either employee empowerment process related or digital innovation process related. However, for the eight underlying issues identified in the literature review, we derive that the factors are valid for both categories, stressing the interaction process. One of the case study's major findings is the assessment of the *emergent sources of structure's* influence. Since employee empowerment, as well as digital innovation, lead to changes in culture, work environment and operations, new sources of the structure significantly affect the process of mutual interaction. Only if the structures within a firm change accordingly and only if the framing conditions are adjusted can digital innovation facilitate employee empowerment and vice versa. When analysing the adaptation process of employee empowerment and digital innovation, attention should thus be paid to the output variables that may change as well. Since the application context outcomes and new social structures are likely to vary depending on company and context, a few examples are illustrated in Figure 2.

Thirdly, for the *application context outcomes*, we observe that the mutual interaction of employee empowerment and digital innovation goes along with the digital transformation of workplaces and infrastructure. Existing systems, tools and technologies need to be updated when introducing digital innovation and employee empowerment. This goes along with our research question, i.e. how to apply digital technologies to empower employees to generate and enhance digital innovation: The digital transformation of workplaces and infrastructure, amongst others, is crucial for empowering employees to generate and enhance digital innovation. Thus, also the infrastructure of the idea generation process and, therefore, the employee's motivation for thinking creatively and participating in the system can be improved, for instance, with an effective suggestion system that is supported by management (Fairbank & Williams, 2001). Furthermore, company-wide flagship initiatives for employee-driven digital innovation ideas can be an outcome when bringing together empowerment and digital innovation. If there is no consistent communication, the ongoing adaption process will likely turn unsuccessful. Furthermore, measurement methods of digital innovation ideas that are appropriated to the context can be an outcome if the adaption process runs in a fair and transparent manner. The findings here can be classified as intended or unintended

processual and technological consequences, which Orlikowski (2000) mentions in her study.

Fourthly, also for the *new social structures,* the case study delivers a number of exemplary results that are in line with Orlikowski's (2000) specification of structural consequences. In contrast to the application context outcomes, not only do workplaces and infrastructure undergo a digital transformation but HR and leadership are disrupted as well. All these transformations influence each other. A practical example is remote working: A digital transformed workplace and infrastructure enable remote work, and therefore the leadership and HR style have to be adjusted. The concept of e-leadership plays a crucial role in this example. On the other hand, the transformation of social structures, such as leadership and HR for remote work, requires the digital transformation of infrastructure and workplaces, as otherwise, the framing conditions would not be suitable. As we observed recently, these developments are accelerated by changing framing conditions due to a global pandemic. Examples of those changing framing conditions are contact and travel restrictions.

The outlined concept of the mutual interaction of employee empowerment and digital innovation challenges previous studies, for example, the contribution by Lokuge et al. (2019) claiming that there needs to be an organisational readiness for digital innovation. Although components like IT readiness, cognitive readiness and resource readiness need to be considered when striving for digital innovation, based on this paper's findings, digital innovation interacts more directly with organisational areas like employee empowerment. The view of being ready for digital innovation to start initiatives is not expressed in this paper. Moreover, it should be taken into account that empowerment can never be perfectly reached in an organisation, as Argyris (1998) highlights. In practice, it would thus be very unlikely to ever reach full readiness in several different areas due to the emergent new structures that are also an integral part of the process area of the adapted AST.

Conclusion

In this study, we explore the concepts of employee empowerment and digital innovation and their connection via EDI. Furthermore, we analyse their relationship in the light of an adapted version of the AST by DeSanctis and Poole (1994). The objective was to examine the interaction effects between these social and technological structures on an employee, managerial and organisational level. Due to the exploratory approach for addressing the knowledge gap, a structured literature review on related topic areas was conducted with a focus on the appropriate outcomes on an employee, managerial and organisational level. The results served as the basis for the single-case study and the examination of the appropriation of structures. The results from the case study were analysed with regard to different aspects in four consecutive data analyse phases following the approach of Miles and

Huberman (1994). Thereafter, we connected the findings to the adapted AST to gain a higher level of abstraction and increase the study's rigour.

The central outcome of this study lies in the confirmation of the mutual interaction effect of employee empowerment and digital innovation. Considering the research question (*How can digital technologies be applied to empower employees to generate and enhance digital innovation?)*, four practical implications can be concluded:

Firstly, a suitable cultural, work and operations environment must be created, which is characterised by equality and a regulated employee-driven (innovation) culture that should have a well-balanced relationship between bottom-up and top-down processes. It is very likely that emerging structures in those areas, such as remote working, new leadership styles as well as financial or technological resources, determine the adaptation process between empowerment and digital technologies, which is why the organisational environment plays a decisive role.

Secondly, potential dilemmas can be derived when considering the appropriation of structures, thus what the characteristics of an adaption, possible tools and attitudes towards digital innovation ideas could be. Consequently, it can be anticipated that there are supporters as well as resistors that either take digital innovation projects seriously or not (faithfulness of appropriation).

Thirdly, empowerment process-related and digital innovation process-related issues should be taken into account for appropriate outcomes on employee, managerial and organisational levels. These challenges can be the attitude, the enactment of employees, the idea generation process, potential influencing factors, the employee's involvement, potential outcomes, preconditions for the interaction and the process flow itself.

Fourthly, the output, characterised by processual and technological changes with regard to the application context and structural changes in social structures, should be considered. Furthermore, the effect of processual and technological changes on the adaption process should be noted. For example, the introduction of new digital tools could make unique experts obsolete, leading to a change in social structures and vice versa. Firms should consider these soft outcome factors when implementing a digital innovation.

Next to these practical implications, our study holds valuable insights for theory as well. We succeed in exploring the relationship between employee empowerment and digital innovation by bridging the gap between social science and information systems. Both disciplines investigate similar phenomena like digital innovation and its impact on employee voice from different perspectives, and we believe that an integrative, holistic view of both concepts adds valuably to existing contributions. Our research can thus be considered an important stepping stone for further research in this field.

Furthermore, we adapt and extend the AST in the context of employee empowerment and digital innovation. Certain challenges like empowerment process-related issues and digital innovation process-related issues, emergent structures, application context outcomes and new social structures have been identified during this process. The well-established theory is very suitable for investigating current phenomena like digital innovation, and it benefits from further re-interpretations.

Since the results from the literature review and single-case study are consistent with the theoretical model of the adapted AST, it can be presumed that there is a mutual interaction between employee empowerment and digital innovation. Digital innovation do not only consist of a technological solution; they embody novel digital business solutions and management concepts. The adoption of digital innovation in firms thus leads to a novel culture and prerequisites for employee empowerment. In return, engaged employees drive companies' digital innovation. Given a perfect set of organisational framing conditions, a self-enforcing loop of digital innovation and employee empowerment can therefore be created, leading to a strong culture of innovation and empowerment. Finally, as outlined in the introduction, employee empowerment can facilitate employee voice as a core outcome of the process.

We summarize our findings with the following propositions:

P1: Employee empowerment influences digital innovation in an organisational context.

P2: Digital innovation influence employee empowerment in an organisational context.

P3: The interaction of employee empowerment and digital innovation in an organisational context represents a process of mutual adaptation that constitutes change on an employee, managerial and organisational level.

Nevertheless, the empirical results reported in this study should be considered in light of certain limitations. Regarding the epistemological stance, our study is not free from potential shortfalls. Although reliability and validity have been addressed thoroughly in the course of a single-case study, there are certain limitations due to the decision for a single-case study when referring to rigour, generalisability, objectivity and the comparative advantage of case studies in general. The findings are therefore limited to analytic generalisation for theoretical propositions but not to statistical generalisation for populations.

From a thematic point of view, there are general limitations addressing, for instance, cultural as well as sector-related and firm-related aspects due to the selection of a German trade fair company and its subsidiary. An example of that is the business of trade fairs, being one of the oldest and most traditional businesses in general. Furthermore, the company size may be relevant here since it makes a difference to either know everyone compared to just knowing the team, which is what the trade

fair company is. We could, therefore, not control for opportunities in the working mode that occurred recently due to the pandemic that severely affected trade fair companies due to the on-site business replacing face-to-face.

Regarding the overall perspective we applied to the paper, we limited our investigations to the concept of employee empowerment while keeping its strong impact on employee voice in mind. Still, since both concepts are often used as synonyms in companies, we suggest that the findings on empowerment can easily be transferred to employee voice.

This single-case study can, however, be considered complementary to further different qualitative, quantitative and statistical methods in another environment. For further research, we recommend investigating larger and more diverse samples in a multiple-case study to examine if our results are valid in different settings. It will be interesting to observe if the companies' industry, size or culture has an impact on the interaction between digital innovation and empowerment. Depending on the level of empowerment, transparency and digitalisation, different firms might have different approaches, leading to insightful findings.

With regard to P1 and P2, it would be interesting to examine the tendency of the influence, such as specific components of digital innovation and employee empowerment that are positively or negatively affected by the respective other. Digital innovation that stem from "the dark side of digitalisation" and that lead to monitoring of employees and raising privacy concerns will most probably not lead to empowerment and employee voice. To investigate the direction of the effect, it would, on the one hand, imply a quantitative measurement of the interaction. On the other hand, it provides a good starting point for qualitative research focusing more on the feelings, attitudes and impressions of employees experiencing the negative influence through digital technologies and modern tracking methods.

Especially in the area of digital innovation, a design science research approach may be valuable when further examining the topic. According to Hevner et al. (2004), IT artefacts that are digital innovation in themselves may solve organisational problems that are already identified. Within an iterative approach of designing and evaluating, employees can be already integrated into the process of creating a digital innovation. We believe that insights into that procedure are relevant when examining mutual interactions between employees and digital technologies.

Another recommendation for further research would be to extend the case study's unit of analysis, as companies do not operate alone anymore but are part of larger ecosystems. We, therefore, suggest taking the mutual interaction between the two concepts for the external environment of a company into consideration, such as its customers, business partners, competitors, stakeholders and the market in general. Finally, when following the recent changes caused by the Covid-19 pandemic, it would be interesting to explore the shift that this development brought to especially

traditional companies when referring to digital innovation projects, such as the AR/VR sales tool that become increasingly important in that context.

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