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LEADERSHIP AND PERSONNEL MANAGEMENT IN SMALL AND MEDIUM-SIZED ENTERPRISES IN THE CONTEXT OF THE GERMAN ELECTRICAL AND INFORMATION TECHNOLOGY TRADES

Written by
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CONFIDENTIALITY CLAUSE

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AUTHOR'S DECLARATION

Whilst registered as a candidate for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this dissertation are the work of the named candidate and have not been submitted for any other academic award.

Georg Thomas

"We have to get used to the idea that companies depend on their best people far more than the good people depend on the company."

Peter F. Drucker

(US economist)

Abstract

This study deals with leadership and human resource management in German small and medium-sized enterprises (SMEs) in the electrical trade sector against the background of digitalisation. It looks at the digital transformation within the industry itself and the resulting changes in competence requirements as well as the digitalisation of human resource management (HRM) in the companies.

The guiding research question is as follows:

How are leadership and human resource management in German SMEs in the electrical trade sector handled regarding the requirements and specifics of increasing digitalisation?

To answer this question, the specifics of contemporary human resource management and its tasks are shown in a comprehensive literature study that includes relevant pertinent professional and research literature. The consequences of successful approaches are also addressed. This presentation forms the basis for a subsequent empirical study. A mixed-methods approach, i.e. a combination of a qualitative and a quantitative perspective, is used to bring together the results of expert interviews with the findings of an employee survey. In this way, it can be shown that the digitalisation of personnel management still plays a rather subordinate role in this sector, while other challenges are currently still seen as more central. However, the industry representatives are aware that digitalisation inevitably changes requirements in various respects.

This dissertation deals with the topic of leadership and human resources management in the context of German SMEs in the electrical trades sector. This topic is discussed in the context of digitization. It addresses both digitization in the industry itself and the resulting changes in terms of requirements, as well as the digitization of human resources management itself in SMEs in this industry. The dissertation is guided by the following research question: How is leadership and personnel management approached in the context of German SMEs in the electrical trades sector regarding the requirements and special features of increasing digitization?

To answer this leading question, a comprehensive literature review is used to address the specifics of contemporary human resource management and its tasks, and the consequences of successful approaches are addressed. This presentation forms the foundation for the empirical approach, which will be utilized employing a mixed-method approach, which includes qualitative interviews with experts on the one hand - and thus the perspective of management and personnel management - and quantitative surveys of employees on the other. Both survey approaches show that the digitization of HR management still seems to play a relatively unimportant role in this industry, while other challenges appear to be more central. However, according to the results of the qualitative survey, the industry representatives are aware that the requirements of digitization are perceived in particular at the requirements level.

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AC	Assessment Centre
BA	Federal Employment Agency
ERP	Enterprise Resource Planning
CDO	Chief Digital Officer
HRM	Human Resource Management
KPI	Key Performance Indicators
SME	Small and medium-sized enterprises
AI	Artificial Intelligence
M&A	Mergers and Acquisitions

1 Introduction

1.1 Guidance and relevance

The term *digital transformation* describes the systematic reorganisation of companies, organisations and institutions as well as society as a whole (cf. Bouwman, Nikou & de Reuver, 2019; Lucas, Agarwal, Clemons, El Sawy & Weber, 2013). Digitalisation and the digital transformation itself are described by authors such as Bharadwaj, El-Sawy, Pavlou and Venkatraman (2013) as shaping contemporary business life in many ways: They influence not only individual work processes, but also business models and management practices (Mithas, Tafti & Mitchell, 2013). In the context of this research work, the focus will be on the latter in particular by looking at human resource management in the context of digitalisation. Thus, the aim here is to look at it from different perspectives. On the one hand, this work will show that the digitalisation of other business areas and a changing set of necessary competences of employees requires that human resource management (HRM) also initiates its own digitalisation process. On the other hand, it is also clear that HRM must succeed in accompanying and supporting a digital or digitising organisation in the best possible way in order to fulfil its strategic role (Ulrich, 1987). The fact that this only seems to work efficiently to a limited extent - especially in the context of SMEs in selected sectors, as they will be differentiated in more detail in the context of this work - will be shown below.

For entrepreneurial organisations, reorganisation as a result of digitalisation brings possibilities and opportunities that manifest themselves in new business models and changed business processes (incremental, disruptive or radical) (cf. Frank, Mendes, Ayala & Ghezzi, 2019; Kotarba, 2018; Lucas et al., 2013). As a result, the trend of progressive digitalisation towards and digital transformation can be observed in most industries, as Priyono, Moin and Putri (2020) show, for example.

In addition, disruptive changes in markets as well as in the environment of companies make change inevitable. As of the first half of 2020, the COVID 19 pandemic has led to companies now relying (even) more on digital business models and ways of working than before. For example, they were forced to implement teleworking or digital distribution models as quickly as possible.

At the same time, Priyono et al. (2020) show that even in times of crisis, an already initiated digital transformation enables companies to change their business models faster than would be possible starting from analogue business models and work processes.

A transformation of business models supported by digital technologies is described in the literature as a strategy for responding to disruptive environmental changes. Specifically, this involves technologies that support companies in identifying and successively implementing new business practices, which can also result in new entrepreneurial opportunities or new business areas (cf. Richter, 2020). Accordingly, digital technologies are also seen as a suitable solution for anticipating and managing the disruptive changes caused by the COVID 19 pandemic, among other things (cf. Priyono et al., 2020).

Small and medium-sized enterprises (SMEs) from the trades, construction or industry are sometimes perceived as less progressive regarding digitalisation or the process of digital transformation. Ulas (2019) and Hamidi, Aziz, Shuhidan, Aziz and Mokhsin (2018) explain this by the coincidence of two factors that have a fundamentally unfavorable impact on digital transformation: In industries that, firstly, are inherently less characterised by digital technologies and their application and, secondly, have a small average company size, barriers to digitalisation exist from the outset. In this context, Li, Su, Zhang and Mao (2017) also show that little is known overall about SME digitisation. The research literature also provides insufficient explanations as to why these companies often lag behind the digitalisation megatrend. Ale Ebrahim, Ahmed and Taha (2010) add that despite their role as major contributors to a country's economic power, SMEs receive very little attention in studies, especially in contrast to multinational corporations. According to Li et al. (2017), this lack of research interest in SMEs is particularly surprising considering the findings of Chen, Jaw and Wu (2016): they were able to show that digitalisation creates new opportunities for SMEs in particular and offers opportunities for entrepreneurial success and growth. This is also emphasised by Galbraith (2014), who notes that digitalisation offers various opportunities for SMEs, particularly in internationalisation and globalisation.

New forms of digital collaboration and expansion enable SMEs that were previously regionally active to operate internationally and, for example, to significantly expand their supply chains or customer networks. At the same time, the costs remain manageable using digital technologies and business models (cf. Kerr, Nanda & Rhodes-Kropf, 2014; Chang, Bacigalupo, Wills & De Roure, 2010). In this context, the authors refer to elements of cloud computing in addition to alternative methods for digital communication. These enable a dynamic expansion of digital structures without upfront costs, which is a great relief for SMEs in particular. Other digital technologies, e.g. the use of artificial intelligence (AI) or other application solutions based on big data, are also mentioned as success factors for such initiatives (cf. Huin, Luong & Abhary, 2003; Žigienė, Rybakovas & Alzbutas, 2019).

Various studies show that companies that significantly digitise their business and work processes and are increasingly data-driven tend to be more successful than those that have not yet fully implemented these trends (cf. LaValle, Lesser, Shockley, Hopkins & Kruschwitz, 2011; Wamba, Akter, Edwards, Chopin & Gnanzou, 2015). Nevertheless, authors such as Thomas (2020a) point out that SMEs in particular have so far made little use of these advantages. This problem seems to be more pronounced in companies that are not fundamentally IT-driven. Internal processes are particularly affected (cf. Thomas, 2020a; Hammermann & Stettes, 2016). This deficit is associated with a lack of expertise within companies and a reluctance to invest in the deployment of acceptable solutions. In addition, Thomas (2020a; 2020b) emphasises that in many areas there is simply a lack of the necessary resources for successful digitalisation. This concerns financial and time resources, but also leadership resources.

Becker, Schmid and Botzkowski (2018) suggest that companies consider appointing a Chief Digital Officer (CDO). This person would need to have the necessary competencies and transformative powers to drive the digital transformation of the company. Overall, digital transformation needs to be more comprehensive than a department-focused approach would suggest, which is reflected in the accompanying competency development initiatives (cf. Sousa & Rocha, 2019). The partial lack of digitalisation of HRM in this business environment - as this research will illustrate - is attributed to deficiencies in leadership and human resource management (HRM) or underlying structural challenges of SMEs.

Several framework conditions are identified which, from the perspective of the author - and his own entrepreneurial expertise as well as scientific knowledge - seem to be formative for the developments to be described here. Leadership and management in companies - according to one of the central assumptions of this research work, which will also be empirically verified - must succeed in reacting to these changing demands and challenges. The focus of the approach to be taken here is clearly on the specificities resulting from digitalisation: Although other developments such as the need for sustainable solutions (Collins, Steg & Koning, 2007), demographic change (Tyers & Shi, 2007), or migration (Farndale, Raghuram, Gully, Liu, Philipps & Vidovic, 2017) are also identified here as relevant for human resource management agendas, they are outside the scope of the objective envisaged here, but are explicitly addressed when they overlap with the topic of digitalisation.

However, digitalisation itself also leads to far-reaching consequences that clearly go beyond technological aspects. On the one hand, the cooperation between companies and their

customers seems to be affected, as Sharma (2005) can show: In particular, the concept of business model innovation is emphasised in the context of digitalisation as a relevant development that increasingly shapes the interaction between companies and customers. One example is service models that seem to be moving from classic ownership models to usage models (*product-as-a-service*), as developments in the media sector (Netflix, Spotify; Rayna & Striukova, 2016) or in the mobility sector (Uber, car sharing; Cannon & Summers, 2014) illustrate. On the other hand, changing innovation cycles must be addressed, which - as Verbeke, Dietz and Verwaal (2011) describe - are also increasingly changing the interaction between customers and companies. Consequently, customers increasingly expect companies not only to carry out innovation projects more quickly, but also to be able to communicate them adequately. According to the authors, this also leads to changing demands on employees, who are not only increasingly exposed to the growing pressure to innovate, but also have to be able to present increasingly innovative and complex products and services as *knowledge brokers. In* general, there is also an intensifying *collaboration* between companies and their customers, which becomes clear in the context of so-called *co-creation approaches* (O'Hern & Rindfleisch, 2017).

North (2011) explains how society has developed into a knowledge society in recent decades, partly as a result of the digital revolution: knowledge, according to the basic assumption, is becoming an increasingly valuable resource for companies and people alike and is seen as essential for both economic and social development. Measures to develop, expand and manage knowledge are therefore seen as essential tasks for day-to-day management. Innovative workplaces are considered to be particularly difficult, as they often succeed in expanding existing knowledge and thus create the conditions for future success. Knowledge is becoming increasingly important as a corporate resource, say Reinhard and Abele, and three key factors are driving this trend (Reinhard & Abele, 2011) (a) The economy is undergoing structural change, which means that trade in information or knowledge-related material is becoming increasingly important. As a result, organisations need a new concept of roles and responsibilities that can represent the benefits of information in the context of the organisation. In addition, the ongoing process of globalisation (b) is leading to a shift in the division of labour, with production and similar activities being outsourced mainly to emerging and developing countries, transforming highly developed industrialised countries into knowledge-based economies characterised primarily by intangible resources as the primary source of value creation. The increasing use and spread of the internet and communication technologies, which enable faster and more efficient knowledge exchange, also contributes to this. As a result, this technological basis is seen as one

of the most important driving factors for the faster innovation cycles that are typical of the modern information society (North, 2011; Reinhard & Abele, 2011).

In the context of this knowledge society, the changes on the side of the employees must also be described: Increasingly, their expectations are shaped by digital lifeworld, both in terms of work and in terms of leadership and management activities, as Klaffke (2014), for example, describes them as shaping the next generations. Digital forms of collaboration are increasingly experienced as a basic requirement, which is becoming an even more significant trend in the context of the COVID 19 crisis and the accompanying *prescribed teleworking* (Waizenegger, McKenna, Cai & Bendz, 2020).

In summary, it becomes clear that modern human resource management, which increasingly seeks to assume a strategic role in companies (Paauwe & Boselie, 2003), must react to these changes accordingly. Optimally, as Caldwell (2001) describes it, it not only takes on a supporting but even a driving position in companies. As will be explained in the following chapters, this research work will examine in particular how this relationship between human resource management and digital transformation is taking shape in the context of German SMEs in the (electrical) trades.

The focus is deliberately placed on the concept of human resource management: although the role of leadership - as is explained in chapter 2.5, for example - certainly seems to overlap with that of human resource management time and again, the decision was made here not to focus on digital *leadership,* but on the approach of digital HRM, as it is repeatedly described as the driving force of digital transformation in companies. Here, the research follows an assumption that emerges from industry experience: While it is recognised (see chapter 2.5) that leadership activity is formative for the interaction between companies and employees, it is primarily an individual approach. Large differences can be observed between individual managers within a company. HRM, on the other hand, is perceived as a central approach, which seems to be more suitable for the approach chosen here due to its universality in the companies.

1.2   Initial presentation of the research gap and objective

An examination of the relevant specialist and research literature leads to the conclusion that it is known in principle to what extent digitalisation can fundamentally enable and increase the success of SMEs, with corresponding advantages also being held out in sectors not directly related to IT. At the same time, however, the literature identifies certain challenges that arise from the consequences of digitalisation, especially for managers. Leadership work and HRM

are thus increasingly coming under the scrutiny of entrepreneurial success. Despite this generally established constellation, which is increasingly focusing on how managers can succeed in driving entrepreneurial success through the advancement of digitalisation both in the company itself and in management processes, it remains unclear in many respects to what extent the situation is similar in (German) SMEs.

This reveals one of the central problems and research gaps that this research wants to address. The majority of internationally published articles and approaches to the topic deal with IT-driven companies, in which digitisation often plays a dominant and central role, as the business models themselves are often only made possible by it (cf. Brousseau & Penard, 2007). At the same time, it is noticeable that SMEs - and especially German ones - are rarely the focus of the studies, as Thomas (2020a) also shows. This applies not only to the practical view, according to which digitisation is insufficiently advanced in a large proportion of SMEs (especially in the skilled trades), but also with regard to the specialist and research literature itself, which describes the challenges and special features only inadequately. This paper attempts to address this constellation. To do so, it focuses both the theoretical analysis and the empirical examination specifically on human resource management in German SMEs. Their special features are shown using the example of the electrical trade sector. The complex situation, which includes aspects of leadership, HRM and digitalisation both in the context of the business activity itself and the management processes, is the focus of interest. In particular, it will be shown to what extent digitisation is already understood as a driving force in the context of HRM in this business environment and which obstacles seem to stand in its way.

Digital solutions offer new opportunities, especially for SMEs, for example for collaboration and in sales and purchasing management (cf. Bharadwaj & Shipley, 2020; Mahlamäki, Storbacka, Pylkkönen & Oila, 2020). In many cases, these go hand in hand with a more agile approach and are also increasingly demanded by customers and partners, as authors such as Bollweg, Lackes, Siepermann, Sutai and Weber (2016) show with reference to increasingly partnership-based relationships and changing customer expectations (cf. Bansal, Burden & Swartout, 2020). Increasingly, long-term relationship management and the inclusion of customers in development and planning processes is no longer seen as an exception but as a regular part of the business process (cf. Ramaswamy & Ozcan, 2018), which in turn necessitates digital approaches to collaboration and cooperation in sales (cf. Lember, Brandsen & Tõnurist, 2019).

1.3 Research question and methodological approach

The central and thus guiding research question can be derived from the research gap outlined so far:

How are leadership and human resource management in German SMEs in the electrical trade sector handled with regard to the requirements and specifics of increasing digitalisation?
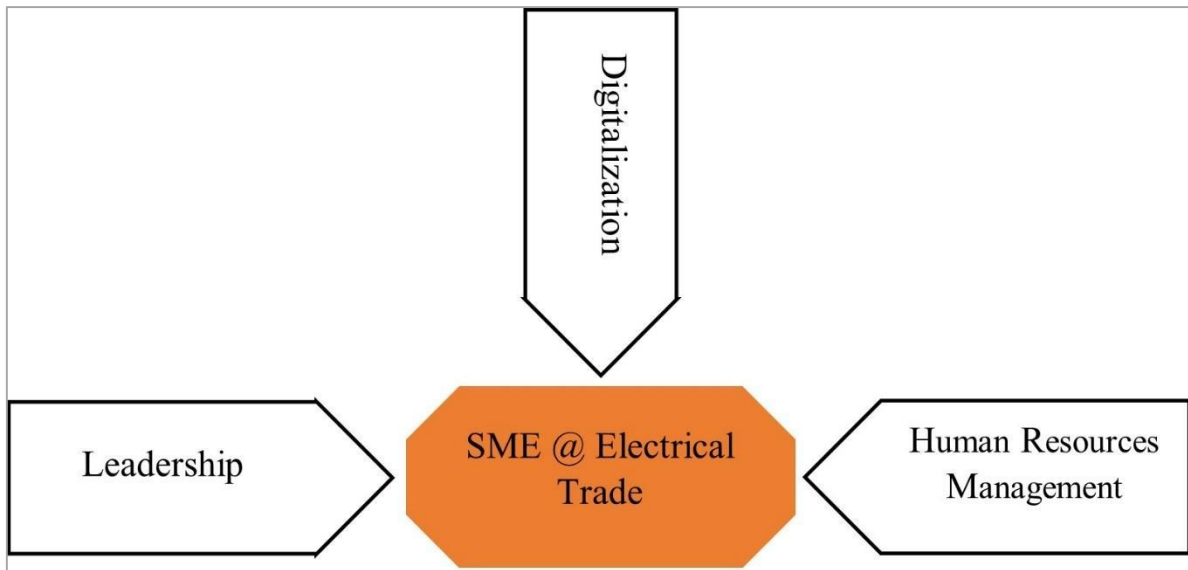
Figure 1: Graphical representation of the research question, own illustration

This research question will be answered step by step by combining a theoretical and an empirical analysis. Chapter 2 first presents the current state of research on the topic. In the course of this, terms relevant to the study are to be introduced and defined. The multidisciplinary nature of the work already becomes clear here, as it brings together research work and approaches from different disciplines. In particular, the areas of employee or personnel management and HRM provide relevant and interesting perspectives that are taken into account here accordingly. Digitalisation is also considered from both a decidedly management-related and a technical perspective. Corresponding consequences - both of digitalisation and of the different management approaches - are explained in chapter 2.3, whereby the role of employees for entrepreneurial success is also addressed here.

These descriptions, derived from the relevant technical and research literature, substantiate the research framework set out in Chapter 3. The description of the existing research gap is deepened here and transferred into a description of practical deficits in the electrical trade.

Both together guide the empirical study that follows in Chapter 4. A mixed-methods approach (cf. Greene, Caracelli & Graham, 1989; Kiessling & Harvey, 2005; Pole, 2007) is used to develop a comprehensive view of the complexity of the overall topic. Methodologists such as Sekaran and Bougie (2016) qualify such an approach, through which different perspectives can be used to work on a research topic and to clarify a research question, as particularly advantageous for working on practical business questions, which usually have a high level of complexity. Simplistic methods, such as experimental designs or purely observational studies, are only suitable to a limited extent for explaining changes in a complex structure of effects that is defined by a large number of relevant actors with a high degree of interconnectedness.
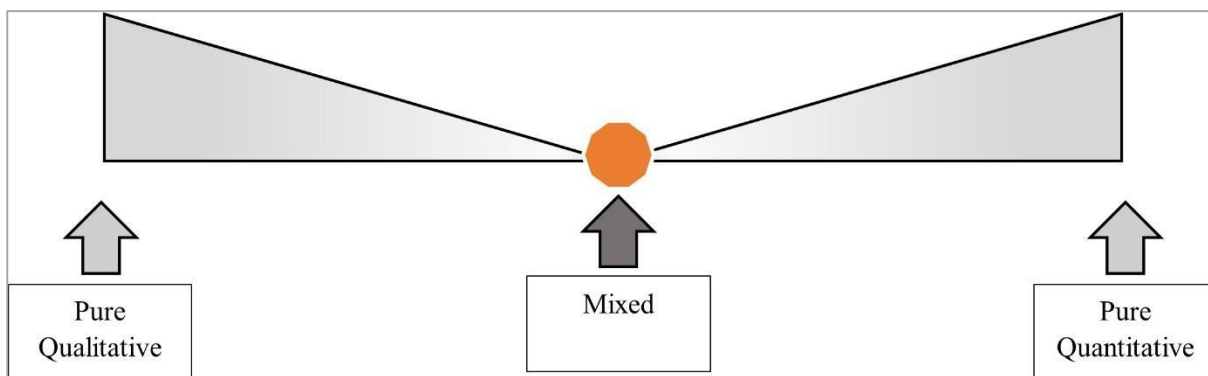
Figure 2: Continuum of Mixed Methods. Own illustration based on Kiessling & Harvey 2005.

The mixed methods approach of this work combines two approaches accordingly. First, a qualitative method is chosen that is well suited as an explorative or hypothesis-generating instrument. Standardised expert interviews (cf. Bogner, Littig & Menz, 2009; Dorussen, Lenz & Blavoukos, 2005) are suitable for gaining an overview of complex economic contexts and related changes (cf. Bogner, Littig & Menz, 2009; Dorussen, Lenz & Blavoukos, 2005). This qualitative method - just like the qualitative content analysis according to Mayring (2010) - is to serve as a basis for the following quantitative analysis.

In this second chapter of the empirical investigation part, a standardised questionnaire based on Likert scales is used for hypothesis testing of a sample of $n = 163$ employees with active experience in the electrical trade. This survey specifically addressed the relationship between perceived experiences with digital HR measures and employees' own attachment to the company. In the spirit of technology and data triangulation (cf. Perone & Tucker, 2003; Wilson, 2014), these results will be compared with the findings from the literature study as well as the expert interviews with regard to the perception of digital HRM, resulting finally in a critical discussion of the overall results. Within the framework of the critical comparison, the focus

will be placed in particular on the implementation and the associated framework conditions of HRM and the extent to which differences and similarities exist here between the perspectives (international literature, experts, employees).

2 Human Resources at a glance

In the context of this presentation, the perspective of international literature will be addressed. This will be used to inform and provide a frame of reference for the subsequent empirical work. The understanding of the basic tasks and challenges of human resource management will be used to clarify the objectives of contemporary approaches.

2.1 Definition and delimitation

According to the authors Meyer, Stanley and Parfyonova (2012) and Shahid and Azhar (2012), the competences of employees are of fundamental relevance to the performance of a company. Employees, with their skills, motivation, and commitment, tend to be one of the most important foundations for coping with growing demands. These include a constantly changing work environment (cf. West & Bogers, 2014), the development and use of innovations to differentiate from the competition (cf. Toften & Hammervoll, 2013) and the requirements of a fundamentally high level of service (cf. Lusch & Vargo, 2014; Qureshi & Syed, 2014). In view of this, Kanning (2012) suggests implementing processes for selection and placement in HRM in order to find qualified employees who also fit the current corporate strategy. The core aspect of these processes is personnel diagnostics, which plays an essential role in the economic success of the company.

Not only the selection process, but also the development of employees is crucial and one of the essential processes within human resource management (cf. Meyers, 2016). Kanning and Staufenbiel (2011) argue that, contrary to popular belief, HRD is much more than just training and developing employees. In fact, the field of human resource development is much broader. It includes, for example, the training of employees' skills and their personal growth in different areas as well as career advancement and the development of the best performers, the so-called talents. It also includes a continuous learning and adaptation process of the company itself, including continuous organisational and also technical changes (cf. Holton & Baldwin, 2003, p.17).

Human resource development is overall a strategy-oriented process whose approach - depending on the company's current strategy and its goals - varies. Ryschka, Solga and Mattenklott (2008) underline that the corporate strategy determines the long-term goals of the company and the possible ways to achieve them, as well as the policies and company guidelines. Therefore, knowledge, competencies and personal attitudes (i.e. also non-skill related aspects) are the fundamental aspects for systematic development in strategy-oriented human resource

development. London (1991, p. 69) points out that these capabilities must be developed in such a way that the performance efficiency required by the company and in the relevant area can be fulfilled.

The literature strongly recommends using an individualised approach in order to achieve the best result in professional development activities and at the same time avoid that all workers follow exclusively the same procedures and thus inter-individual differences would not be appreciated. According to Holling and Liepmann (2004), the development approach must vary according to the current needs of the company. Here, a careful diagnosis must be carried out to identify these needs.

The following figure shows the three phases of such a process. Diagnosis provides the link to one of the essential goals of human resource management, talent management (cf. Iles, Chuai & Preece, 2010). The first phase of the HRD process consists of analysing various factors that actually create a need for it and analysing different ways to address these factors. The second phase involves task evaluation and formulation of performance requirements for employees. The third and final phase is to determine the suitability of the candidate (cf. Ryschka, Solga & Mattenklott, 2008). According to Illes, Chuai and Preece (2010), this diagnosis is key to linking to talent management, one of the most important tasks of HRM.
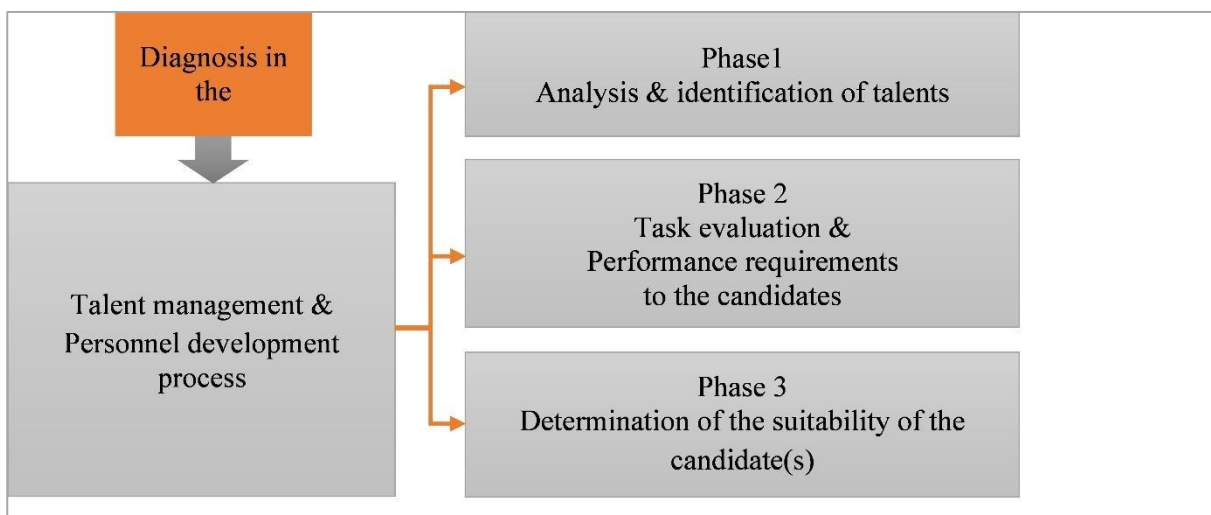
Figure 3: 3 Phases in Talent Relationship Management. Own illustration based on Holling und Liepmann (2004)

2.2 Tasks and challenges of human resource management

This chapter deals with the specific requirements and developments that shape HR management in German SMEs. In this regard, the first step is to address the issue of personnel acquisition as the basis of modern HR activity, before building on this to look at various aspects

of personnel development and the strategic positioning of HRM. These challenges are described in this context as the necessary basis on which contemporary HRM should pursue its strategic and sustainable goals (see chapter 2.3).

2.2.1 Personnel acquisition

Due to the ever-increasing competition in finding the perceived best, companies are forced to invest more resources in recruitment (Swider, Zimmerman & Barrick, 2015). This process consists of gathering, selecting, evaluating, and actually recruiting the most suitable candidates. It is carried out on the basis of skills, previous employment, and general compatibility with a particular company. Managing cost and time efficiency in the recruitment process is crucial for companies. As Melanthiou, Pavlou and Constantinou (2015) point out, finding the perfect fit for the company at low cost becomes a strong competitive advantage and contributes to developing an effective workforce. The factors already described in chapter 2.1 highlight the complex challenges HR managers face. However, all this does not only concern recruiters and HR developers. The societal changes described above also have an impact on companies as employers. As a result of generational change, companies will very soon experience a shortage of well-trained professionals. For the long-term success of companies, it is very important to find ways to retain the most talented professionals. Recruit, cultivate and retain are the three core processes and at the same time the most important tasks for modern HRM (cf. Klaffke, 2014).
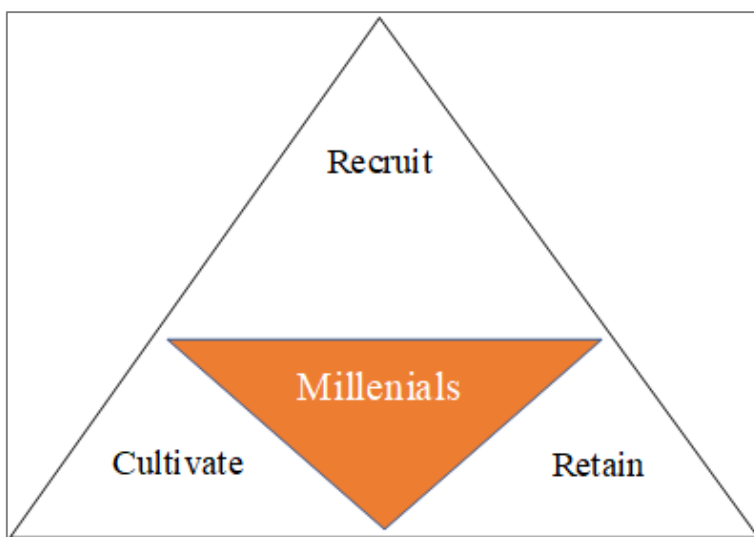
Figure 4:   Own illustration of the core processes, according to Klaffke (2014).

In a rapidly changing market reality and in the face of generational change, attractive monetary remuneration is no longer enough to keep good skilled workers in the company. The

corporate culture must adapt to these changes. In this context, Klaffke (2014) emphasises the importance of a targeted strategy that should be implemented in personnel marketing and in the further course of the recruitment process. In order to receive applications from the best candidates, companies should take care to create a positive image. The actual application process should focus on speed and transparency.

The first step of the prototypical process - a term proposed by Melanthiou, Pavlou and Constantinou (2015) for the application process - is a clear definition of the tasks and requirements of the position to be filled. Already for the advertisement of the position, required competences, personal characteristics of the candidates and other resources must be precisely determined. The authors emphasise that this step is crucial: Interested applicants can better assess their suitability for the advertised position from the outset. The advertising company comes into contact with suitable candidates more quickly and saves resources and time for the later, more personnel-intensive selection process. The right positioning of the advertisement is also defined by the target profile. Advertisements on social media platforms have experienced an enormous upswing in recent years, and the classic newspaper advertisement is taking a back seat. Another way to acquire qualified professionals is through university programs, advertising within internal networks and trade fair activities (cf. Melanthiou, Pavlou & Constantinou, 2015). New digital methods primarily influence *employer branding*, as will also be described in this paper. The subsequent phase focuses on the selection process and job requirements. It includes online applications and a variety of assessment tools during the application process, which make this step transparent for applicants (Melanthiou, Pavlou & Constantinou, 2015). It is an interactive process in which both parties exchange specific information and data. Different theories describe the process of this interaction and data exchange. One of them is the so-called principal-agent theory.
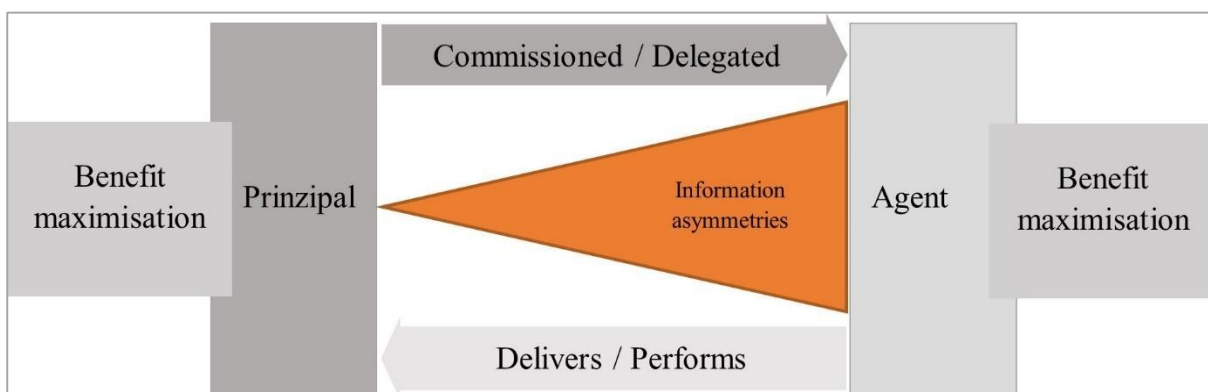
Figure 5: Principal-agent theory. Own illustration according to Eisenhardt (1989)

Although this theory has gained some popularity in the academic context, it is controversial from another perspective (cf. Eisenhardt, 1989). The principal-agent theory was developed in the 1960s and is applied in a variety of different fields, such as business administration, accounting, social sciences, or political science. According to Eisenhardt (1989), this theory is based on considerations of risk sharing between parties. It focuses on the link between a delegating party (headmaster) delegating tasks to another party to perform (agent). Grossman and Hart (1992) extend this definition to decision-making processes under risk conditions. Nevertheless, the theory is potentially confronted with two problems: The first source of problems is a possible difference in the goals and motives of headmaster and agent, moreover the challenge for the delegating party to verify the agent's work. A second source of problems for the relationship between headmaster and agent could develop due to different attitudes towards risk (cf. Eisenhardt, 1989).

A key objective of the theory is to identify the *best* terms for the contract between the parties, considering the problems already mentioned (in particular the information gap between the parties). Eisenhardt (1989) proposes a demonstration of the possible difficulties arising from the application of the strategy using the example of the efficiency of the wage system. The question is whether a classical (behaviour-based) wage model is more efficient than a performance-based (commission-based) model.

Finding a balance to fill information gaps that exist in many processes is in the interest of both parties. Thus, as Eisenhardt (1989) suggests, the headmaster could focus particularly on identifying cues in the other party's behaviour, whereas the agent can implement a range of signals and intends to provide the headmaster with more information.

In order to minimise the risk of being replaced by other organisational structures, HR departments are constantly faced with a variety of challenges in order to keep up as business partners within the corporate hierarchy (cf. Ulrich, 1997). At the same time, there is a growing realisation of the value of recruiting and thus academic interest in this topic, especially against the backdrop of digitalisation (cf. Swider, Zimmerman & Barrick, 2015). The theory of fit between employee and company is one of the most important theories proposed in this context (cf. Swider, Zimmerman & Barrick, 2015). According to this theory, the main component of successful recruitment is to achieve the best possible fit between a professional and an organisation. In situations where candidates have the feeling that they fit in with the company and are in good hands there with their own skills, wishes and demands, they automatically perceive this more positively. This seems to be especially the case when candidates share the values and

standards set by the organisation. According to Swider, Zimmerman and Barrick (2015), this theory suggests that the more candidates perceive their fit with the company, the more willing they are to accept the company's offers.

One of the crucial goals for HR departments is *employer branding* (cf. Backhaus & Tikoo, 2004). The same authors point out that branding brings with it some very valuable benefits for companies, which is why they should prioritise brand management highly. The focus here is on HRM, which is responsible for creating a strong HR-related brand and increasing employer attractiveness in the marketplace. Classic brand management techniques and procedures are used to increase the attractiveness of the company for job seekers on the one hand and the loyalty of existing employees to the company on the other. This again underlines the importance of finding a perfect fit in the complex interaction between employees and the company. Swider, Zimmerman and Barrick (2015) describe this as a key feature of a successful recruitment process.

Employees are the primary market of the organisation. They determine the performance and success of the organisation, which means that recruiting highly qualified professionals is one of the key activities of HRM (Berthon, Ewing & Hah, 2005). The same authors describe that for a long-time recruiter only used traditional advertising strategies to fill vacancies. However, employer branding now requires a much broader and more complex approach to finding suitable candidates. As suggested by Berthon, Ewing and Hah (2005), the most important factor is a link between the employer's requirements for potential candidates and a strategic focus in the description. The key element here is that the brand identity is identified and presented. The central point is the best possible congruence between the image of the organisation perceived from the outside and the corporate culture and values actually lived. Figure 6 shows the great complexity of this process.
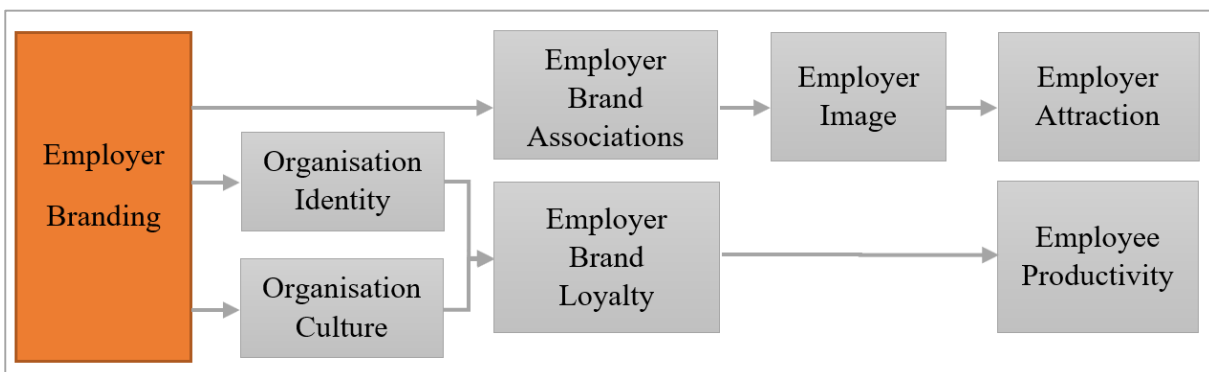
Figure 6:   Employer Branding Framework. Own illustration according to Backhaus & Tikoo (2004)

Following the model of Backhaus and Tikoo (2004), employer branding directly influences the associations, thus also the image and ultimately the attractiveness of employers. At the same time, however, it also has an effect on organisational identity and is interrelated with corporate culture: while the latter is shaped by branding, branding in turn influences corporate culture. The identity and culture of the organisation lead - according to the model - to a specific type of employee loyalty and thus ultimately to increased productivity. The authors thus make it clear that employer branding is ostensibly a marketing measure to be as attractive as possible to potential employees. However, it also tries to create an internal market relevance that positively influences both employee retention and productivity in the long term. With the help of an empirical study, the authors Berthon, Ewing and Hah (2005) were able to identify a total of five factors that describe the dimensions of the attractiveness of corporate structures (cf. Figure 7).
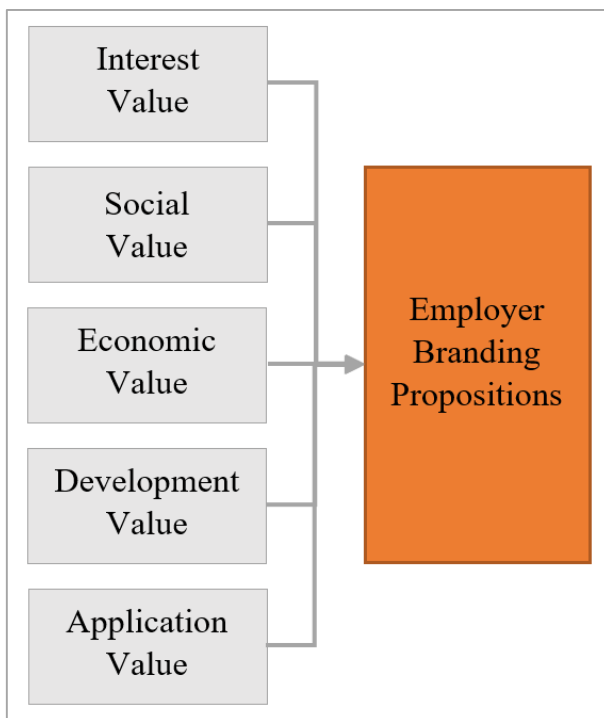
Figure 7:   Employer Branding Propositions. Own illustration according to Berthon, Ewing and Hah (2005)

Interest Value refers to the attractiveness of an employer in terms of the working environment and corresponding work activities. The *Social Value measures the* extent to which workplaces are perceived as pleasant and there is a good collegial relationship. The third factor, *Economic Value,* assesses the extent to which candidates are interested in a company because of financial considerations. The decisive factor is not only the salary, but also the job security or the possibility of additional income. The *development value* captures the extent and dimensions

of employer attractiveness with regard to further development and promotion opportunities. This factor also includes the question of the extent to which employment in a particular company could influence the attractiveness of an applicant from the perspective of other companies in the future. The fifth factor, *Application Value,* describes the congruence between the requirements for potential employees and their knowledge. Specifically, it captures the extent to which a person is likely to be able to contribute their skills and knowledge to the company in order to be perceived as a valuable part of it (cf. Berthon, Ewing & Hah, 2005).

2.2.2 Human resources development

Leadership positions are generally seen as desirable. They are often associated with high prestige (depending on the position) and a high income, but on the negative side also with a high degree of responsibility and sacrifice. Already in the introduction, the question was raised as the central problem of this study, which motives lead people to aspire to a leadership role and which characteristics are also necessary to be successful as a leader. It seems undisputed that when selecting managers, attention must be paid to which personality traits and competencies as well as motives for holding a management position or working for a particular company candidates possess. However, this is not enough. Even if the basic requirements regarding these dimensions are met, this does not guarantee that the manager will be successful as such (cf. von Au, 2017, p.1).

In the best case, the selection of managers succeeds in creating a fit between the tasks and the characteristics of the person, as Figure 8 illustrates.
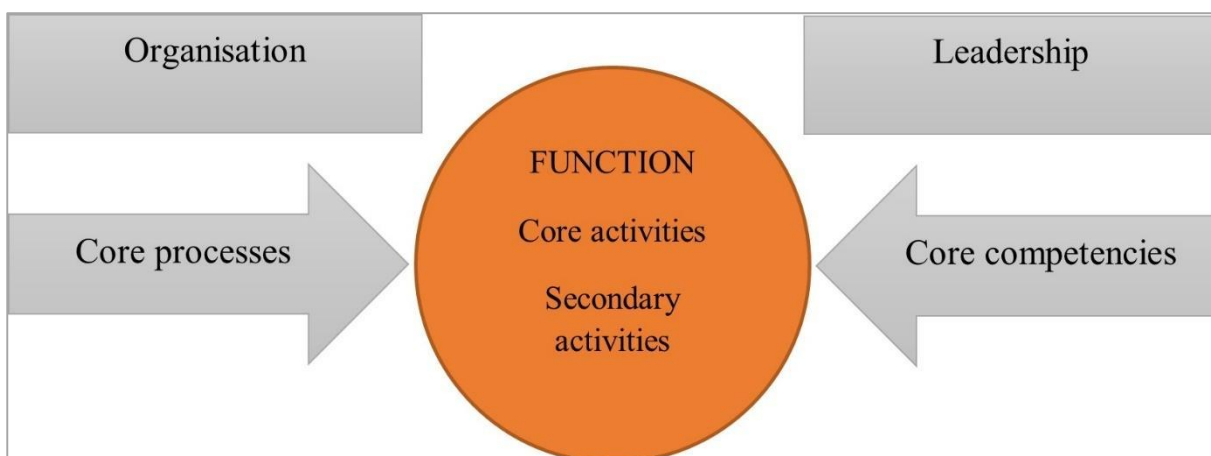
Figure 8: The core processes and core competencies. Own illustration according to Erdogan and Bauer (2005)

The creation of such a fit is also discussed by Erdogan and Bauer (2005): Not only for managers, but also for employees, it seems to be of fundamental importance that the demands

of the professional environment and one's own personality, including personal interests, fit well together. This is generally regarded as a predictor of success and satisfaction - a statement that also and especially applies to managers. In many cases, however, this is only inadequately fulfilled, yet the selection of suitable candidates for management positions is one of the most important tasks of human resources management. There is hardly any other area that can contribute so much to the success of a company with little effort. Most people entrusted with the selection of executives would probably quickly agree with this insight, but in practice the selection procedures show deficits. Compared to the findings of research, the practice of selecting managers in Germany is on the level of a developing country, according to Kanning (2017, p. 28).

The classic process for selecting new employees has four stages: (a) Pre-selection, which is often made according to formal criteria, is followed by (b) the use of tests, e.g., for personality traits. This is followed by (c) one or more interviews and finally (d) the use of an assessment center (AC). This typical staggering is mainly done for economic reasons: The selection of a specific person involves considerable effort. It therefore makes sense to weed out a large proportion of probably unsuitable candidates as quickly as possible before carrying out resource-intensive procedures such as an AC. These are considered to be a particularly valid means of assessing the competencies and skills of candidates required for leadership. In order to observe the actual behaviour of managers, candidates should be placed in a situation that reflects their later everyday management work and the challenges associated with it as closely as possible. Modules and building blocks of an AC can be, for example, role plays, group discussions, presentation exercises, sales and negotiation talks and/or discussions in conflict or even critical situations. Both individual and group ACs are possible, although individual ACs are often preferred for (top) managers for reasons of confidentiality. As with the interview, care should be taken that only a manageable number of competences or sub-competences are assessed within an exercise so that the observers can take in all aspects and assess them appropriately (cf. von Au, 2017, p.16).

A fundamental problem in the selection of managers arises from the typically implicit selection process (Thomas, 2020a): In many cases, managers are selected primarily on the basis of their professional skills, i.e., those employees who perform their tasks particularly well are successively promoted to management positions. This often leads to a corresponding improvement in terms of many parameters and seems to have a rewarding effect on the individual: Those who perform well rise to a leadership position. However, it is precisely in this aspect that the challenge seems to lie, often leading to specific problems: With regard to the fit between

job requirements and personality traits already described, it can be seen that the technical requirements in the job at the operational level do not necessarily match the tactical and strategic as well as communicative requirements of leadership roles. In fact, the empirical approach shows clear discrepancies here as well: Due to the fact that especially in SMEs managers are typically selected according to professional competencies, the quality of leadership is in many cases in need of improvement, and also the managers themselves only partially perceive themselves as effective. Von Rosenstiel (2001, p.321) aptly summarises the problem: Thus, leaders have usually acquired up-to-date technical knowledge, but have not been systematically prepared to use their communicative competencies to influence other people in a targeted way.

Leadership development is typically embedded in general human resource development. In this context, personnel development is described by Meifert (2013) in an eight-stage concept. Figure 9 shows an overview of the eight sub-aspects that make up strategic HR development.

Stage 1: Strategy development				
Stage 2: Management / Control Instruments				
Stage 3: Competence management				
Stage 4: Performance management	Stage 5: Talent Management	Stage 6: Further Education	Stage 7: Retention management	Stage 8: Cultural Management
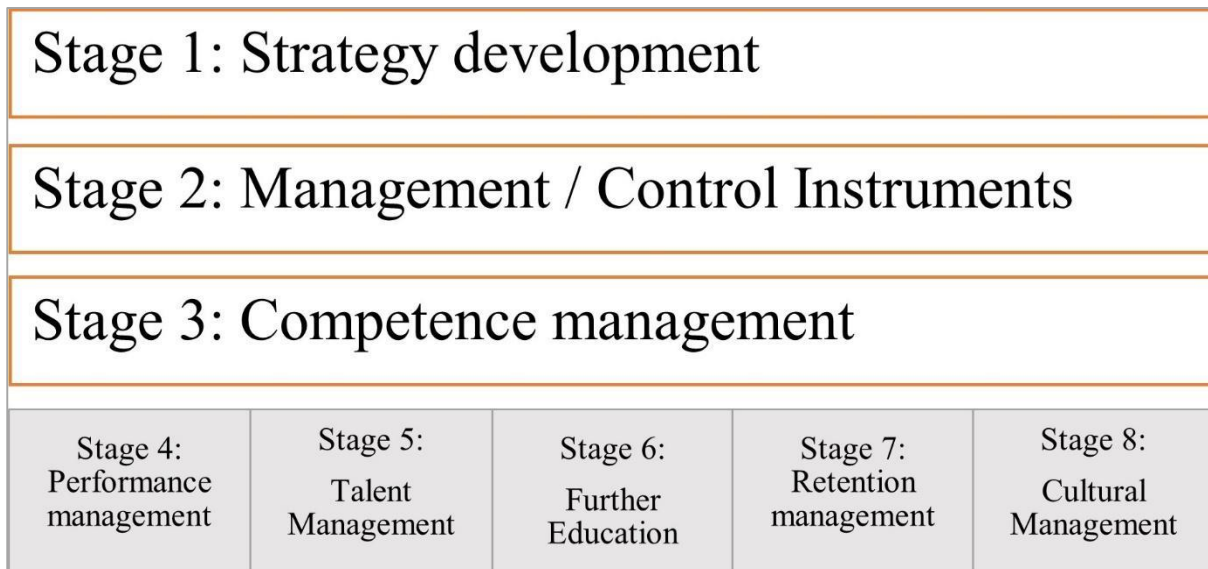
Figure 9: Aspects of human resource development, own illustration according to Meifert 2013

In the following, the significance of the individual stages is explained on the one hand, and on the other hand the effects on leadership development itself are discussed. In this context, it must be emphasised that knowledge (and also a basic understanding) of the thematic focus of personnel development is of double importance for (prospective) leaders: On the one hand, it is about one's own development as a leader, and on the other hand, it is part of the tasks of a modern, successful leader not only to enable but also to support and advance the personnel development of one's own employees. Understanding the stages of this development is an important basis for this. Meifert (2013) explains in this context that the difficulty of personnel

development measures is often based on the inconsistency of action. Thus, in many cases, measures seem to be insufficiently aligned with corresponding programs or do not follow a specifically defined strategy. Accordingly, HRD often falls short in its implementation and only partially exploits its potential. The eight-stage concept discussed here is intended to represent a best-case scenario in this regard, although it should be noted that real company requirements often do not allow for such a comprehensive strategy, or only to a limited extent.

The core of the model is the implementation of a personnel development strategy. Meifert (2013) distinguishes three core aspects here - each sharpened to the question of *what, how and with what* - that need to be considered. Under what, *the* goal of the actual personnel strategy, which can also be relevant in the context of personnel development, is summarised: Meifert (2013, p.85) explains that the HR strategy answers the question of where the organisation's workforce will be in three to five years and what long-term goals (for example, in the form of a ten-year perspective) should be pursued. In addition to the quantitative and qualitative requirements (for example, how many employees are needed in which job classes with which skill and competence profiles), according to the author, the main question is how the framework conditions in the company must be designed so that these goals can be achieved. This approach forms the starting point of the strategy and thus the basic goal orientation. The *how* then explains which instruments and procedures are to be used. This part of the strategy development thus also deals with the role of the functional unit. It also raises the question of how human resource development must be positioned in the company or what role individual managers (can) play in achieving the goals. The third central point of strategy development is the question of *what with, which* Meifert (2013) calls the *business plan of* HRD: Thus, a business plan seems to help to understand the area of human resources (HR) as an economic functional variable and to review the offer accordingly on a regular basis from an economic point of view. This seems to be one of the essential factors so that the corresponding structures can make a recognisable contribution to the company's success (cf. Meifert, 2013, p.87). However, like all HR measures, this development requires close coordination between HRM and the other corporate divisions or their managers: Only when HRM is closely networked with the business units and there is a regular exchange of information can a strategy be developed that adds real value to the company (cf. Kramar, 2006). This is a reference to the concept of strategic HRM. In this regard, e.g., Anca-loana (2013) explain that HR networking is a basis for successful operational cooperation.

2.2.3 Digitisation

In the last decade, the use of innovative, IT-driven developments in the area of human resource management has increased significantly (Marler & Parry, 2016). Thus, the development already mentioned at the beginning, that the use of digital technologies is increasingly shaping the entrepreneurial actions of many organisations, can also be observed in this environment (see chapter 1.1). The basis for the increased *impact of* digitalisation in HRM is the increasing spread of so-called *Enterprise Resource Planning (ERP)* software systems. They represent the starting point for the increasing standardization and automation of many HRM activities. According to Marler and Parry (2016), HRM can gain strategic importance through these and be more strongly integrated into strategy processes. This is one of the specific demands that researchers in the field of strategic and sustainable HRM have been making for some time (cf. Kramar, 2014).

A study by Melanthiou, Pavlou and Constantinou (2015) shows that digital recruitment can have an advantage over traditional methods: The authors speak of a time saving of up to 30% when digital strategies for recruiting new employees are increasingly used in the application process. The use of video conferencing is also mentioned here as a valuable contribution of digitalisation: This can significantly reduce the costs of an application for applicants and enable a more efficient process overall.

Corresponding advantages of digital measures can also be found on the cost side for companies: If job advertisements are placed via social media instead of newspapers or other offline access points, this can mean a cost saving of up to 90 %. In addition, a company can also present itself in a more modern and contemporary way with this strategy, which in turn can have a beneficial effect in the context of employer branding. This is especially important for companies from the IT or high-tech sector. However, these advantages of digitalising the recruitment process in particular and HRM in general face specific challenges in the concrete implementation.

Petry and Jäger (2018) show the contrast between the overall company and HRM in terms of digitalisation based on the implementation or potential of various digital technologies (cf. Figure 10).
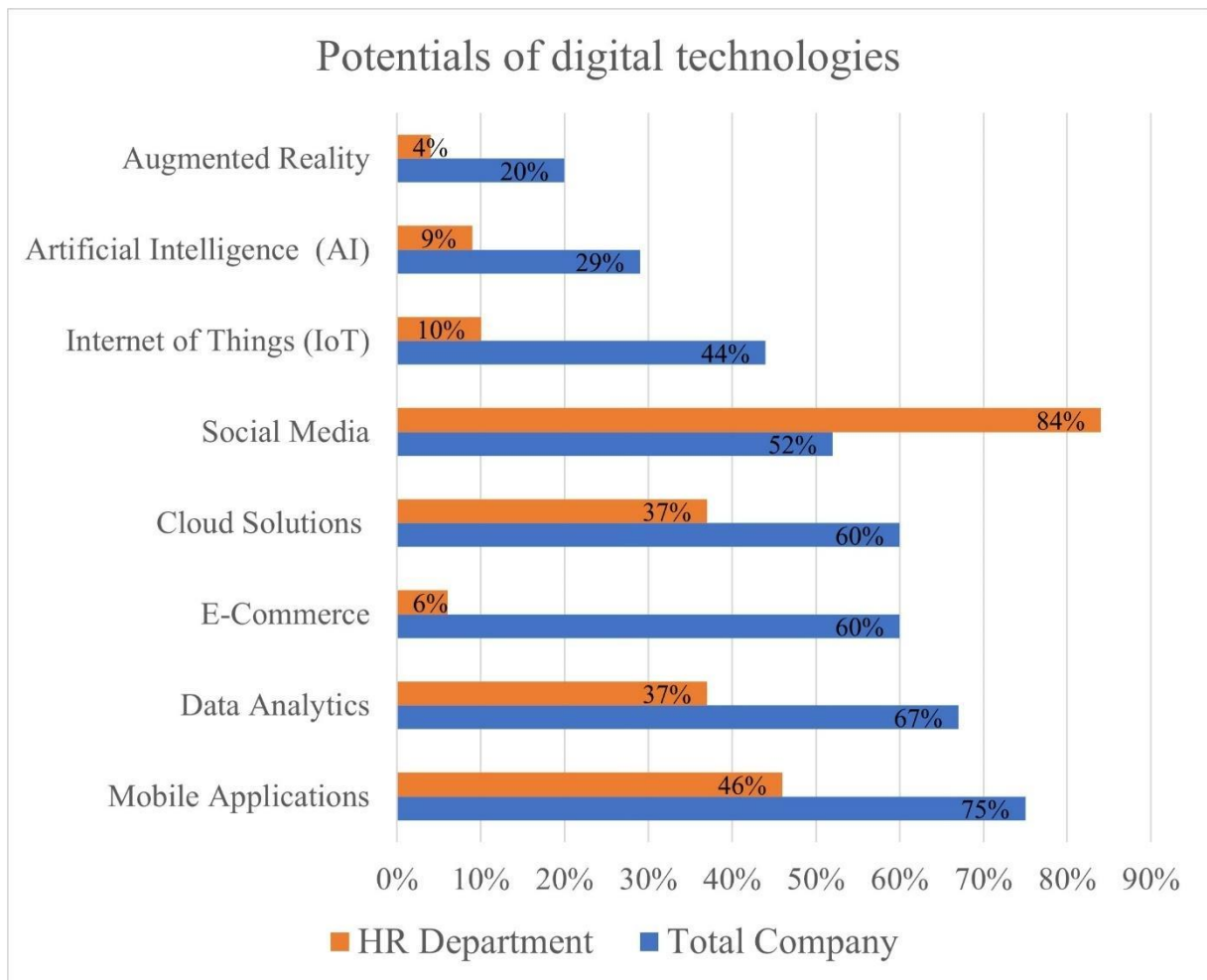
Figure 10: Potentials of digital technologies. Own illustration according to Petry & Jäger, 2018

It becomes clear that, with the exception of the use of social media technologies, there is a large discrepancy with other areas of the company. Although this finding can be explained by budgetary reasons, it shows that HR departments have some catching up to do in terms of digitalisation. At the same time, the results raise the question of whether the problem is due to the lack of implementation of digital processes or the lack of need for them. Social media platforms, for example, which HR departments use today as part of employer branding (cf. Roper, Sivertzen, Nilsen & Olafsen, 2013) and for recruitment, are now used by a large proportion of companies. Data analytics, on the other hand, is used by only a small proportion of HRM users. The question remains open as to whether there has never been a corresponding need or whether it has simply not yet been possible to implement it. This raises the question of the extent to which this discrepancy is caused by HRM itself or by the rest of the company.

In this context, Dickson and Nusair (2010) examined the extent to which the global search for talent would change through the increasing use of digital technologies. The authors

found that the use of AI systems in particular could significantly shape this process. However, the results of Petry and Jäger (2018) still show a very low prevalence here, especially in HRM. Similarly, Oertig, Estermann and Thoma (2017) criticise that SMEs in particular currently only recognise the benefits of digitalisation for HRM to a limited extent.

Based on the maturity model presented in chapter 1.1, Oertig, Estermann and Thoma (2017) describe that in a large proportion of SMEs, the digital maturity level of HRM is still to be located on the first or at most the second level (cf. Figure 11).

1. ad hoc	2. integrated solutions	3. analytics
• Ad hoc problem solving. • Media discontinuities and no or insufficient interfaces. • Excel/PDF/Word Worlds. • Challenge: Establishing uniform processes.	• Introduction and operation of integrated solutions. • Workflow-supportend core processes. • Universal data availability. • Centralisation and automation.	• Big Data, HR Analytics and Artificial Intelligence (AI). • HR-IT as a value creator • Potential for innovation and disruption. • The organization must
Digital Maturity (Testing, Consolidation, Automation, Optimization)		

Figure 11: Digital Maturity. Own illustration according to Oertig, Estermann & Thoma, 2017.

The aim of digitising the HR functions is, among other things, to minimise processing times (especially in the application process). Overall, the processes of this department are to be made more efficient so that HRM can support the other management functions more strongly. Performance and potential management are highlighted here, for example. Oertig, Estermann and Thoma (2017) also suggest that HRM could be more involved in the evaluation process, for example through short surveys of employees.

Cardy and Selvarajan (2006) emphasise in relation to potential management that the importance of competences in the business environment can hardly be overestimated. As shown, these are among the most important resources of a company and are thus decisive for its success. In order to achieve the best possible results, the competences of the organisation and thus those of the employees must be in line with the goals of the organisation. The authors

also emphasise that the best strategy is of no use to the company if it does not have the necessary competences to implement it.

Ley and Albert (2003) qualify the identification of the required competences and the associated matching with the skills and abilities of the employees available in the company as one of the core tasks of modern personnel management. In order to establish this match between requirements and resources, various competence management systems are used here.

The fundamental challenge in human resource management is to measure and record existing competencies (cf. Ley & Albert, 2003). Ley and Albert distinguish between manual approaches and automated procedures for measuring employee competencies. The authors attribute a number of disadvantages to manual approaches to competence measurement. The most important of these is the financial and time effort involved. Not only do competencies have to be recorded and stored once by the HR department, but constant updates are also required. The one-time measurement of competences provides a snapshot of the company's situation. However, it is not suitable for building a long-term strategy on; the demands on the company and then also on the competences of the employees change too dynamically. The latter change not only explicitly (which would make them easier to measure) through targeted personnel development and training measures, but also implicitly. For example, through implicit learning based on new experiences or through exchange in informal teams, competences are subject to constant change, which is difficult to assess and quantify. While it is at least possible to deduce how competences might have developed for explicit competence acquisition with a view to the measures attended, this is no longer the case for implicit learning. Automated approaches cannot completely solve this problem, according to Ley and Albert (2003), but they do offer relief in that they are at least able to extract information from documents with the help of automation.

The authors conclude that the overall relevance of digital solutions results from the effort required to manually assemble the complex competence networks. Thus, chatbots are able to disrupt previous interactions between humans and computers or data (cf. Brandtzaeg & Følstad, 2017). They therefore function as computer agents that provide an interface based on natural language understanding and communication in this context. The increasing popularity of chatbots is mainly due to advances in research and development in machine learning and AI. As a result, chatbots are becoming better at interpreting real speech input in terms of their purpose, rather than just responding to so-called keywords, as was the case in early versions. As Brandtzaeg and Følstad (2017) argue, the development environments offered by technology

companies such as Google, Microsoft and Facebook are also accelerating the adoption of chatbots. For example, they enable consumers to communicate directly and easily via social media platforms.

However, the transition from traditional user interfaces (e.g., apps, websites) to chatbots for interacting with data is not easy: for example, nothing is known about how consumers react when chatbots replace human customer service agents, or how the existence of chatbots in social networks affects multiparty dialogues and information distributions (cf. Brandtzaeg & Følstad, 2017). This, the authors claim, can explain why the majority of chatbots have only low user acceptance and fall short of expectations, which seem quite justified given the multitude of possibilities. For example, many chatbots fail to meet the users' requirements because their goal or purpose is unclear, or because the answers provided are too general or incorrect. Brandtzaeg and Følstad (2017) therefore suggest that the development of chatbots (and other innovative technology solutions) should take the consumer's perspective into account and specify not only what the company expects from the chatbot, but also how it can best help consumers.

According to Garimella and Paruchuri (2015), personnel selection and recruitment is one of the operational structures in which chatbots can be used effectively. In this context, the authors also emphasise the growing popularity of the technological solution in this area, which they attribute primarily to the fact that the increasing importance of online recruitment and the associated time pressure are exacerbating the need for automation in the applicant management process. Added to this is the increasing complexity of recruitment. For example, Garimella and Paruchuri (2015) explain that HR managers are confronted with ever greater expectations, resulting in an additional training effort. This is also emphasised by Oertig, Estermann and Thoma (2017), who suggest that the industry seems to be looking for solutions to reduce the manual handling processes and ensure faster processing and turnaround times.

Text-based dialogue systems can fulfil four basic functions, all of which are intended to relieve the burden on human resources: For example, (in a professional context) they are able to explain job criteria during a simulated dialogue. In addition, chatbots can help candidates outline their key characteristics and talents. Subsequently, the underlying AI is able to analyse and partially verify these. Based on this process, recruiting suggestions can also be made via these platforms (cf. Garimella & Paruchuri, 2015). In addition, Soutar (2019) outlines how chatbots can be used for the re-engagement of candidates. The constant accessibility of these systems and the speed of communication are cited as key advantages of chatbots. Figure 12 summarises these advantages in comparison to communication via email.
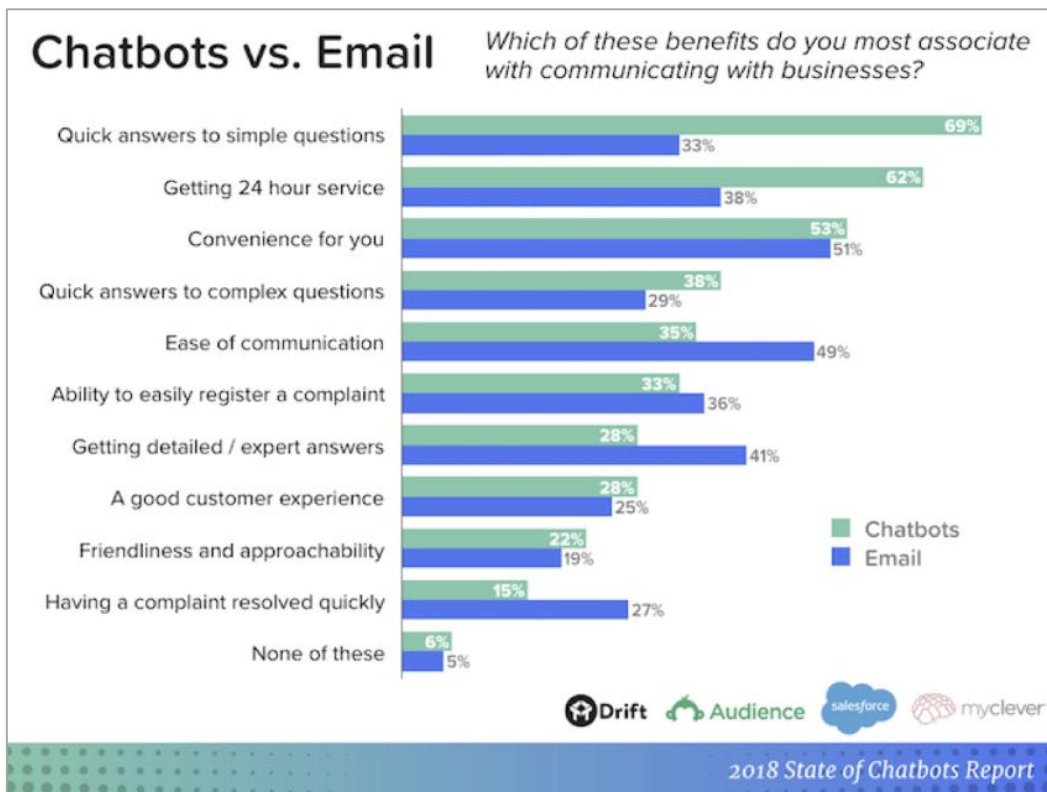
Figure 12: Advantages of chatbots, Soutar (2019)

Despite the terms *Data Science*, *Big Data,* and *Predictive Analytics, which are* often used synonymously in daily life and in corporate communication, they can and must be clearly differentiated from each other. The underlying phenomena are definitely interconnected and build on each other (cf. Provost & Fawcett, 2013).

The term *Big Data* refers to the amount and availability of data: People can collect enormous amounts of data with the help of modern technologies and the internet. In certain cases, they are also obliged to contribute it when it is used. This data can include personnel data, often collected in connection with social media or services, and business data, such as various sales productivity statistics or sensor data from various machines or machine components (cf. Chen, Mao & Liu, 2014). The transatlantic flight described by Mayer-Schönberger and Cukier (2013) is one of the best-known examples of the enormous amounts of data that can be generated by a single aircraft: A single jet engine (as part of a multitude of possible components) can generate more than a terabyte of data during such a journey. Rabl and Jacobsen (2014) also discuss the massive amounts of data that are now being generated, focusing on how this data is handled: Data is often stored multiple times, as it needs to be shared, pre- and post-processed, loaded, stored, and backed up, which requires a logical approach.

Data science aims to make *data* usable and thus valuable through processing, analysis and linkage (cf. Swan, 2013). At the company level, statistical techniques are used for data analysis and data interpretation, among other things, in order to make it useful for practitioners and decision-makers (Provost & Fawcett, 2013). Furthermore, Provost and Fawcett (2013) point out that it is through this process of data analysis and use that data value is created: The mere collection and possession of data does not create value, because it is only through the active activity of analysing and applying the data in the company that the concrete possibilities for use arise.

Predictive analytics is a specific subfield of data science. Although data can be used to evaluate actions and events or to uncover patterns in consumer behaviour, it is primarily the prediction of future events that is considered valuable to businesses. This approach is based, among other things, on a long-standing belief in the field of psychology that the best predictor of future behaviour is previous behaviour (cf. Wernimont & Campbell, 1968). In the field of predictive analytics, attempts are made to make predictions about future events by analysing historical data (or - in the case of real-time analytics - current data) (cf. Shmueli & Koppius, 2011). The extent to which this is also possible in reality and in a practical implementation, especially in HR work, depends not only on the technological and infrastructural capabilities of a company, but also on its leadership and corporate culture (cf. Müller & Jensen, 2017). In this context, reference is made to leadership and the alignment of corporate strategy and goals. Accordingly, the authors recommend that managers integrate data use more strongly into the corporate culture and strategy and make more data-driven decisions. LaValle, Lesser, Shockley, Hopkins and Kruschwitz (2011), who were able to prove in a comprehensive study that the main obstacles to an effective implementation of data analytics lie in management, also confirm the previously described results: In a survey, executives and managers overwhelmingly highlighted organisational aspects as the biggest obstacles for their company. A lack of awareness of how data (analytics) can be used to support and develop the business was cited as the most significant barrier, followed by a lack of targeted implementation of specific challenges from management (such as a lack of bandwidth) and internal capabilities.

Thums and Müller (2019) observe that little is known about whether the use of predictive analytics as part of an increasingly digital application process is viewed positively or negatively by applicants or employees. However, the authors claim that additional advances in human resource management are often accompanied by improvements in employee wellbeing and loyalty. However, this is only true if people see the process described as a good development for themselves and the company. If, however, they believe that a new HR policy mainly

serves to save costs, the opposite effect can occur, according to the authors (cf. Thums & Müller, 2019).

As Moreira (2013) notes, the issue of privacy could potentially play a growing role here as well. Watkins Allen, Coopman, Hart and Walker (2007) address this in detail using the example of surveillance in the workplace. This seems to be a particularly critical and increasingly relevant aspect, as surveillance contradicts one of the basic principles of management - trust. Although this demand and the need for trust in the work environment are widely recognised, the monitoring of employees, for example through technological tools, continues to increase. This creates a progressive conflict between the company's desire to obtain information and the employee's need or desire for privacy.

With regard to this dilemma, the growing trend of using social media in the recruiting process can and must be discussed (cf. Melanthiou, Pavlou & Constantinou, 2015). On the one hand, social media platforms make it possible to actively recruit candidates and, in addition, to show the corresponding company structures (in the course of employer branding) in the self-presentation as an attractive employer. On the other hand, social media platforms offer the possibility of pre-screening candidates and thus finding out more about them than the application forms reveal. However, therein lies the enormous risk of this practice: If this practice becomes public and candidates interpret it negatively, there is a risk that the company will lose attractive candidates.

However, Melanthiou, Pavlou and Constantinou (2015) show that companies do use such screening practices: For example, more than three quarters of the companies interviewed by the authors in a study stated that they evaluate applications after an online search, mainly using Facebook and LinkedIn.

Alongside this increasing digitalisation in the application process, another reputation-related change is emerging. As Aula (2010) points out, communication in the digital age is much more democratic and no longer one-sided. As a result, companies can no longer control the publicly available information about them. Rather, peer-to-peer communication, especially via social media, is on the rise, which means that scandals or criticism, for example, can spread much faster than in the past. Aula (2010) therefore emphasises that it is no longer sufficient for a company or an operational structure to market itself well; rather, they must actually be excellent.

The examples presented here - especially the already well-researched chatbots - show on the one hand how companies can succeed in presenting added value through the use of digital

methods in the field of HRM. At the same time, however, findings such as those by Petry and Jäger (2018) make it clear that the digitalisation of many HR departments seems to succeed only inadequately, especially outside of recruitment.

2.2.4 HR and change

The critical role and enormous relevance of human resources policy and thus of an HRM strategy is emphasised by the authors Meyer-Ferreira and Lombriser (2003). They show that the importance becomes clear especially in the context of mergers of company structures. Bligh (2006) also analyses the effects and consequences of possible mergers on the corporate cultures of the companies involved and makes it clear that a "culture clash" can result. According to the author, this clash of different corporate cultures is often blamed for the disappointing results (from the point of view of the parties involved) of corporate mergers. In this context, the results of a study for which 218 US companies were interviewed are revealing. According to the majority, corporate culture is a critical predictor of the success of mergers and acquisitions. Negative factors can include problems with corporate identity, in the area of human resources, as well as communication difficulties and differences (for example, with regard to specific approaches) between the various groups. Marks and Mirvis (2011) point out that especially in mergers and acquisitions the personnel component or the general view of the employees is often overlooked. As a result, there are often financial losses as well as conflicts between the groups involved.

Bligh (2006) describes the often-devastating effects of mergers on workers. In this context, he also lists poor outcomes in the course of professional activities, which are largely due to the negative effects of major transformations on workers (e.g., in the form of low commitment, low job satisfaction, etc.). Due to the drastic and stressful nature of mergers, they often result in stress-related effects such as increased absenteeism, increased turnover in general and the perception of a deteriorating work environment. It is these variables that have a significant negative effect on long-term labour productivity.

Marks and Mirvis (2011) identify further consequences in this context: they list, for example, difficulties and challenges in communication, problems in the procurement of labour and an increasing loss of corporate identity. However, managers responsible for mergers and acquisitions often overlook or ignore the now mentioned and often well-known problems. This is often due to an over-emphasis on the financial elements in the course of the issue. As a result of any conflicts that may exist, often within specific departments, difficulties in integrating and

standardising internal business processes, but also structural challenges, usually lead to a reduction in overall operational efficiency and thus financial losses.

Ivancevich, Schweiger and Power (1987) also note corresponding aspects. They identify HRM as one of the most important, but often insufficiently considered areas in the context of mergers and acquisitions (M&A), i.e., corporate mergers or transactions. As has already been made clear, their impact on HR and also the psychological implications of corporate mergers are often overlooked, whereas both the financial and legal aspects of mergers are often dealt with in detail. When considering a merger, HRM should definitely be involved, as the research papers considered here reinforce. This integration is often important with regard to the consequences of the merger for the company as well as for the career development of individual employees. In particular, each individual employee and manager must be given the opportunity to communicate possible concerns, ask questions and clarify ambiguities to the HRM department (cf. Ivancevich, Schweiger & Power, 1987, p.19). For example, by providing adequate training before and during a merger, companies can better prepare their employees for future changes, reduce uncertainty and thus mitigate the possible negative effects of the merger.

However, according to Conway and Monks (2007), the importance of HRM, especially in change processes, is not limited to mergers and similar financial transactions. In this context, they conducted an empirical study to determine the effect of different HRM strategies on employee commitment to change in the healthcare industry. Employees were asked to select from a list of ongoing change processes the one that affected them personally at the time of the survey and on which they could report based on their specific experience. The attitudes were then assessed to determine the level of commitment of the employees (and thus their commitment). Subsequently, the respondents were given a questionnaire to determine their satisfaction with the HR and leadership methods. They were also asked to provide a number of other employer-related assessments. The results indicate that there is a discrepancy between the HR strategies valued by employees - such as specific reward and incentive programs, a particular type of communication and targeted programs to improve the work-life balance - and the strategies that are increasingly being addressed and implemented in the management environment: Conditional remuneration systems, performance management or further training or promotion programs were mentioned here, for example. At the same time, however, the authors emphasise that HR practices - including the leadership style in the organisation - have a significant influence on employee satisfaction and also on the perception of change processes.

However, Caldwell's (2001) findings from the practical implementation of any processes contradict this importance of HRM in transformation processes: Field studies have shown that the persons responsible for HR in change or even innovation processes only take on the conforming or also the deviant role. They could thus either support and advise through their own experience or actively and autonomously participate as deviants. However, the author cites only limited evidence from the 1980s. These show that HR managers actively and autonomously participate in change processes. A corresponding position is seen - at least according to the author - as relatively insignificant. It was not until the 1990s that HRM gained importance in many companies and thus moved closer to corporate management, which was reflected in greater, strategic involvement in change processes (cf. Caldwell, 2001). Storey (1992) emphasises with regard to those responsible for human resource management that they act as "change-makers" (Storey, 1992, p.169) and thus must not be seen merely as facilitators of change. Although the author claims that this is an exception, the establishment of a new attitude and perspective with regard to this group of people becomes clear. Accordingly, human resource management must no longer be viewed as merely tactical, but also strategic - a requirement that also seems to correspond with the development of strategic human resource management. Ulrich (1998) also emphasises this new function of HRM: he stresses that it should become an agent of continuous transformation by creating procedures and a culture that together increase an organisation's capacity for change (cf. Ulrich, 1998, p.125). The author also describes this as a kind of transition in the form of an agenda of HRM: he demands that every effort of HRM must contribute to increasing the performance of the company (for example in the form of customer service or a general increase in operational value).

In concrete terms, this means that HR departments are not only of great importance in maintaining a high level of employee satisfaction during the transformation process but must also take an active role here and be supported in this. The primary task of contemporary HRM in a transformation environment is therefore to find ways to change (and also improve) the organisational design of company structures. Thus, HRM is responsible for new management structures as well as for new work processes and remuneration methods. Ulrich (1998) emphasises as a particular challenge that these new personnel activities must not displace or replace traditional personnel tasks. This aspect in particular makes it clear that management must also support change in the human resources sector. In order to be able to meet the increased demands, human resources departments must also have larger budget and sufficient personnel at their disposal. This investment in personnel is not only necessary to ensure the completion of new and existing tasks, but also serves as a signal to redefine the value of the department.

Of course, changes can also be classified according to their purposes and the specific objectives behind them. These can range from creating new business models or focusing on a new management style to more dramatic events such as mergers. However, the focus of this study will be on the different types of change. A key aspect of this is to show how they are viewed by workers and managers alike. A possible influence of situation management should also be considered. The distinction often made between different types of change is particularly advantageous in this context, as these variants can each influence perception differently (cf. Anderson & Anderson, 2002). For example, transitional change, i.e. the process of moving an organisation (or a subset thereof) from one state to another, is often cited as an example of planning-driven change (cf. Amado & Ambrose, 2018). In contrast, transformational change is usually described as less plan driven. It takes place in a more dynamic business environment, where changes are required as a result of changing business conditions (and thus as a result of various risks or even crisis events).

Lauer (2014) discusses the reasons for the need for organisational transformation. He describes that companies find themselves in an increasingly dynamic environment and accordingly consider a continuous adaptation of their internal structures as necessary in order to be able to continue to exist in the sales and procurement markets. According to Lauer (2014), external changes are influenced by the market environment, political, technical and also ecological conditions as well as by the overall economy, certain market institutions and various market trends. However, the author emphasises above all the increasing competition as a significant factor.

Companies operating in today's business environment must accept growing complexity in order to respond effectively to increasing environmental dynamics. According to Lauer (2014), especially against the background of this development, a categorisation of the business environment has developed both in the literature and in the practice of strategic business management, which varies in the number of environmental categories but generally paints a fairly consistent picture.

Lauer (2014) identifies a total of six environmental factors that affect change and can therefore produce divergent approaches to change: the social environment, the macroeconomic environment, the political environment, the technological environment, and the institutional environment.

The social environmental factors include not only quantitative data (e.g., socio-demographic variables) but also qualitative data, such as lifestyles or social ideals, which may indicate the need for change within a business strategy. The macroeconomic environment includes the overall economic climate, which affects all business structures. Both economic progress and structural changes in the economy can be seen as manifestations of this dynamic, according to Lauer (2014). This category contains information about the political environment and thus implies, for example, political circumstances, a certain stability, legislative changes, and power transitions. This topic area in particular has also been taken up more recently in the literature in relation to risk management. Here, political threats are also increasingly mentioned as a factor influencing the development of corresponding solutions (cf. Brink, 2017). With regard to the technological environment, Lauer (2014) highlights above all the direction and pace of technological progress as critical information. According to the author, the ecological environment, which is implied, for example, by climate changes, peculiarities in fauna and flora, and the presence or depletion of natural resources, is an essential component of this field. The institutional environment of the economic environment, which includes both physical and intellectual infrastructure, is the last element that influences important changes.

2.2.5 Performance Management

Performance measurement is a complex process. Its elements are included under the generic term *performance management*. It involves identifying and communicating assessment results based on specific (performance) indicators (cf. McAdam, Hazlett & Galbraith, 2014).

Performance management was introduced into the corporate sector as early as the 1950s and has since been an integral aspect of income entitlement in the sense of performance-related pay determination for employees (cf. Ogbonnaya & Messersmith, 2019). This measure, as Guest (2017), for example, shows, was favoured in part by the difficulty of explaining employee compensation at the time. A holistic management approach to performance reward was seen as a suitable solution. The emergence of human resource management accelerated the development of performance management (especially in the service sector) by contributing to the adoption of more specific methods of employee development and also employee promotion. Many companies have implemented methods to use employee appraisals and integrate performance management here. This is to ensure that the actions and results of workers are in line with the objectives of the company structures (cf. Ogbonnaya & Messersmith, 2019). Effective performance management also sets out the organisation's growth plans (in detail) and encourages conversations about appraisal, coaching, general feedback or even sharing information on the

use of mentoring programs. One of the fundamental challenges of management is to align staff with what is often considered a strategic plan in order to pursue the primary goal of increasing performance. In order to effectively achieve the goals of an organisation, it is often necessary to form a collaborative group, which must be aware of the different requirements of the various organisational levels and structures (Guest, 2017). It becomes clear that organisations need to connect their goals with those of their employees. This also involves establishing mutually acceptable means and processes for measuring capabilities, developing strategies and achieving results. If this is not considered, a company risks a kind of misallocation of labour resources, leading to reduced opportunities for development. Individuals in all operational structures should understand and internalise their tasks and roles in achieving and improving the profitability of the company.

The primary operations of performance management are the selection of objectives and the aggregation of measurement data for these objectives. In addition, the specific activities of the approach include the various interventions undertaken by managers to improve future performance against these objectives. Typically, operational performance management involves an examination of the organisation as a whole, as well as the identification of alternative methods to achieve the goals. It follows that companies need to optimally align their strategic goals and objectives in order to actively influence the performance of the operational structures.

Before an appropriate performance management can be implemented in a company, it is necessary to understand the market and the working environment in detail, so that the most effective cluster of the concept can also be chosen (cf. Mone & London, 2018). Overall, performance management involves setting performance goals and conducting continuous assessment, where setting performance goals in turn involves setting intentions for both the organisation and the individual. The set organisational goals are communicated to employees so that they can understand what the organisation is trying to achieve within a certain time frame (cf. Guest, 2017). In order to define specific requirements and objectives in the area of organisational performance, it is necessary to convene meetings that are attended by both management and all employees of the organisation. The meetings should address the individual efforts needed to ensure that the organisation achieves its goals (cf. Krishnan, Khanzadi, Eriksson & Svensson, 2013). Continuous (re)assessment is also a way of determining whether an organisation's performance is in line with stated goals (cf. Karkoulian, Assaker & Hallak, 2016). Furthermore, continuous assessment helps determine what support is needed to enable and achieve effective performance improvement (cf. Krishnan et al., 2013). Continuous assessment further contributes to the identification of barriers to achieving high organisational performance in the

service business. A thorough knowledge of the issues that could lead to compromised or hindered performance enables the most effective method for performance management to be implemented. This identification of potential hurdles in the course of an organisation's performance management approach is referred to as *performance coaching* and is considered fundamentally useful (cf. Karkoulian et al., 2016).

However, it is important to emphasise that organisations continue to rely heavily on performance measurement per se. In an ideal world, an organisation's ability to achieve defined goals depends on a link between performance measurement and management. According to Smith and Bititci (2017), organisations need to develop more effective performance measurement methods that lead to greater employee engagement and performance.

The implementation of performance measurement systems has great benefits for organisational management. For example, Slovak, Schairer, Herrmann, Pulverer and Torrengo (2018) explain measurement as a continuous learning process. Performance feedback is used to assess performance and determine how to align initiatives and strategies with the aim of increasing the effectiveness of activities and services in line with the organisation's mission and vision (cf. Slovak et al., 2018). According to Zwikael, Chih and Meredith's (2018) research on project management, assessment also provides balanced and methodical ways of assessing individual and organisational performance from different aspects. Financial aspects, productivity and client-employee relations can be considered (Zwikael et al., 2018). According to Harbour (2017), it is particularly important for organisations to improve decision-making due to changes or developments in technological and political aspects as well as other external variables (cf. Harbour, 2017). Performance evaluation, and therefore performance measurement, enables these decisions to be made at the individual, operational and strategic levels. According to Valmohammadi and Ahmadi (2015), performance measurement should be seen as a management system within an organisation, rather than a means of collecting data on set performance goals or targets. According to Slovak et al. (2018), assessing performance measurement is critical to identifying and preventing organisational risks that affect the conformity of work products and the effectiveness and efficiency of goods and services.

2.2.6 Talent management

As a component of human resource development, talent management lacks a uniform definition and defined conceptual boundaries (cf. Collings & Mellahi, 2009; Blass, 2009). According to Ritz and Sinelli (2018), a company must define for itself what constitutes talent against the

background of individual requirements. A distinction is made between egalitarian, hierarchy-oriented, potential-oriented and qualification-oriented talent types.

Chen (2016, p.214) defines talent management as a multi-stage process that begins with the identification, analysis and creation of job-related talent. As a further component of talent management, an appropriate learning or development programme must be developed and then implemented in the organisation (cf. Church & Silzer, 2016, p.647.; Rutledge, LeMire, Hawks & Mowdood, 2016, p.240). According to Chen (2016, p.214), effective skills management benefits both the organisation and the staff. It helps to gain a better understanding of what skills and information are necessary for one's job and how they can be obtained and subsequently presented (cf. Chen, 2016, p.214).

Chen's method shows that competence management must always include two perspectives: that of the job and that of the staff. This implies that a link must be established between job requirements and staff skills, which is one of the core objectives of effective competence management (cf. Chen, 2016, p.214; Mauno, Kubicek, Minkkinen & Korunka, 2019, p.694). This method is also cited by Ley and Albert (2003, p.1501). They note that the primary function of current human resource management systems is to identify essential skills and match them with employees' existing competencies.

This is followed by the - far more difficult - task of forecasting future changes in the field. The skills to be assessed are not only those required for the current job or activity, but also those needed for future jobs or activities. Capability and competence management systems can support this assessment (cf. Ley & Albert, 2003, p.1501).

The authors distinguish between two methods of talent identification in an organisational setting: manual and automated methods (cf. Ley & Albert, 2003, p.1502). The manual method starts at the organisational level and differentiates between the core competencies of an organisational unit and the skills of individual employees.

To ensure that employees' skills are managed in accordance with the future needs of the organisation, (automated) skills management starts with a study of future market changes and customer needs and defines the core competencies of the organisational unit (cf. Ley & Albert, 2003, p.1502). According to Ley and Albert (2003, p.1502), the next step in implementation is to define the required individual skills either for a single job or a family of jobs (cf. also Richardson, 1999, p.267).

The current skills of the workforce are then assessed in relation to the required competencies. This can be done through self-assessment or as part of the company's standard assessment process (cf. Ley & Albert, 2003, p.1502; Hockemeyer, Conlan, Wade & Albert, 2003, p.1428).

2.3 Objectives of modern human resources management

The previous chapter showed which challenges and tools modern human resource management has to respond to. This chapter looks at the objectives from a strategic perspective: If it is assumed that the role is to drive transformation in companies and to create the necessary success factors that provide a competitive advantage in the modern business environment, then it seems necessary to create definitions about the objectives relevant for this.

2.3.1 Employee retention

Organisational commitment or retention is defined, for example, by the authors Becker, Billings, Eveleth and Gilbert (1996, p.464) as a type of psychological attachment of employees to their jobs. Becker et al. (1996) argue that employee retention is related to a number of work-related factors that are important to organisations. Stronger job attachment can also be associated with favourable outcomes for employees. The authors highlight the benefits of good retention. For example, they note that people who feel attached to a company are much less likely to change organisations. From the company's perspective, this results in lower turnover rates, cost savings and less negative productive friction within the organisation. In addition, strongly bonded and committed employees report greater satisfaction in studies and thus a greater willingness to do the assigned work. According to Becker et al. (1996), this should also lead to a proportionally better performance of employees who are more committed to their organisation and feel correspondingly connected. This can also be interpreted against the background of numerous study results (for example by Macey & Schneider, 2008 or Saks, 2006): It is assumed that employee engagement and retention are significant determinants of work success and thus also highly relevant for managers. At the same time, however, it must be emphasised that employee engagement is not only dependent on management and the organisation, but also on other factors such as the personality or the personal values and ideals of employees (cf. Meixner, 2020). In this context, the author also explains that both internal characteristics of the individual (e.g., personality or motivation) and characteristics of the environment (e.g., leadership or general work tasks and attitudes) shape commitment and subsequent work performance.

A construct that is particularly important and often emphasised in this context is motivation (in the context of performance). According to Heckhausen (1989), this variable refers to behaviour that is associated with a performance norm. Thus, a behaviour is defined as performance-motivated when an individual strives to do something particularly well or even better than everyone else. In this context, the author emphasises above all the comparison with other people (e.g. colleagues at work), but also with one's own standards (e.g. past performance or specific quality standards) as an essential component of achievement motivation. According to Heckhausen (1989), these are self-defined goals. Consequently, achievement motivation can be categorised as an aspect of intrinsic motivation.

In their studies, Barling and Beattie (1983) and Graves, Sarkis and Zhu (2013) point out that increasing employee motivation is one of the most important tasks of managers. Social science-based motivation research thus refers, for example, to the differentiation postulated by Ryan and Deci (2000) between intrinsic and extrinsic motivation, which can also be regarded as the fundamental driving factors of human activity outside the leadership or corporate context. The authors emphasise motivation (as already noted in the context of achievement motivation) as the driving factor of human action. Ryan and Deci (2000) further state that the dichotomy between intrinsic and extrinsic motivation points to different sources of motivation. Intrinsic motivation is thus largely motivated by characteristics of the individual, such as an interest in a particular subject or a desire to perform well. Extrinsic motivation, on the other hand, is defined by the presence and influence of external elements or incentives that cause a person to behave in a certain way not out of an inner desire, but out of a desire for a reward. It must be emphasised here that extrinsic and intrinsic motivation - although fundamentally different in their structure of action and their sources - should not be regarded as polar opposites of one scale (cf. Deci & Ryan, 2000; Ryan & Deci, 2000). Rather, they are two fundamentally separate modes of motivation that can operate independently of each other. Thus, circumstances in which both intrinsic and extrinsic drive are substantially expressed seem just as plausible as those in which only one type of incentive is strongly expressed. In this context, the authors claim that an action is only rarely fed by only one source of motivation; in the majority of cases, both sources are active together.

Both intrinsic and extrinsic motivation of employees can be influenced and shaped by leadership behaviour (cf. Barbuto, 2005). Thus, intrinsic motivation arises in the work context when people engage in tasks that seem meaningful, enjoyable, or rewarding to them. Extrinsic motivation arises when actions are carried out towards a specific end and thus target state, for the achievement of which a reward is in prospect. In this context, it is also worth mentioning

that motivation at work or in the company is often not completely intrinsic but is a combination of the intrinsic and extrinsic motivation already mentioned (cf. Barbuto, 2005). However, as Barbuto (2005) has shown in an empirical study, the main purpose of transformational leadership is to promote intrinsic drive. In contrast, transactional leadership obviously aims at promoting extrinsic motivation, as it is based on and partly goes beyond a classical compensation structure. Transactional approaches to leadership, as described here, include different aspects in which the extrinsic motivation of employees is to be increased by creating a transaction (reward or punishment incentives). In this respect, classical remuneration itself is (only) to be understood as a partial component. At the same time, the author emphasises that managers can only generate part of the motivation: As the results of the empirical study show, leadership strategy contributes little to clarifying motivation disparities.

Felfe (2008) argues in his research on employee satisfaction and retention that satisfaction is often substantially correlated with company loyalty. Accordingly, improved employee satisfaction should be associated with higher company loyalty. The author goes on to say that employee loyalty is not only highly relevant for the company or the organisation, but also for the individual employee. The so-called desire of employees for loyalty and recognition can also be strengthened by a feeling of belonging to the company and a feeling of attachment to the organisation. This feeling should in turn be seen positively by employees (cf. Felfe, 2008).

Felfe (2008) and Felfe and Wombacher (2016) elaborate on this concept of employee engagement or retention: They describe engagement as a psychological connection between an organisation or company and individual employees (cf. Felfe & Wombacher, 2016). The authors specify (in agreement with others, such as Reichers, 1985; Meyer & Allen, 2001) that this engagement is not a one-dimensional construct, however. Rather, it reflects the complex interplay of multiple causes. According to the authors, commitment comprises an emotional, a calculative and a normative dimension. Regardless of this differentiation made, the authors further assert that an organisation's commitment varies depending on the goal it is pursuing. Thus, commitment can be shown not only towards the company as a whole, but also towards a manager, a team or a department as individual elements of operational structures.

As indicated in the introduction of the chapter, employee retention is a feeling of perceived attachment between employees and the company or management on the one hand and the company or management on the other (cf. Kanning, 2017). One can therefore also speak of a sense of social identity or, in a broader sense, self-image, as it is studied in various social science subjects (cf. Creed & Scully, 2000; Hogg, 2016). According to this, individuals identify

themselves partly through their own personality, their achievements, triumphs, and weaknesses, but also through their affiliation to certain organisations or groups. These can be direct social connections such as friends or family, on the one hand, or broader, often abstract groupings such as companies, organisations, industries, or political ideas (cf. Obschonka, Goethner, Silbereisen & Cantner, 2012).

In this respect - as Kanning (2017) also points out - a certain overlap between involvement and social identity in relation to the employing company is to be expected. However, this does not always seem to be the case: Involvement can also exist outside of social identity, for example when employees derive monetary benefits from their affiliation with the organisation that they would not want to do without in the future. This observation prompted Allen and Meyer (1990) to distinguish between three types of commitment. Their differentiation is generally recognised in research (cf. Kanning, 2017). As the first type, the authors show affective commitment, which refers to the emotional relationship between employees and the company. Employees derive pleasure or pride from the relationship and strive to show loyalty to the company. For example, as Rodrigo, Aqueveque and Duran (2019) describe, affective commitment can be strongly influenced by an organisation's social responsibility efforts. The second type, normative commitment, is qualified by Allen and Meyer (1990) as much more sober: it is based on the conviction of employees to be loyal to the employing company. If, for example, the company has consistently financed the training and paid the salary for years, in the case of normative commitment this results in the willingness to commit to the company. If employees were to leave the company at the first opportunity (for example, because another company offers a higher salary or the existing company has financial difficulties), this would be seen as ungrateful, and one would have to reckon with condemnation by others. The need for unity and certain values or norms are decisive here.

Although Allen and Meyer (1990) define the three types of commitment as independent characteristics of engagement, they are nevertheless interrelated. The more employees are committed to their job at the emotional level, the more likely they are to feel a normative moral responsibility to stay with that company. There is a much lower correlation between normative and calculative commitment.

Wolf (2018) has restructured the previously mentioned types and added a fourth: behavioral commitment. While most research on organisational commitment focuses on employees' feelings towards their employment and the company, Wolf (2018) argues that actual behaviour must also be considered in developing a comprehensive model of organisational commitment:

While intentions and attitudes influence action, actual behaviour can vary both positively and negatively. For example, employees with high emotional commitment may still actively seek alternative employment, while employees with low commitment may not do so for reasons unrelated to commitment. Against this background, a connection can be made to results from health research. The keyword intention-behaviour gap describes how occasionally people's actual behaviour does not match their intentions. Due to specific considerations on aspects such as convenience, individuals may not act even though they have the will to do so (cf. Sheeran & Webb, 2016).

Employee engagement has been the subject of numerous studies and meta-analyses from different perspectives. Two of these meta-analyses show the relationship between job satisfaction and engagement (cf. Meyer, Stanley, Herscovitch & Topolnytsky, 2002; Tett & Meyer, 1993). For certain situations, very high correlations could be demonstrated, which prove a significant connection between the two dimensions. Meta-analyses can be used to examine the extent to which links can be established between engagement and work performance (e.g. Cohen & Hudecek, 1993; Cooper-Hakim & Viswesvaran, 2005; Meyer et al., 2002; Ng, 2015). Positive links could be revealed, especially for general and emotional commitment. In light of this, Kanning (2017) formulates the thesis that commitment is a strong predictor of a variety of entrepreneurial outcomes and therefore requires closer examination.

2.3.2 Efficiency and service quality

With regard to maintaining customer relationships, the service quality already discussed comes into focus as a fundamental aspect. In this context, Pansari and Kumar (2017) state that in the area of sales and customer management, it is no longer just the actual product, but also the services associated with it, and thus the quality of care, that are increasingly receiving attention. Thus, customers are increasingly participating in the specific development and change processes through so-called open innovation strategies and thus benefit from solutions that are tailored to their individual requirements (cf. Verbeke, Dietz & Verwaal, 2011).

As an additional development, research on the so-called *Service-Dominant Logic*, an approach to investigate and explain value creation in networks, is being advanced against the background of the growing relevance of experience (cf. Vargo & Lusch, 2008; Vargo & Lusch, 2014). The authors emphasise not only an increased relevance of services, but also the accompanying need for a reassessment. As a result, the authors explicitly define service as the application of expertise (knowledge or skills) through specific procedures or actions and also the

targeted use of specific processes that benefit (another) party. Thus, above all, a uniform terminology seems to be crucial here in order to be able to compare research results in this field and thus further develop the field of service logic.

However, the service quality described must be understood as a complex construct that is difficult to evaluate as a whole. One of the main difficulties with regard to this complexity and the attempt to evaluate it is the high degree of subjectivity and personal involvement of customers in the process of assessing service quality (cf. González, Comesaña & Brea, 2007).

Authors Brady and Cronin Jr. (2001) explain that while there are several approaches to measuring perceived service quality, most current disputes are concerned with what specific aspects should be assessed in relation to perceived service quality - a discussion that highlights the multi-faceted nature of the concept.

The SERVQUAL model developed by Parasuraman, Zeithaml and Berry (1985; 1988) is one of the most widely used models for assessing service quality. It quantifies the perceived discrepancy between expected and received service quality. While the model in its original form attempted to assess the ten aspects of responsiveness, access, reliability, courtesy, assurance, customer understanding, facts, competence, credibility and communication, a revised version shows a reduction to only five factors (empathy, facts, assurances, responsiveness, reliability).
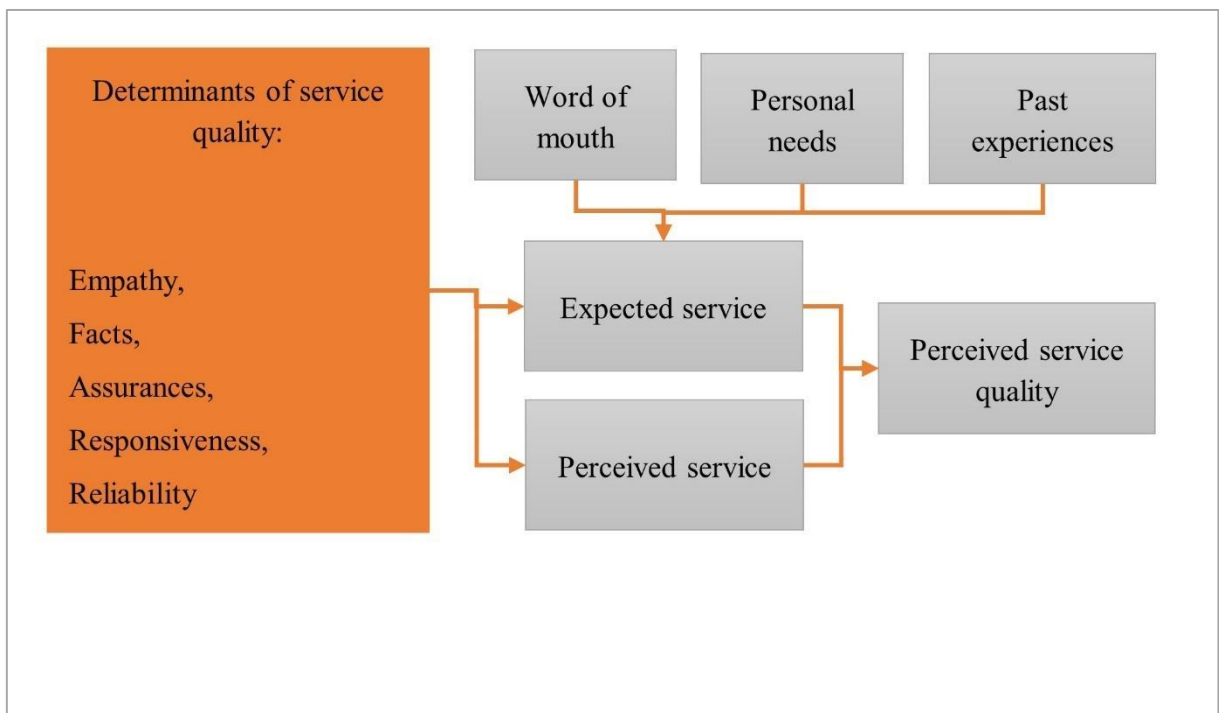
Figure 13: Model explaining perceived service quality. Own illustration according to Parasuraman, Zeithaml and Berry 1985.

Several studies have shown that service quality is influenced by a variety of factors (including human resource management and subsequently employee motivation and commitment) (see Law, Bai, Davidson, McPhail & Barry, 2011; Gazzoli, Hancer & Park, 2010; Husin, Chelladurai & Musa, 2012).

2.4   Strategic and sustainable human resources management

Despite the fact that the concept of sustainability has gained prominence in both academic and increasingly public discourse and is often emphasised in its importance, Kramer (2013) notes that sustainable (human resource) management is a relatively new field despite the already prevalent link to operational structures such as *corporate social responsibility* (leading in a socially responsible way) and also sustainable leadership strategy (cf. Avery, 2005).

It must be emphasised here that there is not yet a universally valid definition of sustainable human resource management, but that the various methods are consistently oriented towards the changing needs of employees, which are becoming increasingly difficult to meet, as well as the growing demands on companies. Especially with regard to these growing demands, the increasing desire to meet specific performance standards and the need for flexibility must be taken into account. To put it bluntly, these demands can be seen as an answer to advancing globalisation and digitalisation (cf. Chareonwongsak, 2002). It becomes clear that it is precisely these two developments that have a major influence on personnel policy decisions and considerations.

Human resource management must not only orient itself towards the aforementioned goals and position itself as an (experienced) partner within the organisation, but also enable quantification of its own performance. LaValle, Lesser, Shockley, Hopkins, and Kruschwitz (2011) describe the present as an entrepreneurial age in which the individual departments of human resource management are also challenged accordingly and must adapt to specific changes. Ulrich (1997a) emphasises that these development trends are to be regarded as fundamental challenges for those working in human resource management not only because of the high relevance of contemporary business environments and the changes that accompany them, but also because of their complexity. For example, the derivation of appropriate key performance indicators (KPI) is already one of the basic tasks for sales and production departments, but in HRM it is a challenge that has hardly been accepted yet and is at the same time greater (cf. Rogers & Wright, 1998). This is possibly due to the fact that performance measurement is not (yet) common for such specialised departments. In addition, the tasks of HR departments have changed considerably: Rogers and Wright (1998), for example, emphasise the fact that

new tasks are always being added or weightings are changing. According to the authors, HR departments used to focus almost exclusively on drawing up contracts, processing payrolls and other administrative tasks until the 1990s, whereas more recent accounts such as that of Kramar (2013) point to the strategic positioning of HRM.

Ulrich (1997) makes it clear that it was above all these tasks that could be easily observed and thus also measured through key figures, for example, of process and throughput times or also staff absences. However, due to increasing strategic responsibility and also due to the changes in development goals that occur, it is precisely this measurability that is becoming increasingly difficult to implement. At the same time, Ulrich (1997) emphasises that despite the difficulties that arise, the changed challenge can be the basis for establishing human resource management as an integral part of the organisation.

2.5   Human resources and leadership

Human resource management is often equated with the concept of leadership and also discussed in connection with it. According to Ulrich and Smallwood (2012), this link is crucial, especially with regard to talent management, because - as further research subsequently specifies - the constructs are nevertheless interwoven despite clearly different characteristics (cf. Leroy et al. , 2018; Mehmood & Arif, 2011; Vermeeren, Kuipers & Steijin, 2014).

The leadership concepts currently prevailing or being discussed with a view to the future do not only focus on traditional leadership competences such as the use of commands or the assignment of tasks. They increasingly emphasise social and communicative skills as well. The ability to adopt new perspectives or adapt to changing circumstances is also an essential aspect of modern leadership concepts and roles (cf. Baethge, Denkinger and Kadritzke, 1995; De Vries, Bakker-Pieper and Oostenveld, 2010). In this context, the authors McFarland, Senn and Childress (1993), based on a research paper by Bass and Avolio (1990), point out early on the relevance of specific aspects that need to be noted especially with regard to the definition of 20th century leadership.

The authors Bass and Avolio (1990), cited above, established the basic distinction between transformational and transactional leadership in the mid-1980s. The transformational approach refers to a leadership style in which the leader, who takes on a variety of tasks, is able to anticipate new, changing environments and work contexts. To do this, she works with the whole team (in a collaborative way) to tackle complex problems. In contrast, transactional leadership is increasingly understood as the traditional definition of leadership in which the leader

achieves specific work and departmental goals primarily through reward and punishment in a mutually accepted leader-follower relationship (cf. Bass & Avolio, 1990). In such a reward context, motivators designed to increase employee retention and motivation include both tangible incentives and intra-company currencies. In addition, immaterial incentives are also provided, for example through recognition and praise for good results and moderate or positively directed criticism for less good results. It is clear here that rewards are relevant in both transformational and transactional forms of leadership (cf. Bass et al., 2003). As far as the retention of employees is concerned, transformational leadership has the more suitable instruments with regard to the recommended measures (e.g., the use of motivators) (cf. Meixner, 2020; Sow, Ntamon & Osuoha, 2016). Onyango (2015, p.52), especially in the context of effective talent management. In this context, the corporate culture, which is essentially dependent on the respective leadership style (cf. Sarros, Cooper & Santora, 2008) and also on the orientation of human resource management (cf. Sripada, 2019), must be considered as an important mediator.

As a first interim conclusion, it can be noted here that the image of modern managers has changed significantly in recent years and decades. According to Preußig and Sichart (2019), there is a growing demand to consider the perspectives and demands of employees in the context of specific decisions as well as in the choice of corresponding (leadership) strategies.

Whitener (2001) argues that one of the fundamental tasks of both managers and HRM is to increase employee retention and motivation in order to subsequently positively influence their performance (see also chapter 3.1). The author goes on to explain that by strengthening the bond between companies and employees, the factors already noted can be positively influenced (cf. also chapter 3.1 on types of bonds and chapter 3.2 on possible consequences of bond). However, in order to achieve optimal retention and also strengthen corresponding developments, appropriate leadership approaches and strategies are needed. Whitener (2001) conducted a multidimensional study (chosen according to the complexity of the topic) to investigate these interactions and their effects with a focus on the already explained retention. He involved a total of 180 companies and surveyed their employees ($n = 1689$). The author focused on the one hand on personnel and management practices and on the other hand also on the specific perceptions of the employees. In the course of the study, he attempted to establish a link between perceptions of leadership and HR activities and employees' self-assessment of commitment to the organisation. It should be noted that in addition to this multitude of possible constructs, a distinction was also made in advance between the control-focused and the commitment-focused approaches to leadership. Whitener (2001) explains the scope of possibly related variables by the fact that employee engagement is to be understood as a specific, multifactorial construct.

Therefore, a corresponding distinction was made between leadership approaches based on their specific goals: Thus, control-oriented leadership and HR practices aim primarily at increasing the efficiency of operational structures and also of the organisational unit as a whole, thereby reducing labour costs. In order to achieve the aforementioned aspects in the course of control-oriented approaches and also to be able to ensure compliance with specific regulations and requirements, corresponding regulations, and processes as well as associated reward systems are often established. In contrast, engagement-oriented approaches are not about processes or reward systems, but about creating effectiveness-enhancing working and environmental conditions. Among the best-known measures that usually have a positive impact on employee engagement are, for example, specific communication techniques or the creation of a corporate culture in which employees feel supported (cf. Whitener, 2001).

It becomes clear that the author differentiates the leadership approaches analogously to Bass' (1999) differentiation (transformational vs. transactional leadership). Thus, the focus is not only on the leadership activity itself, but also on the goal of creating a conducive work environment and corporate culture that can improve the well-being and productivity of employees (cf. Tourish & Pinnington, 2002).

Whitener (2001), in addition to dividing leadership into control and commitment-oriented approaches, also looks at the relationship between employees and their leaders. The focus here is on trust, which according to Whitener (2001) must be seen as an important moderator with regard to the effects of the prevailing leadership. This is also emphasised by Van der Berg and Martins (2013), who point out that, due to the complexity of this construct, basic trust needs to be considered not only in the context of a managed relationship, but also in general operational processes.

The mediating effect of trust in the relationship between leader and led can be attributed to cognitive, affective and behavioural aspects within the three-dimensional concept of commitment described here (Van der Berg & Martins, 2013). Whitener (2001), on the other hand, limits his study to a one-dimensional concept of trust, to which he nevertheless also attributes a moderating role. In this research work, which is cited here as a representative of a large number of other studies on the topic, trust is defined, among other things, as the conviction that employees are adequately supported and accompanied by their organisation even in difficult situations.

The author Whitener, who is cited particularly frequently in this chapter, used the constructs presented here as the basis of his empirical study. For example, he formulated the hypothesis that a positive correlation exists between the perceived support by company structures (i.e. the company as the leadership) and the commitment as well as the trust in the leaders. In a second hypothesis, Whitener (2001) assumes that there is a positive relationship between commitment and perceived trust. The assumptions could be tested and finally validated with the help of the sample already noted. Whitener (2001) was thus able to demonstrate both the relevance of trust and the connection between characteristics of commitment-focused leadership and employee retention by examining more than 180 organisations.

In this context, reference can once again be made to the paradigm of intrinsic and extrinsic motivation by Deci and Ryan (2000), which in a combination with the model of Kelman (1958; differentiation of different intensity levels of employee commitment) suggests a motivational course: While the early phases of commitment are primarily characterised by the attempt to avoid punishment or the striving for reward, intrinsic motivation and thus the desire to behave in the interests of the company and to perform to the best of one's ability for it seems to come more to the fore in the late phases of identification.

2.6 Summary of the state of research and framework

2.7 Presentation of the state of research and research framework

In the previous chapters of this study, it was presented on the basis of a research discussion how the environment of companies and, accordingly, the challenges they are confronted with have changed in the last decades and which requirements are derived from this for leadership and HRM. Basically, it became clear that the digital transformation in particular is drastically changing the requirements for companies, for example in the emergence of new business models (cf. Frank, Mendes, Ayla & Ghezzi, 2019). This is also accompanied by changes in the requirements for competences and skills of employees (cf. Ley & Albert, 2003). This applies, for example, to the use of digital technologies and work tools, new forms of communication and collaboration as well as changed, more flexible and dynamically changing customer requirements (cf. Verbeke, Dietz & Verwaal, 2011). Leadership and management must succeed in responding to these developments through appropriate measures and incentives, i.e. enabling employees to cope with these new challenges and creating a productive environment for this.

As Thomas (2020a) shows following a study on the situation in the craft sector, SMEs in particular face various difficulties here. In many cases, managers face structural challenges, as they usually do not have sufficient time or financial resources to advance the leadership role in addition to their operational activities. While it is clearly recognised, according to Thomas (2020a), that it is the task of managers to accompany the company (and thus also the employees) into a digital future, practice shows that the necessary resources are lacking in many cases. It is also doubtful whether management itself has the necessary competences, as the understanding of leadership (cf. Bass & Avolio, 1990) has changed significantly in recent years and decades. Professional leadership is increasingly being surpassed in terms of its relevance by emotional and personal leadership, as findings by Whitener (2001) show before the question of the motivating and binding role of leadership. Accordingly, managers in sectors that are traditionally less digitised and rather backward with regard to the implementation of modern forms of leadership (cf. Thomas, 2020b) are faced with particular challenges that now need to be addressed after the description given here.

This is precisely the aim of the following study, which focuses on the specifics of the situation in the German electrical trade. This sector with its specific challenges provides the

framework for the empirical analysis, which is to include a practice-oriented survey and accordingly attempts to work out the current status of leadership and digitalisation - as well as the complex interplay of these two aspects of entrepreneurship.

2.8   Sub-research questions

Based on the research framework presented and in anticipation of the planned methodological approach, two sub-research questions are derived, which are to be addressed accordingly in order to finally be able to answer the research question guiding this study on the basis of current research data.

SF1:   How do experts from the German electrical trade feel about the relationship between digitalisation and HR management or leadership?

SF2:   How are digital HR and leadership measures perceived by employees in the electrical trade?

3 Empirical study

3.1 Research strategy

A mixed-methods approach is used here, which combines qualitative and quantitative approaches in the sense of a holistic approach to answer the research question formulated here. As Sekaran and Bougie (2016) explain, on the one hand, the advantages of both approaches can be used, while on the other hand, the disadvantages can be at least partially compensated. This is especially true for the area examined here: in principle, a mixed-methods approach is suitable for adequately depicting the high degree of complexity of situations and problems that exist in the real economy. Sekaran and Bougie (2016) further argue that this is one of the fundamental challenges of many research projects in business administration and management: "Such constellations are typically characterised by the presence of a multitude of different actors, interests and perspectives, which are on the one hand interwoven and on the other hand often diametrically opposed to each other. Mixed methods approach succeeds in bringing together these different perspectives in an adequate way, addressing them and finally looking at them critically, making it possible to shed light on such situations in an approximately holistic way.

In the following, a qualitative approach is first used to look at the perspective of the managers. It is assumed that they have the necessary expertise to be able to provide sufficiently detailed information on how the digital transformation of the industry affects the areas of leadership and HRM.

Subsequently, the perspective of the employees is included in a quantitative study with the help of an online survey. The aim is to achieve as large and representative a sample as possible, which will provide information on the perception of digital leadership measures.

3.2 Qualitative research

3.2.1 Interview guide

A standardised guideline was developed to guide the expert interview. This was developed on the basis of the presented state of research and in accordance with the specifics of the research situation in the German electrical trade. After the guideline had been subjected to a pre-test and corresponding detailed changes had been made, it was used as a basis for the actual interview. The guideline used, as it was developed in this way, is presented below.

[Introduction and welcome]

Thank you very much for taking part in my study. We are mainly concerned with what particular challenges you are currently dealing with in HR. All responses will be used anonymously only. Before I evaluate them, I will send you the transcript to be used for review and approval - if you find information or statements in it that you would like to delete, we are very welcome to do so. I only ask for brief feedback in that case. Please answer as openly and honestly as possible, as this is the only way I can develop a good overview of the existing challenges and approaches. Thank you very much!

[Employees and applicants]

– How have the demands on employees in the skilled crafts sector changed over the past ten years?
– To what extent has the profile of applicants changed over the past ten years?
– Do you think that the coming years will bring further changes?

[Challenges Personnel Acquisition]

– Personnel acquisition is increasingly being described as an important task in the skilled crafts sector as well.
– What measures are you using in your company to try to modernise personnel acquisition?
– How do you deal with the issue of employer branding?
– What measures would you find useful to make acquisition more successful?
– What challenges do you face in this regard?
– Do you think your approach to staff acquisition will change significantly in the next five years?

[Human Resources Development Challenges]

– Changing needs can also be partly covered by staff development measures.
– What approaches are you taking in this area?
– Is retraining already a relevant issue for you as an approach to meeting staffing needs?
– How do you rate the willingness of your employees to participate in development measures?
– Do you think that retraining is an effective instrument for the company and for the employees?

[Digital Measures in Acquisition & Development]

– Researchers are increasingly talking about the digitalisation of human resources.
– What approaches are you taking in this regard?

– Would you consider your department to be above or below average in terms of digitalisation compared to the rest of the company?
– Do you think that the digitalisation of HR brings advantages for staff acquisition and development? If yes - which ones?

3.2.2 Recruitment of experts

For this study, 12 experts from the electrical trade who are active in the field of human resources development and who meet at least one of the following characteristics were interviewed:

I. Managing persons from the areas of personnel and HR
II. People involved in human resources development and management
III. Managers from the human resources sector
IV. People from other disciplines who nevertheless know about human resource management

In order to preserve the anonymity of the interviewees, no personal attribution is made. The abbreviations I1 to I12 refer to the individual interviews; quotations used in the evaluation are marked with corresponding references. The table in Appendix 1 shows the essential data of the interviewees.

3.2.3 Sampling

One of the most difficult aspects of empirical research is the selection of an appropriate and thus valid sample. It is necessary to consider the importance of both the sample size and thus the number of subjects - in this case the number of interview partners - and the representativeness of the selected sample. In general, the evaluation should enable statements to be made about a group of individuals or about certain circumstances that can be qualified as the population.

In this context, Bortz and Döring (2007) emphasise the crucial need to maximise the overlap between the research interest and the level of knowledge of the persons interviewed. A necessary condition for conducting successful empirical research is thus the identification of a group of persons or events that appear fundamentally suitable for providing in-depth knowledge about the object of interest.

The selection of the sample thus has a significant influence on the quality of the measurement method or the survey instrument and then also on the results. This is also emphasised by Patton (2005). He points out, before using the term *purposive sampling,* that especially in

qualitative studies (such as the one conducted here) care must be taken to select only those people who are willing and able to provide sufficient relevant information on the research topic.

Accordingly, for the qualitative part of the research conducted here, persons were selected who could be considered experts in the practice of the research field due to their professional experience. Individuals with extensive professional experience in the relevant field were considered who, from the perspective of their own company and also the underlying collaboration system (i.e. the specific ecosystem) in which they operate, are able to provide the insight necessary to answer the research question. Specifically, on how digital transformation within the industry can both influence and be driven by changes in HR.

3.2.4 Evaluation strategy

Because a qualitative method was chosen here with the use of interviews as an instrument for data collection, the evaluation must also be carried out accordingly. The qualitative content analysis according to Mayring (2010) is used for this purpose.

This aims to process data material according to a predefined methodology in order to enable both comparative and classificatory forms of evaluation. These "predefined rules of text analysis" (Mayring, 2010, p. 50) are followed in order to develop a transparent method that is comprehensible from the outside and goes beyond the interpretation of the data material in its application. Thus, it should be possible to document the decisions made about the data material and also to represent them scientifically in order to be able to speak of a legitimate method (cf. Berger-Grabner, 2016).

There are three basic forms of qualitative content analysis: summary, structuring and exploration. Summarising provides the reduction of the material. The aim is to evaluate the remaining components in order to create a mental picture of the research object. The focus of structuring is on features of the data material that were deductively derived in advance from the theoretical foundations. In this part, a cross-section of the data material will be created. In the explication, certain segments of the data material are isolated and supplemented with additional information from outside. The aim is to increase the depth of knowledge (cf. Berger-Grabner, 2016; Mayring, 2010).

In the course of this research, it was determined that a structured qualitative content analysis would be most useful. Methodologically, this means that the question complexes of the guideline were formed deductively from the theoretical foundation, while the subsequent categorisations were created inductively on the basis of the data obtained. As a result, three upper categories were formed, each of which was further divided into several subcategories.

3.3 Quantitative research

The focus of the quantitative research part is on answering the second sub-research question. The aim was to clarify the relationship between perceived digital HR measures, the employees' own digital competence and their loyalty to the company. Thus, the research here follows a correlative approach with which the correlations between several characteristics can be uncovered. An online questionnaire was used, which is based on the measurement methods presented below. The complete questionnaire can be found in Appendix 2.

3.3.1 Measurement method

The commitment of individuals was measured on the basis of the scales developed by Meyer and Allen (1990) to survey organisational commitment. This allows us to look at three different aspects of commitment: emotional, calculative, and normative commitment. The following figure shows an overview of the three dimensions of organisational commitment.

Figure 14:   Own illustration of the organisational commitment according to Meyer and Allen, own illustration.

The digital literacy scale developed by Ng (2012) was used to determine the extent to which people describe themselves as digitally literate and the extent to which they possess digital skills. With a total of 22 Likert-scaled items, this scale records the self-assessment of the possession of digital competences.

Subsequently, the aspects of digital HRM were also recorded in a survey developed by Adli, Gharib, Hakami and Pourmahdi (2014). The items of the questionnaire refer on the one hand to typical activities of digital HRM in the company in which the respondents work and on the other hand to how the respondents perceive these activities and their consequences. The activities include the fields of e-recruitment, e-compensation, e-training, e-communication, and e-performance appraisal. As consequences of these activities, the authors assume the fields of e-employee satisfaction, e-productivity, and e-cost efficiency. The implementation of these areas is assessed from the perspective of employees using several Likert-scaled items per category.

3.3.2 Sample

According to Bortz and Döring (2007), striving for an optimal match between the fundamental research interest and the wealth of experience or knowledge of the sample to be studied is crucial for the success of empirical research. A corresponding match is thus one of the fundamental prerequisites for being able to make meaningful and also comprehensible statements on the basis of actual experiences (and not merely assessments of them). In this context, the authors also emphasise the relevant criterion of representativeness. Thus, in the field of hypothesis-testing procedures (and thus also for the present study), it is crucial that the sample can be considered representative of the population and is free of distortions due to sampling errors. With regard to the sample, the size of the sample must also be considered, which is primarily determined by the strength of the expected effects and the type of (statistical) procedures used.

For the present study, primarily correlative statistical analysis methods are to be used (cf. chapter 5.1) in order to test hypotheses about possible correlations. Cohen (1992, p.158) explains that, depending on the expected effect size, a sample size of $n = 28$ for large effects, $n = 85$ for medium effects and $n = 783$ for small effects is required in order to be able to prove them accordingly. In the social sciences, moderate effects are often assumed. These are characterised, for example, by a specific value of the correlation coefficient r (.30). The aim here was to obtain a number of test persons that at least fulfilled this criterion.

3.3.3 Quality criteria

Various authors, including Gläser and Laudel (2009), state that compliance with certain quality standards is one of the primary challenges in planning a scientific study. In addition to psychometric criteria, which can sometimes determine the quality of a study, the authors refer in particular to the basic ethical assumptions of research, which are summarised in Figure 15.
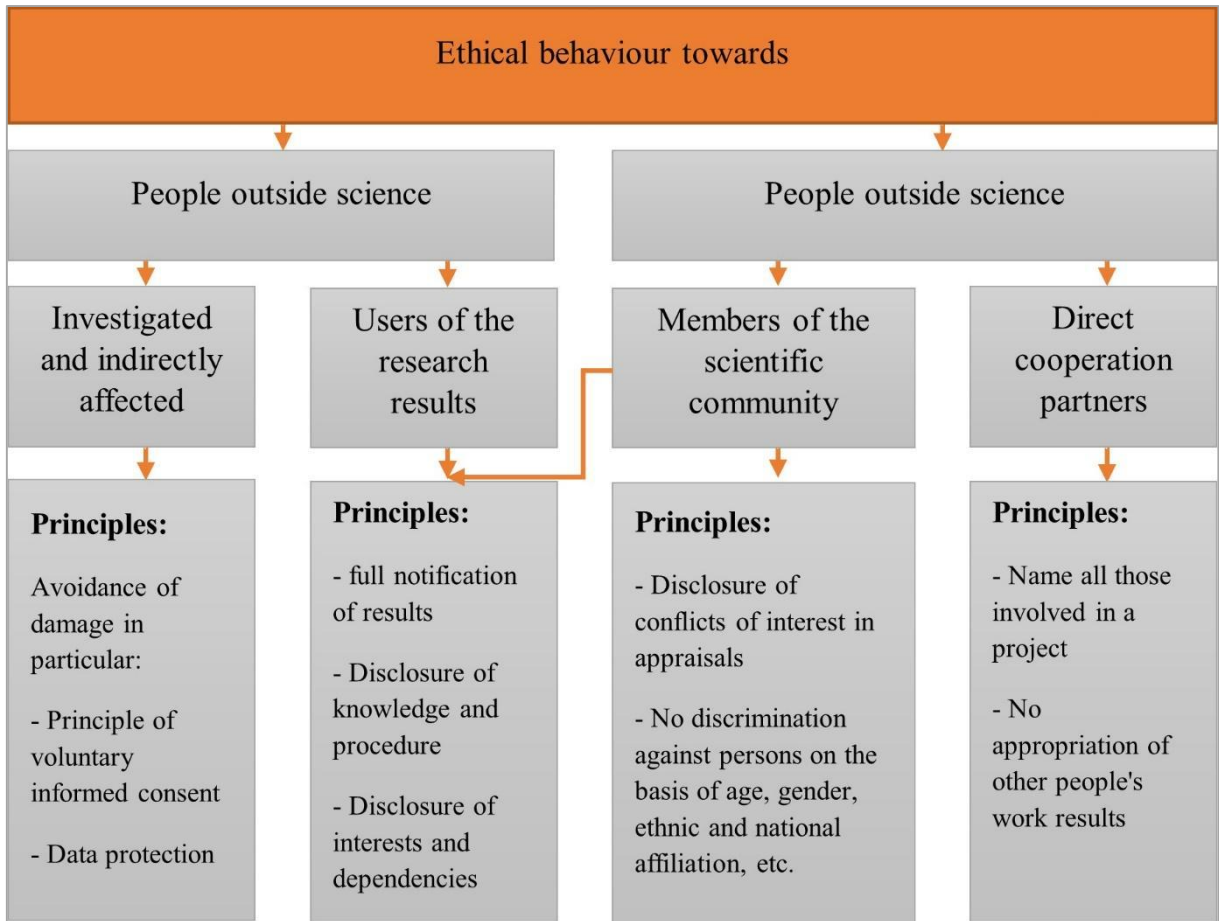
Figure 15: Principles of ethical behaviour (Gläser & Laudel, 2009, p.50), own illustration.

Figure 15 gives an impression of the breadth of the concept and also the underlying assumption that ethical behaviour is shown towards all actors within, but also outside, the science system, and thus individuals must be considered individually. In this context, Gläser and Laudel (2009) draw particular attention to relevant individuals who do not belong to a scientific community but who may nevertheless be affected by a specific research design or its findings and conclusions. Thus, it is essential that there are no detrimental or adverse effects for those who are directly or even indirectly involved in the investigation.

According to Gläser and Laudel (2009), participation in such a study should always be voluntary. Furthermore, consenting participants should have the possibility to withdraw and

revoke their participation at any time. In recent years and decades, data protection and the associated data protection regulations have also increasingly come into focus. They, too, must be adequately considered in empirical research. It seems to be a common practice to collect data completely anonymously and to collect only that personal information that is necessary to classify the results. Overall, it must not be possible to draw conclusions about the person behind the data (Gläser & Laudel, 2009). In this context, socio-demographic data such as age, gender or even the highest level of education should also be considered, since - as pointed out by Bortz and Döring (2007), for example - these are typically recorded in the context of most social science studies. These personal data serve to characterise the sample and enable readers to classify the results. Corresponding data were also collected for the present study. However, additional data that would allow conclusions to be drawn about the identity of the participants was avoided.

In addition to the ethical standards of empirical research, Bühner (2011) and Bortz and Döring (2007) mention the three quality criteria for psychometric measurement instruments: validity, reliability, and objectivity. These fundamentally relevant standards represent basic possibilities for measuring the quality of scientific-quantitative work.

Thus, objectivity refers to the degree to which the results of a measurement are independent of the person who conducted, evaluated, or interpreted the measurement. In accordance with the criterion of objectivity, a standardised questionnaire with quantifiable response options was used in this study, whereby judgmental or distracting items were avoided. Accordingly, there should be no corresponding distortions in the implementation or evaluation of the basic data.

According to the authors Cook and Beckman (2006), a measurement is valid if what should be measured is actually measured. A distinction is made between three types of validity: (a) visual validity, which primarily refers to the perception of the test persons, (b) convergent validity and (c) divergent validity. For the latter two, it is assumed that the measurement of a corresponding procedure shows sufficiently high correlations with related or similar characteristics (convergent validity), while it shows correspondingly lower correlations with less strongly related characteristics (divergent validity). The criterion of validity was considered in the present study in various ways. Due to the fact that the items used are very similar to those described in the literature and thus closely related to the constructs of interest, content validity was assumed to be given. Furthermore, it is assumed that a consideration of the correlations

between the examined criteria provides information about the fundamentally prevailing validity: If there is a correlation between aspects of leadership and aspects of commitment, the assumption of fulfilled convergent validity is obvious.

For reliability as the third quality criterion of empirical research, the authors Tavakol and Dennick (2011) and Santos (1999) point out that before a scale is used in empirical research, its structural reliability must be determined. A particularly established method is the determination of the Cronbach's alpha value. This indicates the extent to which the items of a scale correlate with the assumed mean value of the scale. A high correlation coefficient and thus a high Cronbach's alpha value indicates that the individual items and the scale are well matched. A value of 0.7 is considered an acceptable value in this context.

4 Results

4.1 Qualitative results

4.1.1 Category scheme

The category scheme used in this paper is presented in the appendix of this paper. It was developed in accordance with the recommendations of Mayring (2010) for the analysis of qualitative data. The aim was to create a basis that would allow the research question to be dealt with systematically and objectively. In the following, the results found are described on the basis of the categories formed, thus forming the basis for answering the research question from the experts' perspective.

4.1.2 Employees and applicants

4.1.2.1 10-year forecast and comparison

Basically, the interviewees explain that the (electrical) trade is subject to constant change, in the course of which personnel work is also changing (cf. I1, R17; I2, R4.; I7, R21). In this context, reference is made, for example, to the consequences of digitalisation, which, among other things, is also demanded of applicants (cf. I2, R4). This is described as a development that has already been going on for some time:

> I think that flexibility has definitely increased, both ten years ago and in the future. All the technology is growing together here, we have building technology, IT, and automation as specialist areas, which are increasingly merging with each other. So electrical engineering and IT in particular, or automation technology and IT, are growing together more and more. That's why the fitter, the craftsman, must also be able to do more or build up more knowledge (I8, R15).

However, this also has an impact on human resources management itself, as interviewee 7 notes: "So this leap into digitalisation in the skilled crafts sector is also simply to see a job advertisement, let's stay with the very mundane example, I can place it via Facebook, for example, via social media" (I7, R21).

At the same time, the clear internationalisation of the workforce is mentioned as one of the most relevant developments in the context of the past and next ten years. The following statement is exemplary: "I have 60 per cent foreigners in the company" (I1, R25). At the same time, this also results in administrative hurdles, some of which are difficult to overcome or should not be viewed only from a business perspective. For example, the situation of those was described,

[...] who did their electrician training somewhere abroad but are not recognised here. So, you would still have to do the recognition procedure, for example, or offer a course. But we already have such applications at the moment. And I think that this will increase, especially because I don't think the profession is as popular as it used to be (I8, R29).

It is an entrepreneurial task to deal with these changes adequately, which can also be stated with reference to the development on the applicant side in general (cf. I4, R21). However, the fact that this is often experienced as difficult is emphasised, for example, by I1 (row 27):

I have started three attempts, all of which were terminated within a very short time, i.e. the people were willing at the beginning, in my opinion also capable to a certain extent, but then after a quarter of a year at the latest, due to severe illnesses, which were also certified by doctors, they were not in a position to continue the internship or to start a successful vocational training in such a way that we could see a future here. I have to say quite clearly that these are also educational things and people from the aforementioned areas have a different upbringing, but some of them have already been in Germany for several years, slash decades, and have also adopted the mentality to a certain extent.

In this respect, contradictory assessments of the popularity of the industry from the applicant's point of view were given. For example, it was made clear that in many cases the industry is not seen as the first choice, which could have corresponding effects on the commitment of employees:

Young people think more like, I'll apply for a job in industry and if it doesn't work out there, I'll go back to the trades. So that means (they don't get the first choice in the beginning). And if there is someone, I say, who is really good and strong and also technically, theoretically, and practically good, then he will move on immediately after this apprenticeship (I3, R12).

This is also emphasised by I9 (cf. row 31), I11 (cf. row 45) and I5 (row 27):

As far as that is concerned, it has all turned around, especially for the well qualified. And here we are again at the point where the number of well-qualified people, i.e., those who I can now send out and I know they can cope with any constellation, is decreasing, people know that and thus their market value is also increasing.

In this context, the COVID-19 pandemic is also understood as a challenge in the competition for qualified applicants (cf. I11, R45; I1, R23).

4.1.2.2 Changes in requirements - craft workers

Overall, as described in chapter 5.1.2.1, it is not only the demands of employees and applicants on companies that are changing. Against the background of technology-driven changes, the sector is also making new demands on employees in terms of qualifications and skills:

Exactly, broken down completely, he was a mechanic, so to speak, and unscrewed the device, if you take a car as an example or a machine. He opened the flap and could see everything. Today, he has to be an electronics technician in parallel, besides what he sees, he has to recognise other circuits, quasi digital solutions, the network. As a rule, he doesn't have a purely visual inspection at his disposal, he has to think along with it. And I think there is a tremendous complexity behind it because the machines also talk to each other (I12, row 13).

The increasing digitalisation and the new requirements and work processes associated with it are thus again explicitly addressed here, which I7 (row 19) or I4 (row 9) also describe, although they also take a critical stance here:

That's mixed with us. Many come with the thoughts: "I only need to sit at the computer to do all this software- and hardware-wise", where I always say: "Man, it's about a light switch on the wall, the lamp is on the ceiling and the distribution. There's also a line that has to be laid and connected. "So many people have the wrong idea about the electronics profession, regardless of whether it's telecommunications and IT technology or whether it's building services engineering (I4, R9).

In addition to the changed requirements resulting from digitalisation and automation, language problems are also described as challenging:

And the serious difference compared to ten years ago is simply that the proportion of non-German-speaking fitters has increased enormously. So, he also has a lot of language problems. [...] There are too few, there are still Germans, but there are too few young people who, let's say, aspire to the electrical trade. The trade has an image problem somewhere (I3, R8).

4.1.3 Challenges of personnel acquisition

In the context of the challenges in the area of personnel acquisition, three basic topic areas could be identified that are relevant here: General challenges, general modernisation measures and employer branding measures.

With regard to staff acquisition, it is noted that the sector partly has to struggle with an image problem: The sector and the demands on employees are described as challenging, which can make it difficult to acquire staff:

I would say that nobody really wants to get dirty anymore. And the electrician first cuts, makes breakthroughs, that's dirt. And I mean, it's nice now with the temperatures, but if I get a building site in winter, that's not attractive. (I11, R57).

Accordingly, several interviewees (cf. I1, R23; I2, R8; I3, R12; I11, R45.) report that only an insufficient number of applications are received and that the qualifications of some applicants fall short of expectations:

Well, it is definitely the case that we are currently doing less or working less with unskilled workers in the skilled trades, the situation is still too good for that. There is always a bottleneck, but not such a big bottleneck that you have to work with unskilled or unskilled workers, as they say, with helpers. It is more likely to be with European foreign employees (I6, R59; cf. also I1, R 37).

In principle, a positive trend in the number of applications is recognised in some cases - for example, I1 (row 37) explains that an upward trend has become visible in the last few months - but the quality leaves something to be desired in some cases, which I8 also attributes to the applicants' parental homes:

Well, there are always a few parents who I have the feeling are not that interested in their children. Then you get an application where you think, hey, someone could have read about it again and then there are those who really look at what their son is doing and they also go to the training places and ask questions and then say: Ah yes, Heldele, I know him or I said, why don't you try out mechatronics or something (I8, row 47).

These challenges, I4 argues, must be responded to accordingly:

Even if you receive an application: react immediately! So don't just react after two or three days: "Yes, we received your email, we'll get back to you! "But as soon as possible because young people are so short-lived (I4, R83).

At the same time, the answers show that aspects of human resources management are also seen as relevant. This includes the acquisition of employees, but also increasing their loyalty to the company:

Retain the important system-relevant employees. Challenge, promote, in other words, challenge and promote. And if it is possible to select. When you say: "I'm basically no longer satisfied with this employee. He's had several chances to, shall I say, reconsider his case. "So, if you are dissatisfied with someone, then perhaps you should also take the path of saying goodbye to that person (I4, R77).

This statement also makes it clear that the assessment process is not only important in the context of personnel acquisition, but that the company must make ongoing efforts here.

In principle, it is also necessary to react with modernisation measures, as many survey participants confirm (cf. I2, R24; I6, R34; I8, R37; I12, R39). Both internal and external solutions are sought to cover the personnel needs: "So whether it is really an external headhunter, that is a possible way. But I believe that direct acquisition will increase, that there will perhaps also be really messy ways, but companies do what is best for their company" (I12, R39). These channels must be used to permanently align the talent pool and the number of employees with the company's needs, which is identified as one of the central tasks in the skilled crafts sector (cf. I1, R35). A company must therefore succeed in actively approaching new employees in order to recruit them for the company (cf. I6, R45).

At the same time, however, it is also clear that digital measures are not yet being implemented across the board in the companies. This can partly be attributed to a lack of resources: "Well, I am personally on LinkedIn, but otherwise not, no, as far as the company is concerned, because that has to be maintained. We're a bit too small for that. And a non-maintained presence somewhere is-, can be very damaging" (I4, R35). The complexity of the topic and the breadth of digital offerings that could and should be used by companies is also mentioned as a reason:

> You need YouTube, you need Instagram, you need this and that. I don't want to say whether it has to be Twitter or not, but you would need an account on Instagram, you have to apply for it. You have to take care of the data protection issues there and you need someone to make films on the side. It takes time to make the films and that costs money. It has to be someone who takes care of it. There are also freelancers who do this, who only pay them selectively (I2, R28).

Here, too, it becomes apparent that resources are sometimes not available or allocated to a sufficient extent to guarantee a professional appearance (cf. I1, R33).

This is also discussed with regard to the relevant aspect of employer branding. Although the approaches differ in part from those in other areas, the analysis of the interviews makes it clear that the industry experts are aware of the importance of this topic:

> So, the brand is important. Every craftsman, or I say if you go to the smaller villages, the gas-water man has his banners at the sports field. But also, the electrician. And he actually tries to be a brand. But he leaves it at these banners. And I think he has to invest a bit more in the internet presence today, together with the social media. Even if he has trainees, my suggestion would be to simply do this as a project (I2, R16).

Both digital campaigns and various partnerships are used, such as those with educational institutions or in cooperation with the Federal Employment Office (BA), which are experienced as productive (cf. I8, R63). In this way, the companies also try to keep up with larger competitors and position themselves accordingly in their market (cf. I9, R35). Measuring the quality and efficiency of social media campaigns for employer branding is also experienced as challenging:

> That is very difficult to measure. I always ask them who attracted their attention. Usually there are several factors where you can't say exactly: "Okay, that-, through this campaign it was more [...], that's what attracted me to Heldele, that's what drew me to Heldele more than that. " So, we have-, at the employment office we are strongly represented with advertisements, that is, on the Internet, but also in paper form, that is, print media (I4, R23).

Employer branding is also perceived as an approach that focuses primarily on the aspects of human resources development and the extent to which employees are given opportunities for growth and promotion within the company:

Yes, exactly, employer branding. Yes. We have a huge number of people who are currently attending either part-time or full-time master school or technical school. Of course, with the development plan behind it, that they don't come back as fitters or senior fitters, but perhaps as site managers or project managers (I6, R37).

4.1.4 Challenges of human resource development

With regard to personnel development, reference can be made in particular to the changing requirements (cf. I10, R11; I11, R77; I6, R65). In this context, the interviewees again perceive the image of the sector and the usual work activities there as challenging:

This means that the craft still has a very, very bad reputation, not only in the minds of young people, but also in the minds of people who are a little more experienced in life. Dirty, filthy, poor pay. Partly, when you see what an unskilled worker at an automotive supplier, who does nothing but put sheet metal parts into a machine all day long, who has never learned this and then earns two, three, four euros more than an employee who is qualified by me, he has to fall very, very low to feel called to think about the job he is currently doing (I1, R41).

For training, new approaches such as compensation, which would allow easier horizontal switching between different fields, are viewed critically by some interviewees:

Then there was the possibility to acquire the electronic technician in a compensated measure over one year, or in the end it was one and a half years, in other words to complete the qualification. Personally, I'm not at all a fan of these compensated things, which was good for the boys, both of whom graduated and got their journeyman's certificate. So I'm not a friend of it (I4, row 49).

Elsewhere, however, corresponding measures are already being implemented - partly in harmony with external education partners:

We work together with the BFE (Bundestechnologiezentrum für Elektro- und Informationstechnik e. V. in Oldenburg). Among other things, this is the vocational support for the electrical trade. And they also do retrain. The applicants have other professions and for whatever reason. One of them was a bricklayer, a foreman on a building site, but somehow, he couldn't do it anymore because of his back. And then he retrained as an electrician. And now we've hired him. He starts on the first of September. And then we have another measure going on with the employment agency and with the BFE. (I11, R73).

In addition to the technical challenges, soft skills are also mentioned here. These are recognised in principle, but in the assessment of the experts interviewed, their relevance lags behind the technical skills:

Yes, maybe more training in the soft skills area, so we already do a lot of training on a technical level, so if someone somehow needs a new technique or someone has to be taken on after training and of course first has to be instructed in the fire alarm system, so there are thousands of training sessions (I8, R77).

The employee perspective on development measures is also addressed. Once again, the linearity of CVs and the possibility of retraining, which I11 (row 77) and I4 (row 49) have already discussed from different perspectives, are addressed:

> But to be able to answer the question positively from another point of view, that was also what I have with the straightforward CVs, I have an employee in the company, now fifty-one years old, who did his A-levels, studied for seven years, unfortunately did not complete his studies successfully, then worked his way through as a helper in a large, well-known German electrical company, then came to several companies via spin-offs. Until he was forty years old. In the end he only worked as a helper, then received a qualification measure from the employment agency with about two thousand five hundred hours. He applied for a job with me, but I assumed that he only wanted me to reject him so that he could continue to receive some kind of subsidy. Anyway, he came to me and told me quite clearly that he wants to work, he wants to work in this profession (I1, R43).

I3 (row 28) also addresses this aspect in a similar way. It is explained, for example, that people from industry repeatedly move to a craft enterprise where they can benefit from horizontal personnel development measures. The corresponding willingness to participate in such measures and to use them beneficially seems to be at least partly given, as I5 (row 41) or I10 (row 56) explain. Accordingly, the concept of personnel development is not only relevant for existing employees, but is also addressed in the context of personnel selection (cf. also chapter 5.1.3), especially against the background of the fact that more and more applicants come to companies as lateral entrants:

> I have to tell you that 80 per cent, more than 80 per cent, I would almost say nine to one of the applications are nine lateral entrants and one who knows a bit about it. So that's enormous and you're right, we should actually look at them very closely and think about whether we can afford to train them as qualified electricians so that they can do this work alone without supervision (I10, R56).

Such lateral entrants also seem to be consistently welcome in the sector, so that appropriate measures to further develop these people professionally are implemented (cf. I4, R51).

4.1.5 Digital measures in acquisition and development

Finally, the advantages of digital measures in the area of human resources were addressed, in addition to the contents presented above. Although these measures and the structural difficulties associated with them have already been mentioned in chapter 5.1.3, they will be discussed in more detail here. The breadth of the different approaches should also be shown. I2, for example, reports on this and describes the first approaches to digitalisation in the operational area:

Yes, well, that starts with the timesheet. That is, do I still write the timesheet by hand, then hand it over to the master's wife and she then transfers the hours or sends them to the tax advisor. Or do I just send the timesheet to another place where (money is paid with it), or do I start at the source of the creation of this data and digitise it by having a barcode somewhere or whatever. That the mechanic enters on site, but then the data goes through. I think that's the first step towards digitalisation in human resources (I2, R46).

Direct reference to the digitalisation of HR measures is made, for example, in connection with job applications and personnel acquisition:

Point number one is what has already been done at the moment, which is online applications. In my time, 1994, 1995, you still printed out every application, bought a nice folder, put it in an envelope, sent it off and when a big letter came back, then you knew the application was over. Nowadays, as I said, four-fifths of applications are submitted online as PDFs, or on our homepage there is an option for people to test themselves first, could the company, could the profession we offer suit me? Where people can then immediately either apply online or send emails with their attachments (I1, row 49).

Such approaches of digitised application processes and successively digitised applicant management thus seem to be gaining in importance (cf. I7, R117). At the same time, however, concerns are also expressed here. For example, with regard to data protection, for which responsibilities must be clarified both externally and internally (cf. I11, R91).

Digitisation measures in HR are not successful in all cases:

Unfortunately, I was not able to experience it again and can only assume from hearsay that the project failed in the company where I experienced it. Because the solution that came out of it was simply not the one that was hoped for. Namely, saving time, saving resources, transparency in staff development processes, in curricula vitae, in staff planning, so to speak, which competences we have in the company. That did not work in the course of this (I12, R59).

4.2 Quantitative results

Following on from the presentation of the results of the expert interviews in the previous chapter, the quantitative survey is referred to here. The objective of the survey was explained in chapter 4.3, where the measurement methods used were also described. By adding this second perspective, a comprehensive picture of the overall situation is to be created.

4.2.1 Reliability check

As described in chapter 4.4.5, the first step was to check the reliability of the scales. Although these are all established and thus already evaluated procedures, the present procedure follows the basic procedure recommended by authors such as Tavakol and Dennick (2011) for checking the psychometric quality of scales. In this context, it is also considered that the quality

of scales does not depend exclusively on their own characteristics, but also on the characteristics of the sample that is used to apply the scales.

Following this consideration, the reliability is presented using the Cronbach's alpha criterion for the scales to be formed. The sometimes strongly varying number of items per scale must be taken into account, which must be reflected accordingly in the interpretation of the values. 1The table shows the reliability of the three commitment scales that are to be formed as criteria.

Table 1:   Reliability Commitment

Commitment	Cronbach's alpha	Number of items
Emotional commitment	.753	7
Rational commitment	.810	8
Normative commitment	.849	8

Initially, all three scales consisted of eight items. For the *Emotional Commitment* scale, however, it was necessary to remove one item in order to significantly increase the reliability of the scale. Table 1 therefore already shows the reliability of the corrected scale. The item "I like to discuss with people outside my organisation" was removed, as this process was able to increase the reliability of the scale accordingly. In summary, after this adjustment, the reliability of the three aspects of organisational commitment is satisfactory.

The same procedure was followed for the three scales *Digital Literacy, Digital Learning,* and *Digital HRM Perception. It* is worth noting here that the scale in third place only has two items, which can lead to an underestimation of the actual reliability (cf. Tavakol & Dennick, 2011).

Table 2:   Reliability Digital Literacy, Learning & HRM

Digital	Cronbach's alpha	Number of items
Digital Literacy	.887	22
Digital Learning	.917	17
Digital HRM	.910	2

Table 2 shows the reliability indicators of the three scales mentioned. Contrary to the assumption that the low number of items in the perception of digital HRM could lead to an underestimation of the reliability, a consistently satisfactory value was shown here with an

ALPHA =. 910. Nevertheless, the low number of items must be taken into account when interpreting the results in this context. Consistently satisfactory results were also found for the much more comprehensive scales on *digital literacy* and attitudes towards *digital learning*.

Subsequently, the reliability check was carried out for the scales of the *e-activities* category (cf. Adli, Gharib, Hakami & Pourmahdi, 2014). The results are shown in Table 3.

Table 3: Reliability E-HRM

E-HRM activities	Cronbach's alpha	Number of items
E-Recruitment	.859	3
E-Compensation	.814	4
E-Training	.220	3
E-Communication	.746	3
E-Performance Appraisal	.273	2

Here the picture is only partially satisfactory: for the scales *E-Training* and *E-Performance Appraisal,* even the attempt to remove or recode individual items (from the scales already comprising only two and three items respectively) could not lead to an improvement in the insufficient reliability. Therefore, these two scales will not be created in the further elaboration; they will therefore not be included in the subsequent evaluations and presentations. For the remaining three scales in this topic area, however, the results were largely satisfactory, so that the scales could be created here without any restrictions.

Finally, the reliability of the remaining three scales was tested. These scales belong to the topic complex of *e-outcomes* and *e-performance and* therefore do not represent digital HRM activities, but rather the assessment of their consequences.

Table 4: Reliability E-Outcomes

E-HRM Outcomes	Cronbach's alpha	Number of items
E-Employee Satisfaction	.740	6
E-Productivity	.937	5
E-Cost Efficiency	.950	3

The results were largely satisfactory and lie within the optimal range of reliability, especially for perceived productivity and cost efficiency. The scales for this topic area can therefore also be formed without further restrictions or adaptations.

The scaling was done by an automated averaging of the individual items. This can react to missing values through an adjustment and thus avoid potential distortions.

4.2.2 Descriptive description of the sample

In chapter 5.2.1 it was shown to what extent the reliability and thus the psychometric quality of the available data allows a scale to be created. This review forms the basis for the descriptive description of the available data. In a first step, reference is made here to classic sample characteristics, which include, for example, the group of socio-demographic data. This is followed by a presentation of the psychometric parameters for the scales discussed in chapter 5.1.1.

The gender distribution within the sample is shown in Figure 16.
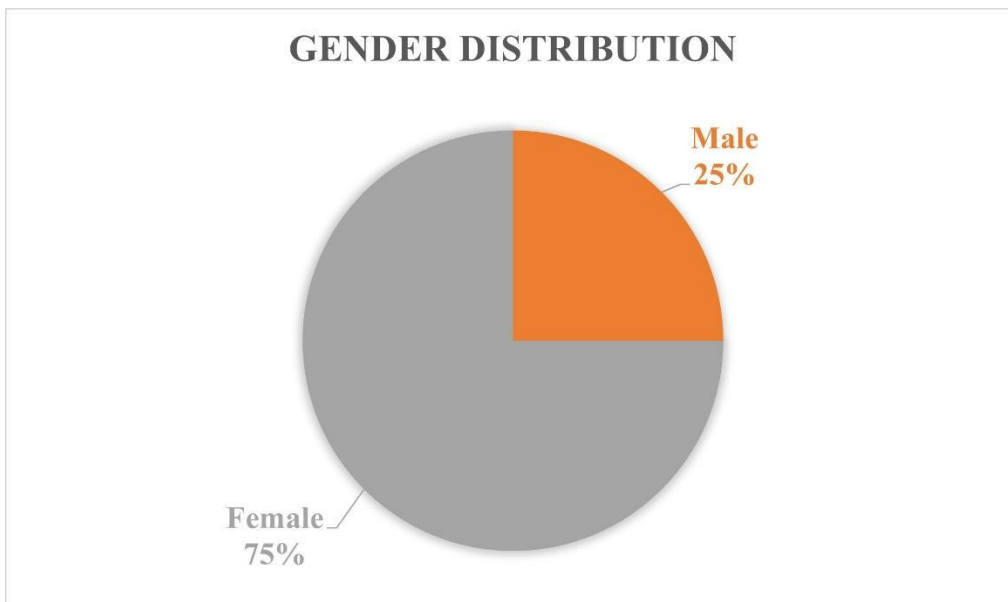
Figure 16: Gender distribution, own illustration

The plot shows that 75 % (and thus 120 persons) of the sample were male. Table 5 shows the distribution of educational qualifications within the sample.

Table 5: Educational qualifications

	Number	Percent
Other	33	20,4
Secondary school diploma	1	,6
Vocational school	42	25,9
Abitur (high School Gradation)	16	9,9
Study	70	43,2
Total	162	100,0

With 43.2 % of the respondents, the largest group of persons states that they have completed a university degree. The second largest group is made up of people with a vocational school diploma (25.9 %), while a further 20.4 % state that they have achieved an educational qualification not listed here. With regard to the industry classification of the respondents, Figure 17 shows a clear picture.
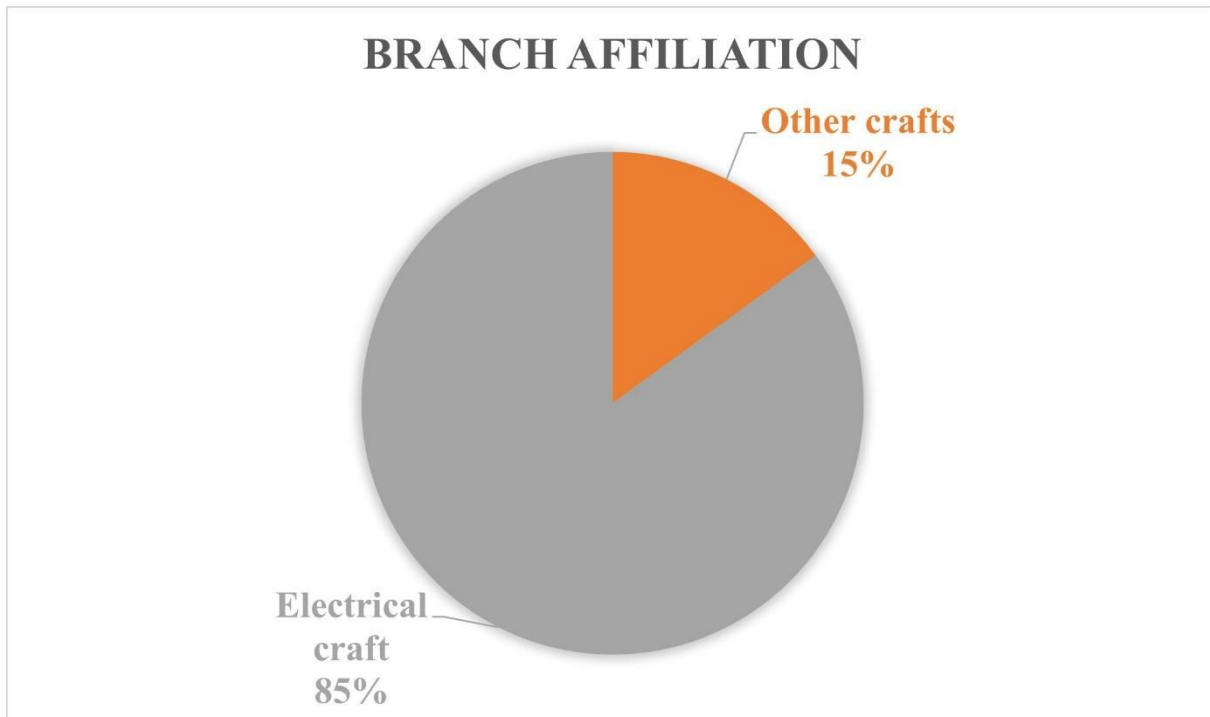
Figure 17:   Branch affiliation, own illustration

More than 85 % of the respondents therefore come from the electrical trade sector. The sample thus meets the criterion formulated in chapter 5.4.3.

The size of the companies in which the survey participants work is shown in Table 6.

Table 6:   Company sizes

	Number	Percent
1-10	5	3,1
11-25	1	,6
26-50	5	3,1
51-100	61	37,7
101-500	59	36,4
>500	31	19,1

According to the survey, most of the respondents work in companies with more than 50 employees. Only a minority of less than 10% of the participants stated that they work in a smaller organisation.

The industry and position experience of the study participants as well as their age is listed in Table 7.

Table 7: Age and experience

	Minimum	Maximum	MW	Std.dev.
Age	19,00	62,00	39,8148	11,83018
Position experience	0,00	32,00	8,9012	7,03426
Experience in industry	0,00	42,00	13,9475	9,31232

The average age of the respondents is thus $MW = 39.81$ years, with an average of $MW = 8.90$ years of experience in their current position and a total of $MW = 13.95$ years of experience in their industry.

Following on from these socio-demographic variables, the next step was to focus on the scales presented and formed in chapter 5.2.1. Table 8 shows the descriptive values for the three commitment scales.

Table 8: Descriptive description Commitment

	Min	Max	MW	Std.dev.	Skew		Kurtosis	
					Stat	SE	Stat	SE
Emotional commitment	1,57	5,00	3,7311	,63757	-,244	,191	-,109	,379
Rational commitment	1,00	5,00	2,4251	,86771	,507	,191	-,207	,379
Normative commitment	1,00	4,63	3,8299	,73410	-1,510	,191	2,110	,379

With regard to skewness and kurtosis, the following statement can be made on the basis of the available results: Significant skewness is found in the scales *Rational Commitment* and *Normative Commitment*. With regard to the kurtosis, a significant value is only found for the *Normative Commitment scale*. To illustrate this finding, the distribution form for normative commitment is shown in Figure 18.
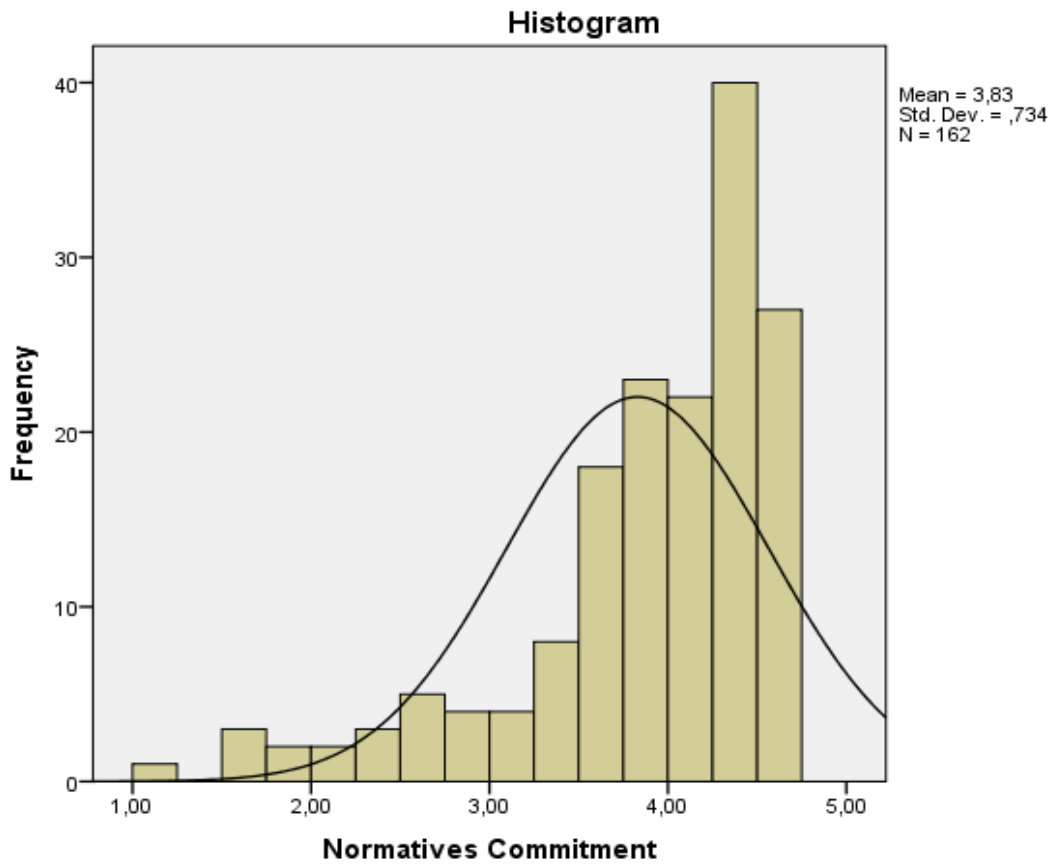
Figure 18: Representation of the distribution form

This representation makes it clear that this is a right-split distribution with significant kurtosis.

Table 9 shows the descriptive characteristic values for the three aspects of the *digital scales.*

Table 9: Descriptive description Digital Literacy, Learning, HRM

	Min	Max	MW	Std.dev.	Skew		Kurtosis	
					Stat	SE	Stat	SE
Digital Literacy	1,86	4,73	3,6750	,61894	-,556	,191	-,333	,379
Digital Learning	2,12	4,88	3,9702	,55315	-1,003	,191	,972	,379
Digital HRM	1,00	5,00	2,5370	1,27513	,415	,191	-1,092	,379

In terms of skewness, there is a significant result for all the scales shown, but for kurtosis or excess only for *digital learning* and *digital HRM*.

Subsequently, these characteristic values are also presented for the scales of the perception of e-HRM. For this purpose, Table 10 summarises the e-activities and e-outcomes as described in this paper in a tabular presentation.

Table 10: Descriptive description E-HRM activities

	Min	Max	MW	Std.dev.	Skew		Kurtosis	
					Stat	SE	Stat	SE
E-Recruitment	1,00	5,00	4,2181	,74519	-1,365	,191	2,419	,379
E-Compensation	1,25	5,00	4,1620	1,00053	-1,104	,191	-,098	,379
E-Communication	1,00	5,00	3,4660	,99258	-,409	,191	-,922	,379
E-Employee Satisfaction	1,00	5,00	3,7199	,61660	-1,200	,191	4,235	,379
E-Productivity	1,00	5,00	4,1230	,64907	-1,683	,191	6,213	,379
E-Cost Efficiency	1,00	5,00	4,0000	,66563	-1,521	,191	5,227	,379

In this representation, the conspicuous forms of distribution again become clear: All scales are those with significant skewness. The kurtosis is also significantly conspicuous for all scales with the exception of *e-compensation*. Figure 19 again shows this form of distribution using the example of *e-productivity*, which is characterised here by the most pronounced skewness and kurtosis.

Figure 19: Distribution form E-productivity

This interplay of strongly pronounced skewness (which in the specific case, as with the other variables of this cluster, indicates a right-skewed distribution) and strong excess implies that the respondents generally give very positive evaluations in this area. At the same time, from the perspective of possible bias, it should be noted that results characterised by a high degree of skewness and excess can be subject to a ceiling effect on the one hand (cf. Groeneve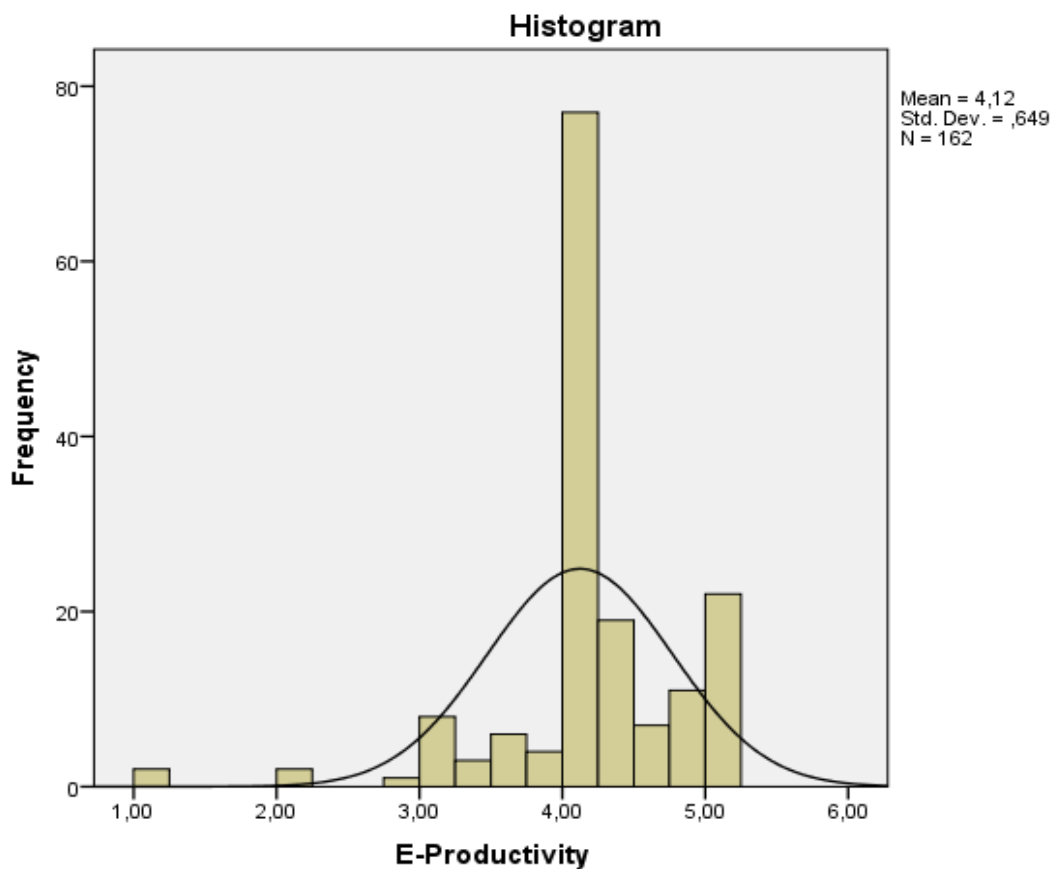ld & Meeden, 1984) and the possibility of a variance restriction on the other. Such a restriction, as Sackett and Yang (2000) explain for example, can lead, among other things, to the fact that actually existing correlations may be underestimated within the framework of the statistical evaluation. Classic examples of such variance restrictions can be found, for example, in the context of examining the results of IQ tests in selection settings. Here, a corresponding restriction takes place through selection, which leads to the fact that correlations can be underestimated in corresponding studies (cf. Burns & Boice, 2009).

4.2.3 Inferential statistical processing

The inferential statistical analysis of the data collected and presented in chapter 5.2.2 follows the approach of establishing an understanding of the relationships within the individual data complexes in a first step in order to address the issue of validity. It is assumed that meaningful correlations within the variable complexes are to be tested in terms of divergent validity in order to establish the quality of the data beyond the test of reliability (see chapter 5.2.1).

4.2.3.1 Convergent and divergent validity

In a first step, this was done with regard to the variables of the commitment area. A bivariate correlation analysis was used to determine the extent to which the variables of the emotional, normative and rational commitment aspects are related to each other. Table 11 summarises the results of the test.

Table 11: Intercorrelations Commitment

	Emotional Commitment	Rational Commitment	Normative Commitment
Emotional commitment	1	,211**	,467**
Rational commitment		1	-,005
Normative commitment			1
**. Correlation is significant at the 0.01 level (2-tailed).			

As can be seen from the data, the results are partly in line with expectations: Emotional commitment correlates positively with rational commitment and normative commitment. This

therefore confirms the assumption that these are fundamentally related sub-aspects. This could not be confirmed for the relationship between rational commitment and normative commitment, where no significant correlation was found.

Table 12: Intercorrelations Digital Literacy, Learning & HRM

	Digital Literacy	Digital Learning	Digital HRM
Digital Literacy	1	,699**	-,104
Digital Learning		1	-,127
Digital HRM			1
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 12 shows the comparable examination of the *digital cluster*. It becomes clear here that although the attitude towards digital learning and digital competence correlate significantly with each other, at the same time the scale *perception of digital HRM* shows no correlation with the other two variables. For this reason, this scale was also successively included in the following cluster, which deals with the internal relationship of the developed scales of *e-activities* in the field of HRM. Again, a set of bivariate correlation analyses was carried out, which is summarised in Table 13.

Table 13: Intercorrelations Digital HRM

	Digital HRM	E-Recruitment	E-Compensation	E-Communication
Digital HRM	1	-,186*	-,050	,346**
E-Recruitment		1	,538**	,231**
E-Compensation			1	,320**
E-Communication				1
**. Correlation is significant at the 0.01 level (2-tailed).				

Here, too, the results were almost entirely in line with expectations. The scales introduced in chapter 5.4.2 (*e-recruitment*, *e-compensation* and *e-communication*) correlate significantly positively with each other. This is an indication of their convergent validity on the one hand and on the other hand that the development of individual digital HRM measures (hereafter also referred to as E-HRM in reference to the questionnaire used) should in principle represent an at least approximately homogeneous procedure. At the same time, it is noticeable that the specially developed short scale *Perception of Digital HRM* was not related to these scales or was even negative (Digital HRM * E-Recruitment, $r = -.186$, $p < .01$).

In the following, the internal relationship of the so-called *e-outcomes* is discussed. The results of the corresponding review are presented in Table 14.

Table 14: Intercorrelations E-Outcomes

	E-Employee Satisfaction	E-Productivity	E-Cost Efficiency
E-Employee Satisfaction	1	,743**	,679**
E-Productivity		1	,835**
E-Cost Efficiency			1
**. Correlation is significant at the 0.01 level (2-tailed).			

In this analysis, the consistently significant and strongly positive relationship of the variables to each other becomes clear: There are - as shown in Table 14 - consistently positive relationships between the three variables, which can be assigned to the e-outcomes described in Chapter 5.4.2.

4.2.3.2 Connections between the clusters

Following the cluster-internal presentation of the results in chapter 5.2.1.1, the correlations between the variables of different clusters are discussed below. This is intended to show how the individual topic areas correlate with each other, which is directly aimed at answering the research question posed here (see chapter 1.3). It will thus be shown to what extent aspects of the use of digital HR measures are related to different aspects of employee commitment. Socio-demographic variables are also critically examined in the context of these aspects.

For this purpose, the first step is to check whether male and female persons differ from each other with regard to their commitment, their attitude towards digital competence and the relevance of digital learning. This should help to classify further effects and show any bias or bias effects that could have an influence here. However, it must be considered in this comparison using a series of t-tests that the sample does not have a balanced gender ratio, which can complicate the interpretation of the results. This problem can be accepted here, however, because the gender comparison is not the focus of the research interest. Rather, it is only carried out as a supplementary analysis of possible confounding effects. Table 15 shows in a descriptive way the differences between the two genders with regard to the data relevant here.

Table 15: Gender differences, descriptive

Gender		N	MW	Std.dev.
Emotional commitment	male	120	3,8061	,64330
	female	41	3,5087	,58055
Rational commitment	male	120	2,4096	,89997
	female	41	2,4686	,78620
Normative commitment	male	120	3,9550	,69843
	female	41	3,4930	,71992
Digital Literacy	male	120	3,5503	,58439
	female	41	4,0532	,57039
Digital Learning	male	120	3,9394	,52953
	female	41	4,0752	,61131

Table 16 then shows the result of the series of *t-tests.* As can be seen from the results, the Levene test for variance equality carried out for the prerequisite test was consistently inconspicuous; there is a non-significant result for all variables here. Therefore, no corresponding correction of the results of the actual *t-tests* had to be made.

Table 16: Gender differences

	Levene Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Emotional commitment	1,596	,208	2,617	159	,010	,29736	,11362
Rational commitment	,677	,412	-,374	159	,709	-,05908	,15788
Normative commitment	,003	,955	3,628	159	,000	,46198	,12733
Digital Literacy	,241	,624	-4,786	159	,000	-,50297	,10508
Digital Learning	1,202	,274	-1,361	159	,175	-,13573	,09972

The presentation of the significance test shows that there are partly significant differences between the group of female and male respondents. These were shown with regard to emotional and normative commitment as well as digital competence and digital literacy. With regard to rational commitment and attitudes towards digital learning, however, there were no significant differences between the respondent groups in the gender comparison.

This result is also illustrated in the graph in Figure 20.
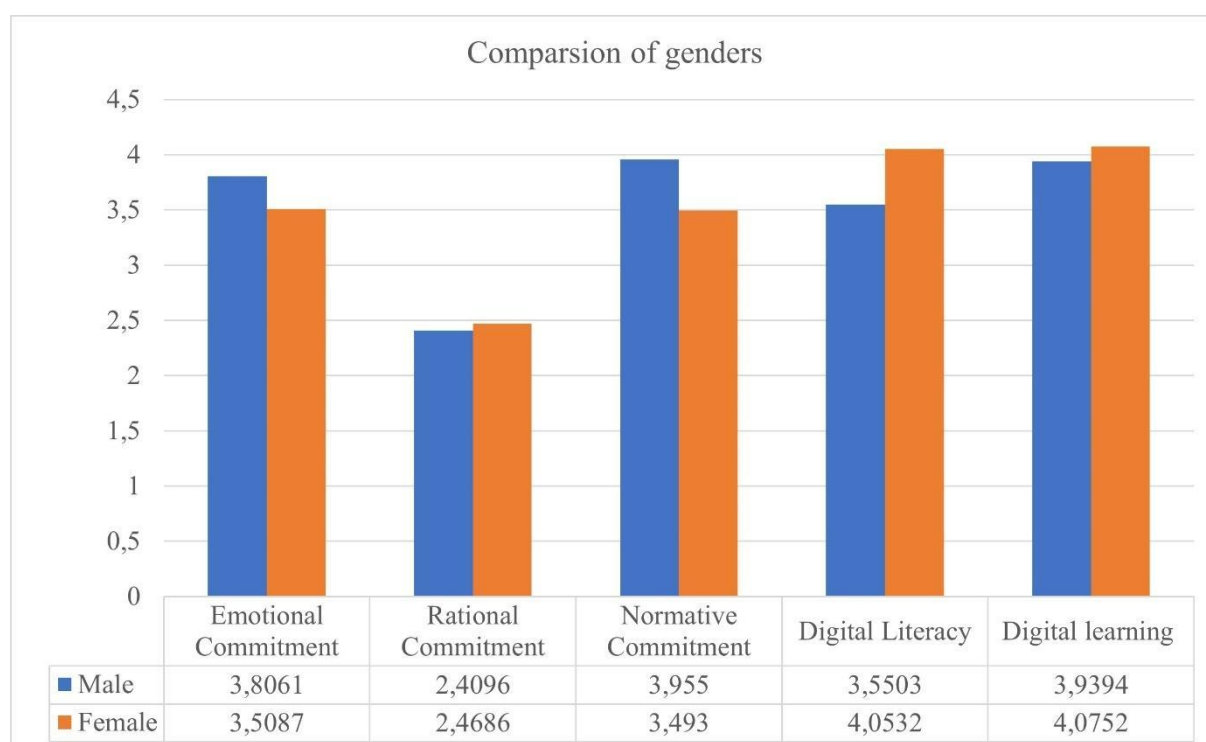
Figure 20: Gender comparison, own illustration.

The focus was then placed on the correlations mentioned above. The first step was to examine the extent to which the three aspects of organisational commitment are related to digital competence, attitudes towards digital learning and perceptions of digital HR practices (cf. Table 17).

Table 17: Relationship Commitment * Digital Aspects

	Digital Literacy	Digital Learning	Digital HRM
Emotional commitment	-,283[**]	-,230[**]	-,029
Rational commitment	-,340[**]	-,257[**]	-,035
Normative commitment	,147	,168[*]	-,346[**]
**. Correlation is significant at the 0.01 level (2-tailed).			

Here it was shown that both emotional and rational commitment are negatively related to digital literacy and digital learning. A high level of digital literacy or digital learning is thus associated with a low emotional and rational commitment. This was not shown in this form for normative commitment: Here, a positive correlation could even be found with the attitude towards digital learning. At the same time, a significant negative correlation was found between normative commitment and the perception of digital HR functions. To further deepen this result,

the relationship between the aspects of commitment and the individual activities of digital HRM was considered in a next step. In this context, the relationship to the outcomes of e-HRM is also examined accordingly (cf. Table 18).

Table 18: Relationship between e-HRM and commitment

	Emotional Commitment	Rational Commitment	Normative Commitment
E-Recruitment	-,085	-,154	,461[**]
E-Compensation	-,063	-,281[**]	,242[**]
E-Communication	-,102	-,064	-,038
E-Employee Satisfaction	-,001	-,160[*]	,441[**]
E-Productivity	,013	-,151	,421[**]
E-Cost Efficiency	-,008	-,080	,377[**]
**. Correlation is significant at the 0.01 level (2-tailed).			
*. Correlation is significant at the 0.05 level (2-tailed).			

Only some relevant correlations are found here. For the variable *Emotional Commitment, it* can be stated that this is neither connected with the e-activities nor with the e-outcomes. With regard to rational commitment, the picture is less clear: it is negatively related to e-compensation and e-employee satisfaction but does not show any significant correlations with regard to the other variables.

Normative commitment, in turn, is characterised by a consistently positive correlation with the individual aspects of e-compensation and e-outcomes: With the exception of the variable *e-communication, normative* commitment basically correlates significantly positively with all the presented aspects of the two clusters e-activities and e-outcomes. The relationship between the aspects of one's own attitude towards digital aspects (digital competence and digital learning) and the perception of the aspects of e-HRM was then also examined (cf. Table 19).

Table 19: Relationship Digital Aspects and E-HRM

	Digital Literacy	Digital Learning	Digital HRM
E-Recruitment	,535[**]	,501[**]	-,186[*]
E-Compensation	,533[**]	,446[**]	-,050
E-Communication	,417[**]	,324[**]	,346[**]
E-Employee Satisfaction	,435[**]	,396[**]	-,170[*]
E-Productivity	,413[**]	,440[**]	-,137
E-Cost Efficiency	,400[**]	,397[**]	-,154

Here, too, relevant results were consistently found: Individuals with higher digital literacy and more positive attitudes towards digital learning also tend to evaluate both the activities of e-HRM and the corresponding outcomes more positively than individuals with lower scores would do.

4.2.3.3 Multivariate approach

Finally, these bivariate approaches, which could already contribute to gaining knowledge, were supplemented by a series of multivariate analyses. In this context, an attempt was made to find out to what extent the individual aspects (digital literacy, digital learning, e-activities, e-outcomes) can contribute in principle to the explanation of variance with regard to the commitment of the respondents. Although the bivariate results could in principle provide information on the extent to which correlations exist in principle, these approaches ignore the intercorrelations between the individual variables. However, it was shown in the previous chapters that these appear to be significant, which makes a corresponding analysis necessary. Therefore, a total of three regression analyses were carried out, each of which followed a step-by-step procedure with regard to the inclusion of predictors. This approach of multiple linear regression analyses is suitable not only for checking the basic forecasting performance of a set of predictors. It can also be used to determine which variables can actually contribute significantly to a gain in knowledge. The following are the results of the regression analyses for the variables *Emotional Commitment, Rational Commitment* and *Normative Commitment.*

Table 20 lists the results of the regression analysis for the variable *emotional commitment*.

Table 20: Regression model Emotional Commitment

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,283[a]	,080	,075	,61334	,080	13,971	1	160	,000

a. Predictors: (Constant), Digital Literacy

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5,256	1	5,256	13,971	,000[b]
	Residual	60,190	160	,376		
	Total	65,446	161			

a. Dependent variable: Emotional commitment

b. Predictors: (Constant), Digital Literacy

Coefficients[a]

Model		Unstandardised coefficients		Standardised coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	4,804	,291		16,507	,000		
	Digital Literacy	-,292	,078	-,283	-3,738	,000	1,000	1,000

a. Dependent variable: Emotional commitment

This illustration makes it clear that only the variable *digital literacy* is capable of explaining variance with regard to emotional commitment. Despite the bivariate correlations found, the other variables do not prove to be significant predictors of emotional commitment or are at least not able to explain variance across *digital literacy*. However, the general predictive power can be considered weak, as implied by the *R^2 value.*

Table 21 lists the results of the regression analysis for the variable *Rational Commitment.*

Table 21: Regression model Rational Commitment

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,340a	,116	,110	,81853	,116	20,928	1	160	,000

a. Predictors: (Constant), Digital Literacy

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14,021	1	14,021	20,928	,000b
	Residual	107,198	160	,670		
	Total	121,219	161			

a. Dependent Variable: Rational Commitment

b. Predictors: (Constant), Digital Literacy

Coefficients^a

Model		Unstandardised coefficients		Standardised coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	4,177	,388		10,755	,000		
	Digital Literacy	-,477	,104	-,340	-4,575	,000	1,000	1,000

a. Dependent Variable: Rational Commitment

This variable again shows that only *digital literacy is* a significant predictor. A significantly different picture emerges when looking at normative commitment.

Table 22 lists the results of the regression analysis for the variable *Normative Commitment*.

Table 22: Regression model Normative Commitment

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,461[a]	,212	,207	,65356	,212	43,127	1	160	,000
2	,531[b]	,282	,273	,62574	,070	15,541	1	159	,000
3	,557[c]	,310	,297	,61558	,027	6,294	1	158	,013
4	,574[d]	,330	,313	,60853	,020	4,683	1	157	,032

a. Predictors: (Constant), E-Recruitment

b. Predictors: (Constant), E-Recruitment, Digital HRM

c. Predictors: (Constant), E-Recruitment, Digital HRM, E-Employee Satisfaction

d. Predictors: (Constant), E-Recruitment, Digital HRM, E-Employee Satisfaction, Digital Literacy

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18,421	1	18,421	43,127	,000[b]
	Residual	68,342	160	,427		
	Total	86,763	161			
2	Regression	24,506	2	12,253	31,294	,000[c]
	Residual	62,257	159	,392		
	Total	86,763	161			
3	Regression	26,891	3	8,964	23,655	,000[d]
	Residual	59,872	158	,379		
	Total	86,763	161			
4	Regression	28,625	4	7,156	19,326	,000[e]
	Residual	58,138	157	,370		
	Total	86,763	161			

a. Dependent Variable: Normative commitment

b. Predictors: (Constant), E-Recruitment

c. Predictors: (Constant), E-Recruitment, Digital HRM

d. Predictors: (Constant), E-Recruitment, Digital HRM, E-Employee Satisfaction

e. Predictors: (Constant), E-Recruitment, Digital HRM, E-Employee Satisfaction, Digital Literacy

Coefficients[a]								
Model		Unstandardised coefficients		Standardised coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1,915	,296		6,469	,000		
	E-Recruitment	,454	,069	,461	6,567	,000	1,000	1,000
2	(Constant)	2,517	,322		7,818	,000		
	E-Recruitment	,404	,067	,411	6,005	,000	,965	1,036
	Digital HRM	-,155	,039	-,270	-3,942	,000	,965	1,036
3	(Constant)	2,120	,354		5,987	,000		
	E-Recruitment	,263	,087	,267	3,022	,003	,560	1,787
	Digital HRM	-,149	,039	-,259	-3,840	,000	,961	1,040
	E-Employee Satisfaction	,263	,105	,221	2,509	,013	,563	1,776
4	(Constant)	2,438	,380		6,422	,000		
	E-Recruitment	,336	,092	,341	3,636	,000	,485	2,061
	Digital HRM	-,149	,038	-,258	-3,879	,000	,961	1,040
	E-Employee Satisfaction	,292	,105	,246	2,797	,006	,554	1,806
	Digital Literacy	-,200	,092	-,169	-2,164	,032	,702	1,425
a. Dependent Variable: Normative commitment								

Here, on the one hand, a significantly better predictive performance is shown, as implied by $R^2 =$. 330. At the same time, a significantly higher number of predictors were included in the actual model. *E-recruitment*, *digital HRM*, *e-employee satisfaction* and *digital literacy,* which also contributed to the variance explanation in the other regression models, proved to be significant here.

In order to check to what extent, the predictive performance of the regression models could be influenced by a different approach - and thus also to check the general predictive power of the full set of predictors - the regression analyses were repeated in a final step, whereby the *Enter method of* variable inclusion was used in this run. This uses all potential predictors to increase the predictive power of a model.

Only a summary version of the results is presented in this context. Table 23 lists these for the variable emotional commitment.

Table 23: Regression Model Enter Emotional Commitment

Model Summary								
Mo-del	R	R Square	Adjusted R Square	Std. Error of the Es-timate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	,342ᵃ	,117	,065	,61663	,117	2,236	9	152	,023
a. Predictors: (Constant), E-Cost Efficiency, Digital HRM, Digital Literacy, E-Communication, E-Compensation, E-Employee Satisfaction, Digital Learning, E-Recruitment, E-Productivity								

This shows that even the inclusion of all possible predictors does not lead to a significant increase in predictive performance. However, as the increased distance between R^2 and the adjusted R^2 implies, the problem of overfitting increasingly arises. This implies that the initially set up prediction model with only one predictor delivers the more valid result.

The result for rational commitment is similar. By including all potential predictors in the model, the prediction performance could be increased to $R^2 = 174$.

Table 24: Regression Model Enter Rational Commitment

Model Summary								
Mo-del	R	R Squ-are	Adjusted R Square	Std. Error of the Es-timate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	,417ᵃ	,174	,125	,81156	,174	3,561	9	152	,000
a. Predictors: (Constant), E-Cost Efficiency, Digital HRM, Digital Literacy, E-Communication, E-Compensation, E-Employee Satisfaction, Digital Learning, E-Recruitment, E-Productivity								

For the variable normative commitment, which already stood out in the first version due to its higher predictive power and the use of several predictors, only a non-significant change in prognostic validity was found.

Table 25: Regression Model Enter Normative Commitment

Model Summary									
Mo-del	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,582ª	,339	,300	,61434	,339	8,654	9	152	,000
a. Predictors: (Constant), E-Cost Efficiency, Digital HRM, Digital Literacy, E-Communication, E-Compensation, E-Employee Satisfaction, Digital Learning, E-Recruitment, E-Productivity									

In summary, it could be shown that although the variables used here can in principle contribute to the prediction of employee commitment, they are only comparatively weak predictors, as a comparison with the explanations of Cohen (1992) with regard to the classification of effect sizes shows. In particular for emotional and rational commitment, the variables used could only explain a little more than 10% of the variance. It was also noticeable here that the company's own digital competence, but not the digital leadership or digital HRM measures used by the company, had a significant influence. Only for normative commitment was there a significant effect - contrary to the original expectation.

5 Discussion

5.1 Critical discussion of the results and triangulation

The present study was able to show the extent to which new challenges and opportunities arise for the electrical trade as a result of digitalisation. This was examined from three different perspectives: In a first step, based on the current professional and research literature, the environment in which these developments are taking place and how digitalisation (and globalisation in connection with it) are shaping business life was presented (see Bouwman, Nikou & de Reuver, 2019; Mithas, Tafti & Mitchell, 2013). It has also been shown how the role of employees in entrepreneurial success is becoming increasingly important, which means that corresponding measures to increase motivation and retention are or should increasingly become the subject of entrepreneurial and leadership activity (Reinhard & Abel, 2013; Verbeke, Dietz & Verwaal, 2011). In this context, digital measures of human resource leadership and management are described as a reaction to social and economic developments (Marler & Parry, 2016; Thums & Müller, 2019). They are considered valuable tools not only to increase the efficiency of HRM, but also to be able to respond to the demands of employees in the company (see chapters 2.3 and 2.5). In particular, it can also be shown here to what extent digitalised HRM can succeed in promoting companies in the context of the digital transformation. In summary, this theory-based approach showed what a relevant role HRM can play in creating a basis for companies and their transformation. Already in the introduction, it was explained to what extent different challenges of the contemporary business environment create the need for a strategic HRM. Following on from this, the tools and finally the objectives of such HRM and the associated necessity of digitalisation were described.

This description provided the basis for the empirical research work, which aimed to find out the implementation status of corresponding measures and the associated development picture in the environment of the German electrical trade. Both qualitative and quantitative approaches were used. In a first step, it was shown on the basis of expert interviews to what extent digitisation in the skilled trades is already seen as part of management practice and what general challenges arise for personnel selection and personnel development. Here it became clear that the industry is subject to constant change, which is not only increasingly driven by the disruptive power of the COVID 19 pandemic. At the same time, however, it is also emphasised that digitalisation itself is significantly changing the requirements profile for applicants, because the activities in the industry itself are evolving. It is becoming increasingly clear - as the theoretical analysis also showed - those employees must bring new competences with them and manage to

actively add value in a digitalised environment. At the same time, however, it also became clear in the context of the analysis carried out here that the necessary framework conditions and prerequisites for this seem to be in place only in rudimentary form: The digitalisation of human resources management is only partially perceived as central here; rather, the focus seems to be on other aspects. It is also clear that the necessary resources for actively driving this development only seem to be available to a limited extent; especially in the context of financial and time resources, it is emphasised here that HR management - and in a similar form management itself - hardly seems to be in a position to take on strategic agendas.

The quantitative perspective clearly focused on the relationship between digital HR measures and employee commitment. It was investigated to what extent such digitalised measures are perceived positively by employees and whether there appears to be predictive validity with regard to organisational commitment - which is described in chapter 2.3.1 as one of the most relevant variables of contemporary entrepreneurial activity. In summary, it was shown that digital HR measures hardly receive any attention, and their predictive validity therefore appears to be low. This is only partly consistent with the initial assumptions. These suggested that modern, digitally supported approaches in the HR sector could certainly make a valuable contribution to increasing employee loyalty, for example. However, such a finding cannot be demonstrated on the results found here in the electrical trade sector: The perception of digital measures - as the inferential statistical observations make clear - does not seem to be related to other key figures of HR activities or their results.

It should be borne in mind that the specialist and research literature included in this study (see chapter 2.3.1 or 2.2.3) consistently focuses on the international or US situation and primarily on companies in other sectors, whereas the mixed-methods study presented here decidedly looks at companies in the German electrical trade. The results thus obtained should therefore be considered and discussed in precisely this context. Their limitations should thus be understood less as an indicator of a lack of validity - this applies to this study as well as to the literature findings included - but rather as evidence that the electrical trade sector in Germany appears to differ significantly from *typical* sectors.

In addition to these findings with regard to digitisation itself, which only partially correspond to the findings from the international specialist literature, the topic of international migration is repeatedly emphasised as a challenge for the skilled crafts sector during the qualitative processing. As can be seen in chapters 5.1.2.1 and 5.1.2.2, the interviewees are consistently critical of this development and the resulting increase in diversity in the companies. This

raises the question of the extent to which the topic of diversity management is sufficiently appreciated in the sector or in the field and to what extent corresponding management approaches are used in practice. The available findings (see chapter 5.1) do not provide any indication that this topic is actively addressed in management practice. An examination of the literature itself (cf. for example Nentwich, Liebig & Steyaert, 2010) also does not lead to the conclusion that corresponding efforts exist on a broad scale or are being promoted. Rather, it appears that the topic of diversity management is more likely to be considered in the context of internationally operating groups and companies (cf. Jin, Lee & Lee, 2017). At the same time, however, the interviewees emphasise that this is precisely where they see a central challenge. The integration of non-German speaking employees was repeatedly described as challenging. In this context, it is questionable to what extent the management and leadership practices currently applied in the German skilled crafts sector are up-to-date and adequately able to meet the requirements of ongoing socio-demographic developments. Authors such as Hollander (2012), for example, show that by using appropriate, inclusive leadership approaches, it is possible to establish diversity not only as a danger, risk and threat, but as an actual opportunity for the company. However, according to Booysen (2014), this is primarily dependent on the will and ability of the respective managers. They must succeed in creating an environment characterised by inclusion that is able to take up the challenges; specifically, in such a way that advantages can be utilised.

5.2 Answering the research question

The initial research question was: **How are leadership and human resource management in German SMEs in the electrical trade sector handled with regard to the requirements and specifics of increasing digitalisation?**

Here it becomes clear that the consequences of digitalisation must be discussed and considered in particular with regard to the changing requirement profiles. In particular, the consideration of the state of research - such as the results presented in chapter 1.1 or 2.2 with reference to North (2011) or Caldwell (2001) - makes it clear here that human resource management in relation to digitalisation is a fundamentally highly relevant procedure. This consideration provided the basis for the empirical work that was carried out as part of this research. The assumptions were at least partially confirmed.

The evaluation of the expert interviews, for example, illustrates the awareness of the experts that the technological requirements for the skills and competences of the employees are gradually changing, which is also increasingly influencing the job profile as such. Similar to

North's (2011) postulation, the experts interviewed also seem to have a fundamental understanding that the business environment must increasingly be regarded as a *knowledge society* and that there is therefore a substantial change in requirements. The importance of digital and personal competences of the employees is emphasised throughout. Thus, the perspective of the experts themselves shows that the digitalisation and repositioning of HRM is only partially recognised as a relevant development. This already shows a discrepancy with the expected result based on the state of research. In the following, the perspective of employees was taken within the framework of a quantitative study.

However, digital leadership and HR management measures themselves seem to play only a partial role in German SMEs in the electrical trade sector, as the perspectives included here make clear. In particular, the quantitative research perspective made it clear that this hesitation is certainly in the interest of the employees, as there is hardly any predictive power of digital HR measures in the context of employee retention. Although it was expected that the perception of digital HR measures should also lead to higher levels of retention (see Marley & Parry, 2016; Melanthiou, Pavlou & Constantinou, 2015), this does not seem to be the case: In general, there seems to be more of a wait-and-see or neutral attitude towards the issue.

In general, it can be seen that digitalisation is discussed in particular with regard to professional requirements, where, for example, impulses are given through corresponding training measures to increase digital skills and abilities. This is to be understood with reference to the fact that although it is recognised that requirement profiles are changing and that further development should be sought through targeted measures, other approaches to digital HRM have not yet gained much importance.

In summary, therefore, a thoroughly critical attitude can be summarised here: Although the - especially international - specialist literature not only postulates the importance of modern and digitised HR measures, but is also able to prove it in an empirical way (see Melanthiou, Pavlou & Constantinou, 2015; Petry & Jäger, 2018; Roper, Sivertzen, Nilsen & Olafsen, 2013), the observation carried out here makes it clear that this only seems to be the case to a limited extent in the German craft sector. Neither do the experts interviewed here describe that digital and strategic approaches seem to be of great relevance in entrepreneurial practice (see chapter 5.1), nor does the survey of employees indicate that the extent of digital activity of HRM seems to be of high relevance. The present research question can thus only be partially affirmatively answered: Although the international business environment offers indications of the importance of digital HRM, it seems to be hardly established in the German electrical trade. The main

hurdles here are the limited resources available, whereby both financial and time resources as well as competences can be addressed here. There seems to be insufficient knowledge about how a modern HRM can be established despite the scarcity of resources and the understanding that such a HRM would be necessary seems to exist only to a limited extent. In this regard, however, the question also arises to what extent such a modern HRM would actually be expected in this environment: Contrary to expectations, there seems to be little expectation on the part of employees with regard to digital HRM measures.

5.3 Limitations and contribution to the state of research

Basically, this research work produced a number of remarkable results. In particular, it should be pointed out here that the degree of implementation of digital measures in the area of HR is only very peripheral for German electrical trade companies. With reference to the HR maturity model mentioned in the introduction (cf. Oertig et al., 2017), it can be stated here that in some cases only rudimentary approaches exist in the companies. It also emerges from the interviews that digitisation in the area of HR is only implemented in outline form or in some cases even discussed only marginally: the focus of the interviewees is clearly on other agendas, digitisation itself is either not addressed or only as a *side issue*. Digitisation is rather an issue in the companies with regard to the requirements of the industry itself. In this regard, the experts explain, for example, that employees increasingly need to have digital skills. Digital measures in HRM itself, on the other hand, still seem to be the exception and, as the results here show (see chapter 5.2), are only demanded or valued by employees to a very limited extent.

With regard to these results, the fundamental limitation of the generalisability of the results obtained here must be addressed: The research data was collected within a niche that is specified on the one hand by the industry (electrical trade) and on the other hand by the typical company size (SME) in Germany. The data and the results obtained from them must therefore also be interpreted in this context: They are expressly not to be interpreted without further ado in such a way that digitisation in HRM - contrary to what is affirmatively proclaimed in the specialist literature - represents a topic that is not relevant per se or is still of little relevance. Rather, according to what has been shown, it can be assumed that the specific sector is still little developed in this respect for structural or entrepreneurial-individual reasons. It therefore remains unclear to what extent the results obtained here can be transferred to other (comparable) sectors and whether the specificity of the findings can be attributed primarily to the sector itself or to the size of the company and the associated limitations.

At the same time, however, this limitation with regard to the generalisability of the results is also one of the central results of this study and the central contribution to the state of research: The sector that was examined here is hardly found in the specialist and research literature, especially international and English-language literature, so that the results of this study can be consistently qualified as innovative, trend-setting, and fundamental. A contribution has been made to the state of research that does not exclude specificity, but rather emphasises it: while there is a large number of research papers that make clear the advantages of digital HR measures, which are praised as immense, and discuss digital business models from different perspectives, the reality of the skilled crafts sector and SMEs has so far been insufficiently addressed. The present work is thus able to close an existing research gap by providing an insight into an industry that is insufficiently considered, especially in the context of contemporary management and leadership approaches.

Another limitation is the structure of the research work: It was assumed here that the digitalisation of leadership and management in particular should be addressed, which also guided the structure of the literature review. The critical analysis of the expert interviews, however, revealed that the diversity of the workforce is perceived by managers as one of the central problem areas. Addressing this in the context of German SMEs can therefore be a starting point for future research, which at the same time addresses a central challenge of management practice. Diversity management is not addressed or thematised in any form - despite the seemingly unanimous opinion of the experts interviewed here that increasing diversity opens up new problem areas. This is understood as an indication that a negative view of the topic prevails in the sector, which is shaped and possibly solidified by the lack of an active and targeted management focus on diversity.

6 New scientific results

Based on extensive long-term observations and experiences in the electrical trade, research questions were formulated and aggregated. These research and sub-research questions were validated through extensive literature research, expert interviews and quantitative surveys with over 160 participants, with important results and insights for the electrical trade. The basis for this is the aforementioned triangulation.

Novel and particularly noteworthy results are the following aspects:

1. **Digitalisation in the electrical trade is only partially perceived as central.** It also becomes clear that the necessary resources for actively driving this development only seem to be available to a limited extent; especially in the context of financial and time resources, it is emphasised here that personnel management - and in a similar form the management itself - hardly seems to be in a position to take on strategic agendas. The quantitative research perspective in particular makes it clear that this hesitation is certainly in the interests of employees, as there is hardly any predictive power of digital HR measures in the context of employee retention.

2. **Digital HRM measures are described as a reaction to social and economic developments**. They are seen as a tool not only to increase the efficiency of HRM, but also to be able to respond to the demands of the employees in the company. In general, there seems to be a rather wait-and-see or neutral attitude towards the topic.

3. **Employees must bring new competences with them** and must be able to actively add value in a digitalised environment. The evaluation of the expert interviews illustrates the awareness of the experts that the technological requirements for the skills and competences of the employees are gradually changing, which is also increasingly influencing the job profile as such.

4. **It turns out that digital HR measures hardly receive any attention** and accordingly their prognostic validity seems to be low. This is only partly consistent with the initial assumptions.

5. **The interviewees were consistently critical of the increase in diversity in the companies**. The available findings do not provide any indication that this topic is actively addressed in management practice. At the same time, however, the interviewees emphasise that they see this as a central challenge. The integration of non-German speaking employees was repeatedly described as challenging.

6. **Digital leadership measures seem to play only a partial role in German SMEs in the electrical trade** sector, as the perspectives included here make clear.

There seems to be insufficient knowledge about how to establish a modern HRM despite the scarcity of resources, and there also seems to be only limited understanding that such an HRM would be necessary.

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Annexes

Anhang 1: Overview of the interview partners

Interview partners	Industry	Function in the company	Region	Company size	Highest education closing
I1	Electrical trade	Managing Director	Stuttgart	90 employees	Dipl.-Ing. (FH)
I2	Electrical trade	Commercial Managing Director	Ulm	590 employees	Graduate in business administration (FH)
I3	Electrical trade	Managing Director	Aalen	120 employees	Dipl.-Ing. (FH) and MBA
I4	Electrical trade	Managing Director	Thuringia	80 employees	Dipl.-Ing. (FH)
I5	Electrical trade	Managing Director	Mannheim	70 employees	Business economist (IHK)
I6	Electrical trade	Head HRM	Ingolstadt	590 employees	M.Sc.
I7	Electrical trade	Head HRM	Hanover	600 employees	Graduate in business administration (FH)
I8	Electrical trade	Head of Human Resources Development	Stuttgart	590 employees	Graduate in Business Administration (BA)
I9	Metal and electrical industry	Managing Director	Stuttgart	90 employees	Dipl.-Ing. (FH)
I10	Electrical trade	Managing Director and Head of Human Resources Development	North Black Forest	120 employees	Master electrician and business economist (IHK)
I11	Electrical trade	Managing Director	Saxony	90 employees	Dipl.-Ing. (FH)
I12	Electrical trade	Head HRM	Hamburg	600 employees	Graduate in business administration (FH)

Anhang 2: Quantitative study - questionnaire

Socio-demographic questions

Age
Gender
Educational level
Industry
Company size
Position
Position experience
Experience in industry

Commitment

1 - does not apply at all	2 - does not apply	3 - partly/partly	4 - applies	5 - completely true

1. I would be very happy to spend the rest of my career in this organisation

2. I like to discuss with people outside my organisation

3. I really feel that the problems of this organisation are my own

4. I think I could easily commit to another organisation as I do here

5. I do not feel "part of the family" in my organisation.

6. I do not feel 'emotionally attached' to this organisation.

7. This organisation has great personal significance for me

8. I do not feel a strong sense of belonging to my organisation

9. I am not afraid of what might happen if I quit my job without having a new one

10. It would be very hard for me to leave my organisation now even if I wanted to

11. Too much would be disrupted in my life if I decided to leave my organisation now

12. It would not be too costly for me to leave my organisation now

13. At the moment, staying with my organisation is more a question of necessity than desire

14. I feel that I have too few options to consider leaving the organisation

15. One of the few serious consequences if I were to leave this organisation would be the lack of available alternatives

16. One of the main reasons I continue to work for this organisation is that leaving it would require significant personal sacrifice - another organisation could not match the overall benefits I have here

17. I think people move from company to company too often these days.

18. I don't believe that a person always has to be loyal to his company.

19. Jumping from one company to another does not seem unethical to me.

20. One of the main reasons I continue to work for this organisation is that I believe that loyalty is important, and therefore I feel morally obliged to remain

21. If I got an offer for a better job elsewhere, I would not think it right to leave my organisation

22. I was taught to believe in the value of loyalty to an organisation

23. Things used to be better when people stayed with one organisation for most of their career

24. I no longer believe that it makes sense to want to be a "company man" or a "company woman"

Digital Literacy

1 - does not apply at all	2 - does not apply	3 - partly/partly	4 - applies	5 - completely true

25. I use the internet to access a school portal or a course or learning management system, e.g. Blackboard, Moodle

26. I use the internet to look up reference information for study purposes (e.g. online dictionaries, content-specific websites, etc.)

27. I use the web to search for general information (e.g. news, holidays, event schedules).

28. I use the Internet/Web or a LAN to play networked games

29. I use the web to listen to sound recordings (e.g. via streaming audio or iTunes).

30. I use the web for other pastimes (e.g. leisure activities)

31. I use the web to buy or sell things (e.g. eBay, Amazon, airline tickets).

32. I use the web for other services (e.g. banking, paying bills)

33. I use the internet to send or receive emails (e.g. Hotmail, Gmail, Yahoo, Outlook).

34. I use the internet for instant messaging/chat (e.g. MSN, Yahoo, ICQ)

35. I use the web to create and maintain a website (e.g. Wikispace, Yola).

36. I use social networking software on the web (e.g. Facebook, Twitter, Instagram)

37. I use the web to download MP3 files (e.g. music, videos, podcasts).

38. I use the internet to upload and share MP3 files (e.g. music, videos, podcasts)

39. I use the internet to share photos or other digital material (e.g. with Blinklist, Flickr).

40. I use the web to make phone calls (e.g. VoIP with Skype)

41. I use the web for web conferences (e.g. with a webcam)

42. I use the web to read RSS feeds (e.g. news feeds).

43. I use the web to read other people's blogs or vlogs

44. I use the web to comment on others' blogs or vlogs

45. I use the web to keep my own blog or vlog

46. I use the web to contribute to the development of a wiki

47. I like to use internet communication technologies (ICT) for learning

48. I learn better with ICT

49. ICT makes learning more interesting.

50. I am more motivated to learn with ICT

51. ICT enables me to learn in a self-directed and independent way

52. The use of mobile technologies (e.g. mobile phones, PDAs, iPods, smartphones, etc.) for learning holds a lot of potential

53. Teachers/lecturers should use more ICT in teaching my classes

54. I know how to solve my own technical problems.

55. I can learn new technologies easily.

56. I keep up to date with important new technologies.

57. I know about a lot of different technologies.

58. I have the technical skills I need to use ICT for learning and create artefacts (e.g. presentations, digital stories, wikis, blogs) that demonstrate my understanding of the learning

59. I have good ICT skills

60. I am confident in searching and evaluating information from the internet

61. I am familiar with issues related to web-based activities, e.g. cyber security, search issues, plagiarism

62. ICT enables me to collaborate better with my fellow students on project work and other learning activities

63. I often get help with my training work from my friends via the internet, e.g. Skype, Facebook, blogs

Perception of digital HR measures

1 - does not apply at all	2 - does not apply	3 - partly/partly	4 - applies	5 - completely true

64. Digital recruiting measures are used in our company.

65. Digital personnel development measures are used in our company.

66. The use of electronic models (such as portals, social websites) in the selection process can bring transparency to the recruitment and selection process.

67. Electronic selection of candidates can reduce staff turnover.

68. Advanced tools and techniques (such as portals, social websites) increase the success rate of the recruitment and selection process.

69. E-HRM tools enable greater integration of HR processes (e.g. performance management is linked to compensation). Improved reporting is facilitated by e-HRM tools.

70. I prefer to find my payslips online rather than handing them out in hard copy.

71. I have agreed that the salary calculation will no longer be carried out manually.

72. Using electronic devices to calculate salaries increases speed and accuracy

73. I prefer the use of e-learning tools to traditional methods of learning.

74. "Traditional" training skills need to be complemented by additional skills.

75. Most of the training and development in my companies is not done through e-learning

76. E-HRM tools have enabled me to communicate better with my colleagues (more analytical information).

77. A publicly accessible website and intranet are available to all employees in my company.

78. Information about the company is easily accessible on the website and the intranet facilities allow staff to communicate online.

79. Discussions of employee performance are no longer face-to-face, indicating the use of contemporary appraisal methods.

80. My company uses performance appraisal software for evaluation.

81. E-HRM tools provide up-to-date information that is beneficial for employee-related decision-making.

82. E-HRM tools are essential for the more strategic role of HR practitioners.

83. Fewer errors occur when employees use e-HRM tools.

84. HR professionals can play more of an advisory role to line management with the help of e-HRM tools.

85. E-HRM information and decision-making tools limit my ability to make decisions.

86. The use of e-HRM tools has led to an automation of routine HR work.

87. E-HRM tools can be used to improve the underlying business processes.

88. E-HRM tools have led to a higher quality of HR services.

89. E-HRM tools enable more productive work.

90. E-HRM tools improve the quality of services.

91. HR services have been streamlined and standardised through the use of information technology.

92. E-HRM activities reduce the costs of transactional tasks.

93. E-HRM tools allow me to work more cost-efficiently.

94. The use of e-HRM tools is more cost-efficient than traditional, manual HR practices.

95. More employees are needed when using e-HRM tools.

96. The benefits of e-HRM are outweighed by the costs

Declaration on the dissertation

Name/Address

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Declaration on my honour regarding my dissertation

Dear Ladies and Gentlemen,

I hereby declare that I have written the enclosed dissertation independently and have not used any auxiliary materials other than those indicated. I have marked all passages taken over verbatim or in terms of content as such.

I also affirm that I have submitted the enclosed dissertation only in this and no other doctoral procedure and that this doctoral procedure has not been preceded by any definitively failed doctoral procedures.

Grabenstetten, 25.04.2022   Signature