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Psychological contracts in the era of HRM 4.0

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Abstract

Digitalisation of production is expected to intensify an ongoing transformation of the psychological contract. This chapter analyses how digital practices of human resource management (HRM 4.0) affect psychological contracts. To perform this analysis, two attributes of HRM 4.0 (standardisation and reduced social interaction) and two demands on HRM 4.0 (transparency and trust) were derived. In the absence of empirical research, effects of the attributes and demands on relational psychological contracts were suggested. Attributes and demands were assessed for many different HRM practices (e.g., selection, training, performance management), and consequences for relational psychological contracts were derived. The analysis shows that large portions of HRM 4.0, except for the practices of autonomy and communication, challenge the development of a relational psychological contract. Organisations are thus advised to establish opportunities for social interaction around HRM issues when introducing HRM 4.0 to ensure trust and transparency and to strengthen the role of the supervisor as an organisational contract partner.

Key words: psychological contracts, digitalisation of human resource management, HRM 4.0, transparency, trust, fairness

Introduction

Relational psychological contracts in HRM 4.0 are a contradiction in terms. HRM 4.0, the digitalised form of Human Resource Management (HRM), focuses on numbers, data and information (Bissola & Imperatori, 2019), whereas relational psychological contracts require interaction and subjectivity for their development (Rousseau, 1989). HRM 4.0 consists of smart and pervasive applications that autonomously interact with one another to produce HRM activities (Strohmeier, 2018). In its analogue form, HRM has been identified as an important context for psychological contracts (Raeder, Knorr, & Hilb, 2012; Uen, Chien, & Yen, 2009). Many HRM practices affect the contents of the psychological contract and its fulfilment (Bal, Kooij, & De Jong, 2013; Sonnenberg, van Zijderveld, & Brinks, 2014). Any new development in HRM is thus expected to influence psychological contracts in the organisation. The accelerating digitalisation in HRM has such potential implications.

Relational psychological contracts develop in long-term employment relationships, are based on loyalty and can be adapted when the context of work changes (Rousseau, 1990). HRM 4.0 has not yet been linked to psychological contracts because aspects of technology and efficiency currently receive more attention (Bondarouk, Parry, & Furtmueller, 2017; Cascio & Montealegre, 2016). In particular, relational psychological contracts may suffer from such a technological view of the employment relationship.

HRM 4.0 is still in its infancy, with the majority of applications to be produced in the near future. It is thus too early to fully explore or examine the effect of HRM 4.0 on psychological contracts. In this chapter, typical attributes of digital forms of HRM, that is, standardisation and reduced social interaction, serve to identify potential consequences for psychological contracts. The demands of ensuring transparency and building trust are derived from the two attributes. The attributes and demands help illuminate the potential consequences for psychological contracts and can also be considered for future applications.

This chapter contributes to extant research through discussing potential consequences of current developments in smart and pervasive practices of HRM. This paper notes the connection between HRM 4.0 and psychological contracts when HRM 4.0 is not yet fully implemented to draw researchers' attention to future benefits or problems. Some of these benefits or problems should be anticipated when smart and pervasive systems are developed to improve consequences of electronic systems on employment relationships. Attributes of HRM 4.0 and demands to be fulfilled by HRM 4.0 provide criteria that can also be used to evaluate future applications and their effects on psychological contracts. Considering potential consequences before HRM 4.0 is implemented allows organisations to plan for future developments and prevent adverse effects on psychological contracts.

Chapter objective

This chapter discusses potential effects of HRM 4.0 on psychological contracts. First, the two attributes of HRM 4.0, standardisation and reduced social interaction, are identified. The demands of trust and transparency that HRM 4.0 is required to fulfil are derived. For each of the attributes and demands, consequences for psychological contracts are reviewed. Second, digital forms of HRM practices are assessed against the background of attributes and demands, and consequences for psychological contracts are explored.

HRM 4.0 and psychological contracts

The term HRM 4.0 is derived from Industry 4.0, where machines form the Internet of Things and autonomously collect and process data (Strohmeier, 2018). Applications of HRM 4.0 are similarly connected to the Internet of Things; they analyse the data that they generate, update information continuously and produce, whenever possible, suggestions for future behaviour. An example of such an application in HRM 4.0 is the autonomous analysis of data on the work performance of an employee that triggers suggestions for training when performance goals have not been met (Richter, Heinrich, Stocker, & Steinhueser, 2017).

HRM practices have been studied as one of the major contextual antecedents of psychological contracts because they contribute to the form and negotiation of psychological contracts. Specifically, HRM practices were shown to positively affect the fulfilment of the psychological contract, and fulfilled psychological contracts help organisations perform (Katou, 2013; Latorre, Guest, Ramos, & Gracia, 2016; Raeder et al., 2012). HRM practices have been found to support a relational psychological contract and inhibit a transactional psychological contract (Bal et al., 2013; Chien & Lin, 2013; Uen et al., 2009). This effect occurs when the HRM practices aim to foster the commitment of employees and support the development of employee skills and careers. Such commitment-based and developmental HRM systems demonstrate to employees that the organisation is investing in the employment relationship. The organisation's interest in long-term employment relationships is compensated by a broader scope and greater flexibility of the psychological contract that allows for commitment to the organisation and for extra-role behaviour (McLean Parks, Kidder, & Gallagher, 1998).

The distinction between relational and transactional psychological contracts refers to the most frequently used definition of psychological contract contents (Rousseau, 1989). Relational contracts focus on socio-emotional aspects and on employee development in a long-term employment relationship, whereas transactional contracts are in their extreme form reduced to the exchange of work time for salary. In contrast, the fulfilment or breach of the psychological contract indicates whether obligations and promises in the employment relationship have been met (Robinson, 1996). Relational contracts are valued in the organisation because they are beneficial for important employee outcomes, such as turnover intention, extra-role behaviour, performance and commitment (De Cuyper & De Witte, 2006; Millward & Hopkins, 1998).

When HRM 4.0 is newly introduced in an organisation, employees may perceive a

breach of the psychological contract because previous promises of the organisation are not being met (Bissola & Imperatori, 2014). Changes to the terms of HRM practices are experienced similar to a form of organisational change that leads to a perceived breach (Tomprou, Nikolaou, & Vakola, 2012). When HRM 4.0 is operational, however, it is more relevant to study how it affects the contents of the psychological contract and to compare digital and analogue practices of HRM and their relationship to psychological contracts. In line with McLean Parks et al. (1998) and as explained below, it is expected that systems of HRM 4.0 lack attributes that motivate employees to perceive their psychological contracts as being relational.

HR staff as an organisational contract partner

The supervisor has been considered the closest representative of the organisation in the psychological contract (Tekleab & Taylor, 2003). The majority of direct interactions that refer to the employment relationship and its terms usually occur between the employee and the supervisor. Many conditions, however, are defined through HRM practices that are implemented by the HR department and communicated by HR staff, such as options for individuals' careers, performance management routines, selection procedures and training opportunities. Particularly in larger organisations, the HR department represents the employer psychological contract in several aspects, but the relationship between the employee and HR staff is less individualised than the relationship with the supervisor (Tekleab & Taylor, 2003).

Who acts as an organisational psychological contract partner also depends on who carries out HRM functions in HRM 4.0 (Intindola, Weisinger, Benson, & Pittz, 2017). Some researchers advocate that automatised processes transfer more responsibility to the line manager (Imperatori, Bissola, Butera, & Bodega, 2019). If such a devolution of HRM responsibilities from the HR department to line managers occurs, the organisational psychological contract is best represented by the supervisor. In either case, HRM aspects of

the employer psychological contract are considered and represented by HR staff directly or by the supervisor. In the context of HRM 4.0, the devolution of HRM responsibilities might even be advantageous for psychological contracts. The social dimension and opportunities to discuss contents of the psychological contract are largely removed in electronic forms of HRM. All forms of interaction (digital and face-to-face) are still practised with the supervisor, thus allowing for exploration of the psychological contract contents.

Attributes of HRM 4.0 and demands

Digitalisation affects how HRM practices are defined and delivered because it promotes the standardisation of processes and reduces the necessity for social interaction in the HRM function. Standardised processes, if implemented correctly, increase the consistency of decisions across occasions and time (e.g., in recruitment, Wiblen, 2016). Consistency is a requirement for fairness in the distribution of outcomes and in procedures. Standardisation and reduced social interaction remove individuality when each practice is implemented. Standardised communication and information do not permit many different and individual options.

Replacing analogue HRM with HRM 4.0 creates a demand for organisations to actively ensure transparency and foster trust (Bissola & Imperatori, 2014; Cascio & Montealegre, 2016). The use of big data requires transparency and protection of privacy, whereas the shift to interaction mediated through technology calls for other sources for trust. As argued below, HRM 4.0 initiates a process of shaping psychological contracts that are standardised for different groups of employees, leaving less space for relational contents and socio-emotional elements than analogue forms of HRM.

Standardisation, consistency and fairness

The standardisation of processes in digital forms of HRM ensures that groups of employees receive the same information and services (Ruël, Bondarouk, & Looise, 2004).

Decisions are based on the same algorithms for all groups of current or future employees, such as when staff is selected. Standardised processes are free of bias and subjectivity that could be caused by HR staff or managers in an organisation. They allow for consistent decisions and ensure that rules are applied in the same manner across occasions and time (Bondarouk, Harms, & Lepak, 2017; Wiblen, 2016).

Electronic systems guarantee fairness through consistency as long as fair procedures have been implemented in algorithms that prevent any disadvantages for current or future employees (e.g., disadvantages for older applicants or those with foreign names in recruiting). Aspects of fairness in systems of HRM 4.0 refer to distributive and procedural justice. Distributive justice means that outcomes of decisions are distributed in a consistent way either in relation to employees' input or in relation to peers (Colquitt, 2001). Procedural justice refers to whether processes that lead to decisions are consistent, unbiased and accurate. Research has shown a positive relationship between procedural justice and the use of electronic HRM practices that cover communication, development and performance management (Bissola & Imperatori, 2014).

Standardisation reduces HRM practices to aspects that are measurable, countable and identical for groups of employees. Less tangible issues are excluded (e.g., commitment, engagement, innovative behaviour) because they cannot be captured electronically (Bondarouk & Brewster, 2016). Relational psychological contracts refer to intangible aspects in employment relationships, and the focus on tangibles thus impedes the development of relational psychological contracts.

Standardisation of processes and information provides the opportunity to communicate identical information on the organisation's psychological contract to different groups of employees. It ensures that the same information and promises are presented and thus that any psychological contract is based on such explicit information. Standardised information can

reduce the variety of interpretations that employees can develop and the risk of psychological contract breach that occurs because perceived promises have not been fulfilled.

Distributive and procedural fairness are positively correlated with relational psychological contracts (Chen, 2010; Cohen, 2013; O'Donohue, Donohue, & Grimmer, 2007). Fairness can thus be considered a prerequisite for relational contracts that digital systems of HRM fulfil without effort. Biases might, however, be present in algorithms of artificial intelligence (Lambrecht & Tucker, 2019; Woods, Ahmed, Nikolaou, Costa, & Anderson, 2020). Biases regarding gender, age or nationality, for example, mirror biases in society, including in analogue HRM practices.

Reduced social interaction and individuality

Digitalisation entails replacing social interaction with HR staff with electronic systems. The term social interaction refers to any type of communication that is not formalised and standardised through electronic systems. Accordingly, social interaction is not restricted to face-to-face communication but can also include exchanges through email or social media in an individualised form.

Digital applications of HRM can respect and define many different subgroups of employees to preserve a high degree of diversity. Individual aspects, however, will not be fully acknowledged in standardised processes where options are defined in advance. It is thus more difficult to approach small target groups of a few employees who are dispersed in the organisation (e.g., key employees who should be retained). HRM 4.0 also reduces the individuality of employers because different employers use the same systems. Hence, employers are more interchangeable as potential contract partners.

Digitalisation replaces social interaction related to topics that are important for refining one's psychological contract. It also reduces communication and negotiation around psychological contracts. This removes opportunities for employees to explore and probe their

psychological contract in interaction. HR staff and employees exchange less information and fewer cues that an employee could incorporate into a relational psychological contract.

Reduced social interaction affects socio-emotional aspects of the psychological contract, particularly in relational psychological contracts (Deas, 2019).

Trust and transparency

Smart and pervasive systems collect data autonomously and continuously and build a cloud of big data (Hecklau, Galeitzke, Flachs, & Kohl, 2016). To maintain employees' trust, it is important to define and transparently inform what data are collected for what purpose and how these data are used and stored. Accumulating big data without clear rules that protect the privacy of those who provide data inhibits perceptions of trust and fairness. This is particularly relevant if sensitive data are generated through wearables, that is, sensors in clothes or attached to the body (Cascio & Montealegre, 2016; Hecklau et al., 2016) or when data are collected from social media, such as for the purpose of recruiting new employees (Woods et al., 2020).

Social interactions are critical for building trust, and in their absence, trust cannot be delegated to digital systems (Torres & Mejia, 2017). Electronic HRM practices that aim to manage the relationship with employees through communication, development and performance management were found to encourage a perception of trust, especially because they are considered fair (Bissola & Imperatori, 2014). Trust is particularly crucial when systems collect data autonomously and in a pervasive manner. The delegation of responsibility for HRM to supervisors in a process of devolution is advantageous to building trust because HRM is then represented through a human being.

Electronic systems in HRM also provide advantages because they allow the employer to inform employees transparently and abundantly about their obligations, promises and inducements (van Niekerk, Chrysler-Fox, & van Wyk, 2019). Such information is rather

standardised and adapted to suit to the needs of groups of employees. Individual concerns are, however, not considered.

Trust is inherent in relational psychological contracts (McLean Parks et al., 1998), and it is thus important that trust is created to ease the development of relational contracts.

Empirical research has shown a relationship between trust and psychological contract breach, with higher trust reducing the likelihood that breach of the psychological contract is perceived (Robinson, 1996). Organisations thus need to understand the importance of trust and ensure that trust is built and maintained through real human beings. Any digital HRM services have to be complemented by real social interaction.

Practices in HRM 4.0 and relational psychological contracts

The term HRM 4.0 was derived from Industry 4.0 less than a decade ago. Earlier, electronic applications of HRM that were neither smart nor pervasive were named, for example, e-HRM or HR Information Systems (Bondarouk, Parry, et al., 2017; Marler & Fisher, 2013). Electronic applications (e.g., online recruitment) are currently more widespread, but not all of them collect and process information autonomously. Concerning their effect on the psychological contract, it is reasonable to consider applications of both HRM 4.0 and e-HRM because they can affect psychological contracts in a similar way.

In its current form, HRM 4.0 has not yet exhausted all potential options. As shown in a survey of experts in HRM, many smart options are not yet widely used (Strohmeier, 2018). Examples of rarely implemented smart practices are recruiting requirements determined by smart things or employee objectives determined by smart things.

Each HRM practice and its digital counterpart convey messages about the employment relationship that can be interpreted in terms of the psychological contract. In the following, major HRM practices and the potential effect of their smart form on psychological contracts are discussed. Attributes and demands introduced above serve to guide the evaluation of

possible consequences.

Recruiting and selection

Recruiting aims to find a pool of applicants with the demanded qualification for a certain position, whereas selection seeks to choose the best-suited applicant through valid and reliable methods. E-recruiting in the form of interactive career websites and announcing vacancies on social media is quite common, as is administering selection tests online (Arjomandy, 2016; Stone, Lukaszewski, Stone-Romero, & Johnson, 2013). Career websites and social media are used with the goal of enhancing employer branding and organisational reputation. Interactive career websites collect applications in a standardised form, easily allowing for automated assessment of each application (Holm, 2012). Newer developments utilise artificial intelligence to search and approach the pool of applicants through social media, conduct the first screening of applications or evaluate video interviews recorded by applicants (Woods et al., 2020).

Recruiting and selection through artificial intelligence are consistent and unbiased as long as the algorithms used are unbiased (Woods et al., 2020). Systems of e-recruiting ensure that information about the employer is presented in a standardised way and require applicants to submit their applications in a standardised way, thus ensuring equal and fair treatment of applicants. Digital applications, however, might not select qualified applicants whose competency profile does not completely match the profile defined for the position. HR staff or supervisors, in contrast, could easily detect value in a variety of slightly diverging profiles.

Several concerns regarding the full automation of recruiting and selection have been raised. An argument against the full automation of selection is the fact that it does not capture social interaction and that social skills thus cannot be assessed in settings of interaction (Strohmeier, 2018). It is also challenging to develop trust in the organisation when the largest portion of the interaction between applicant and organisation is managed through electronic

systems (Torres & Mejia, 2017). Privacy concerns have been voiced because the potential employer collects private data, such as when accessing social media accounts or requesting pre-recorded video interviews (Stone et al., 2013; Woods et al., 2020). It is thus important for the organisation to protect applicants' privacy and ensure their trust in the organisation.

Research has shown that organisations with dedicated career websites present more information on psychological contracts on the career websites than organisations without career websites (van Niekerk et al., 2019). Organisations without a dedicated career website provide information on psychological contracts on their websites, but this information is less detailed. While it is beneficial for organisations to explicitly inform applicants about their psychological contract, a high degree of automation during recruiting and selection reduces opportunities for interaction. If recruiting and selection are fully automated, there are fewer opportunities for a first negotiation of terms of the psychological contract. Such negotiations are particularly useful for intangible aspects that are less likely to be listed on career websites.

Performance management

Performance management entails setting individual goals for employee performance, planning and monitoring the accomplishment of these goals and providing regular feedback on an employee's performance. Instead of monitoring actual performance, systems in HRM 4.0 allow employee performance to be measured through smart things (e.g., sensors in equipment) or wearables when the employee is performing work tasks (Strohmeier, 2018). Such performance data can be used to assess an employee's performance throughout the year, determine compensation or identify talent in the organisation. Continuously monitoring how employees perform their work tasks allows smart systems to immediately suggest training when training needs are detected (Richter et al., 2017). They can also prompt breaks when stress levels are elevated or warn employees in dangerous situations (e.g., a heat detector in firefighters' gear).

This pervasive measurement of employees' performance is one of the most controversial issues in HRM 4.0 (Strohmeier, 2018). Particularly wearables, that is, devices that employees carry on their body or in their clothes, can be perceived as complete surveillance. Collecting big data to measure performance might cause problems with transparency and trust when employees do not know what information is collected, when it is collected, for how long it is stored and for what purpose it is used (Strohmeier, 2018). It is thus important that organisations establish trust through other measures of communication and social interaction and that the use of big data is transparent and rule based.

The ubiquitous measurement of performance through standardised and objective indicators shifts the focus to tangible forms of performance and ignores intangible forms, such as organisational citizenship behaviour, commitment or turnover intention (Bondarouk & Brewster, 2016). The lack of more subjective evaluation of an employee's performance hinders fair assessment of performance because many relevant employee contributions are ignored. The emphasis on objective performance accentuates the economic exchange and thus a transactional psychological contract. Intangible forms of performance, inherent in relational psychological contracts (Millward & Hopkins, 1998), are disregarded.

Career management

Career management integrates approaches that support employees in planning and developing their further career. In HRM 4.0, artificial intelligence suggests career development plans based on employee competencies and prior training (Kohl & Swartz, 2019). More common than fully automated systems are career management platforms that register employees' competency profiles, inform them about demanded competencies for particular positions and link learning and training opportunities to both (Cascio & Montealegre, 2016). Such platforms provide employees with necessary information for their career self-management. Both types of systems support a structured and transparent approach

to career management. They make potential career paths visible and allow organisations to strengthen the internal labour market (Ruël et al., 2004).

Systems of career self-management encourage employees to plan their career on their own based on information that the employer provides. Career self-management transfers the responsibility for career development from the organisation to the individual. Such systems thus motivate employees to develop their employability and, subsequently, to weaken their relationship with the employer. To maintain a relational contract, more effort is required on behalf of the organisation. The organisation needs to express its commitment and help employees plan their careers with a view to the organisation.

Talent management

Talent management aims to develop the career of employees with high potential and ensure succession planning in the organisation. In a fully automated option, high potentials are selected into the talent pool through the smart measurement of employee performance (Strohmeier, 2018). Electronic systems that are not fully automated still provide the advantage that talent is selected in a formalised process and with standardised criteria (Wiblen, 2016).

As discussed above, intangible forms of performance are disregarded when relying on automatically collected indicators. Criteria for defining talent might thus be perceived as unfair when employees are excluded who contribute strongly to the performance of the organisation but produce low objective performance measures.

Research has shown that employees identified as talent have more relational contracts than employees who are not in the talent pool (Seopa, Woecke, & Leeds, 2015). If organisations use an exclusive definition of talent with a small percentage of employees invited into the talent pool, it is more likely that the psychological contract will be perceived as fulfilled (Sonnenberg et al., 2014). This difference in psychological contracts of talent and

non-talent most likely persists when talent management goes digital.

Training

HRM 4.0 allows assessing training demands through smart things (e.g., sensors, wearables), suggesting corresponding forms of skill development and providing facilities for training. For example, the machinery in a workplace continuously registers information to predict potential problems in the production line (Richter et al., 2017). If problems occur, the system suggests options to help the worker solve these problems. This provides an opportunity for the worker to learn based on the data that have been continuously collected. It further enables the worker to avoid and solve problems more efficiently in the future. Fully automated learning facilities, so-called learnstruments, guide employees through all steps of the learning process in a realistic environment (Menn et al., 2018).

In addition to smart forms of training, many digital options exist. Learning can be linked to systems of knowledge management. An electronic knowledge base that describes all work tasks and processes allows employees to search for solutions when problems occur in a production process (Richter et al., 2017). Training can be organised in virtual learning environments that participants access through an avatar. Such virtual learning environments also permit the training of social skills and the exchange of experiences. Social media can be used for training purposes. Digitalisation poses new demands on employees' skills and competencies that can be met with such digital forms of learning.

Training linked to smart things is focused on a deficit model of the worker that suggests training in missing or underdeveloped competencies. Comparably little attention is paid to competencies that allow employees to grow, broaden their social or leadership skills or learn from others. Despite providing an attractive learning environment, all forms of electronic learning lack many cues that occur in real-life interaction. Although several of the digital training options include social skills, social interaction can only be experienced to a

limited degree.

Training was found to be related to the fulfilment of the relational psychological contract (Fontinha, Chambel, & De Cuyper, 2014). It is likely that this relationship also holds for digital forms of training despite their shortcomings regarding social interaction.

Autonomy

Autonomy refers to flexibility and control that employees are granted in their work tasks. In HRM 4.0, employees can be enabled to fulfil their work tasks with a high degree of autonomy through the support of an information and communication network that can be accessed through mobile devices (Richter et al., 2017). At a highly flexible production site, such a network allows employees to inform colleagues about their current work piece and the parts they require to complete it. Employees can retrieve information about the ongoing production from the network and send their demands to colleagues. Employees coordinate autonomously relying on information of the production site and assume responsibility for finalising their work piece. The flexibility of workers and of the production system is protected through the use of the network. In a smart system, information provided by the employees can be complemented by information that is autonomously collected through sensors (Hannola, Richter, Richter, & Stocker, 2018).

Such systems provide comparably complete and easily accessible information regarding the production process (Richter et al., 2017). They allow employees to cooperate more smoothly, as if cooperation is not digitally enabled. They rely on social interaction in a digital form and allow for support and loyalty to develop in this interaction. In essence, such systems provide a context in which a relational psychological contract can grow.

Communication and participation

Organisational communication serves to inform employees about recent and future developments and allow employees to voice their views. In addition to widely used web-

based communication channels (e.g., intranet), organisations rely on social media as a means for internal communication and cooperation (Arjomandy, 2016; Nisar, Prabhakar, & Strakova, 2019). Such social media channels can be designed as internal communication tools or admit external members (e.g., former employees, customers).

With the use of social media, communication and participation can access the world of HRM 4.0 more smoothly than many other HRM practices. Information can easily be exchanged through social media, but it cannot fully replace real-life social interaction. If an organisation does not exclusively rely on electronic forms of communication, social media can well create the bond between the organisation and the employee that is needed for relational psychological contracts.

Discussion

Digitalisation in HRM 4.0 introduces many options for automating processes in organisations, but its development has mainly focused on technological feasibility and economic efficiency. Because practices of HRM 4.0 are not yet widely implemented, the analysis of its consequences for psychological contracts can only rely on theoretical arguments. For this purpose, two attributes of HRM 4.0 (standardisation and reduced social interaction) and two demands to be fulfilled by HRM 4.0 (transparency and trust) were identified.

The analysis has shown that the shift to a mainly-automated HRM could produce negative effects on the employment relationship. The two attributes of HRM 4.0 (standardisation and reduced social interaction) that were selected for this theoretical analysis help assess consequences for psychological contracts. For some practices of HRM 4.0, standardisation ensures consistent and fair decisions (e.g., in recruiting, selection). For others, standardisation limits the range and quality of information that decisions rely on and emphasises economic aspects of the exchange (e.g., performance, career and talent

management). Only for autonomy and communication does standardised information provide a suitable basis. For some practices, the lack of social interaction hinders the development of relational aspects in the psychological contract (e.g., recruiting, selection, performance and career management). Other practices (e.g., communication and participation, autonomy) entail social interaction, such as through social media, that allows employees to develop loyalty and commitment in line with a relational psychological contract.

The two demands posed on HRM 4.0 (transparency and trust) aim to prevent potential problems. Some practices require ensuring transparency when big data and artificial intelligence are used (e.g., recruiting, selection, performance management) and that trust is encouraged when social interaction is replaced with digital systems (e.g., recruiting, selection, performance management). Supervisors are called on to foster trust in the presence of practices of HRM 4.0.

The overall impression created through this analysis is that large parts of HRM 4.0, except for practices to ensure autonomy and communication, challenge the development of a relational psychological contract. The analysis indicates a potential shift to more transactional psychological contracts because they better harmonise with digitalisation in HRM. During the economic downturn at the end of last century, a new psychological contract was suggested, where job security was exchanged for employability (Cavanaugh & Noe, 1999; Turnley & Feldman, 1998). It is likely that fewer long-term employment relationships with relational psychological contracts occur now than at the end of the last century. Relational psychological contracts have not been fully replaced by new or transactional psychological contracts, and job security has not yet ceased to exist. The expected change in psychological contracts became a gradual shift instead of a complete turnaround. In a similar vein, HRM 4.0 is expected to prompt another gradual shift in psychological contracts in the direction of more transactional psychological contracts and a greater emphasis on employability. Socio-

emotional aspects of psychological contracts will most likely suffer in smart HRM.

Different speeds of development can be expected for organisations with different types of jobs. HRM 4.0 will more likely be implemented in technical jobs (e.g., in production) or in jobs that can be fully digitalised (e.g., financial services) but not in jobs with a low degree of digitalisation (e.g., health care). In jobs with a high degree of digitalisation, smart HRM can be aligned with the work infrastructure, whereas this is not an option in jobs with a low degree of digitalisation. A gradual shift to transactional psychological contracts will then proceed more quickly in jobs with a high degree of digitalisation.

Limitations and future research

Some organisations have introduced applications of HRM 4.0, but most have not even tested any such application. It is thus too early to empirically examine consequences of HRM 4.0 on psychological contracts. No empirical research substantiating the assumptions has yet been published. It is also uncertain how quickly the introduction of HRM 4.0 is proceeding. This will depend not only on technological feasibility and economic concerns but also on the acceptance of digital applications of HRM among managers and employees. More time is needed to empirically investigate the effects of HRM 4.0 on psychological contracts.

Not all the hypothesised effects of HRM 4.0 are negative for relational psychological contracts. Some practices enhance consistency and fairness, some simplify communication and collaboration and others invite employees into virtual learning environments. Any future analysis must include positive and negative aspects of HRM 4.0.

When empirically investigating the effect of HRM 4.0 on psychological contracts, it is important to also include employees' perception and evaluation of HRM 4.0. Some of the positive aspects, such as engaging virtual worlds in training or communication through social media, might cause adverse effects. Some of the negative aspects, such as collecting performance measures through wearables, might be seen as beneficial. Any such analysis of

effects of HRM 4.0 should thus first specify advantages and disadvantages of the particular practices. Costs and benefits for the organisation should also be considered.

Future analysis of psychological contracts should also pay attention to the wider context of the labour market. A more transactional psychological contract or more focus on employability leads employees to change jobs more often if the labour market allows. Shorter tenure with one employer can be motivated through attractive jobs on the labour market or periods of recession. Such factors should be taken into account when studying transactional and relational psychological contracts.

Implications for organisational practice

Implementing HRM 4.0 poses high technological demands on organisations and might not produce the expected economic value. Many organisations have so far focused on the two aspects of technological feasibility and economic efficiency. How HRM 4.0 affects communication, cooperation and employment relationships in organisations has not yet been of major interest. HRM 4.0 might, however, influence the organisation as a social system far beyond technological and HRM issues. Any move to HRM 4.0 should thus be carefully planned, particularly considering all potential consequences unrelated to technology and HRM.

Organisations should complement the shift to digital practices with measures to maintain social interaction and respect employees' individuality. Opportunities should be created for employees to discuss and explore the contents of their psychological contract. Organisations should communicate how they plan to maintain transparency amidst the use of big data and to support trust when introducing new systems. When HRM goes digital, the supervisor remains the only important organisational contract partner. Organisations have to be aware of this and should strengthen the role of the supervisor to represent all aspects of the organisational psychological contract.

When introducing practices of HRM 4.0, organisations should consciously take advantage of the strengths of electronic systems that support communication and coordination with and between employees. Communication systems should be used to provide abundant and consistent information about the psychological contract that is offered and expected in the organisation. Such information can, for example, be conveyed through career websites. Communication systems should further support employees in coordinating and planning their work autonomously.

It is crucial to prevent disadvantages to certain employees from the use of practices of HRM 4.0. Organisations should thus ensure that systems are fair and do not discriminate against particular groups of employees or applicants (e.g., older employees or those with foreign names). Fairness can be attained, for example, through inspecting the algorithms of artificial intelligence that are underlying decision making. If doubts occur because principles of fairness are compromised, decisions should be reconsidered with the goal of reaching an overall fair process of decision making. When assessing employees' performance, intangible forms of performance, such as organizational citizenship behaviour, should also be considered. Career self-management systems might motivate employees to plan to continue their career outside the organisation. Such adverse effects should be prevented through actively retaining key employees. To preserve social aspects of training contents and goals, smart or electronic forms of training should be complemented with real-life interaction.

Finally, these recommendations aim to ensure that organisations maintain relational psychological contracts because they support aspects of performance of employees and organisations.

Conclusion

Practices of HRM 4.0 will be continuously implemented in the coming years. While electronic forms of HRM facilitate communication with and cooperation between employees,

they are also criticised for reducing social interaction and neglecting intangible aspects in the employment relationship. Through the increasing use of electronic HRM, the supervisor will remain the only partner to represent the organisational psychological contract. It will thus be important that each supervisor consciously develops relational psychological contracts with employees in addition to ensuring trust and transparency in the use of electronic systems.

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