AI in performance management: a game-changing development?

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ABSTRACT,

Purpose. Due to current developments in the advancements of artificial intelligence, researchers proposed that using AI-generated feedback will automate activities of performance management and make the process continuous and flexible. This research aimed to find out how the integration of artificial intelligence changes the process of giving feedback to employees and extend academic literature on recent developments within performance management.

Design. Due to the explorative nature of the research, a qualitative research design was used. Semi-structured interviews were conducted with two software developers and one employee who is receiving AI-generated feedback.

Findings. Artificial intelligence in performance management is still in its development. Currently, the software can collect, analyse and summarize performance data and therefore automates many activities of the performance management process. Compared to traditional methods, the data collection and evaluation are done continuously, and feedback is always available. Moreover, AI adds the new activity of supporting employees with personal growth by suggesting suitable training. Even though AI-generated feedback provides many opportunities, companies often fail to customize the software and managers are lacking the education to use the program well. In the context of this research, sensemaking theory was used to explore how individuals are shaping their perception of this new technology through external opinions. It was found that software developers present the benefits and opportunities of AI to companies, but managers' perceptions differ immensely from being enthusiastic to being afraid of using artificial intelligence.

Conclusion. Including AI in performance management processes leads to a continuous and flexible procedure that can provide objective and accurate performance data. Even though many activities can be automated, a human touch is still required to ensure a reliable and suitable process. Compared to traditional performance management, data collection, evaluation, and review take place permanently and employees receive support for personal growth through AI.

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1. INTRODUCTION

Can an organization be successful if its workforce is not performing well? If activities and motivations of employees are not connected with the overall strategy of an organization, it is unlikely that workforce contribution will have a reasonable effect on organizational performance. Thus, if employee's work is not aligned with a company's strategic goals, their work will not support the organization in meeting their objectives. Determinants of organizational performance were subject to extensive research. Therefore, many studies illustrate a positive correlation between employee performance and organizational success (Pfeffer & Veiga, 1999; Almatrooshi et al., 2016; Siddiqui, 2014).

The importance of employee performance management (PM) was already recognized by researchers in the 1920s (De Nisi & Pritchard, 2006; Justin & Joy, 2021). Since then, management approaches were subject to frequent change and developed excessively over time. Starting with the concept of "management by exception", where line managers would only intervene in case of a conflict (Komaki, 1986), today's performance management describes a repeated practice displaying high human-technology interaction.

The activity of performance management is defined as the "continuous process of identifying, measuring, and developing the performance of individuals and teams and aligning performance with the strategic goals of the organization" (Aguinis, 2013, p. 2). This indicates that the process of managing employee performance entails different activities intending to provide reliable feedback to the workforce to adjust individual skills with the overall organizational strategy.

In general, the process of performance management is continuous, and its activities are arranged in a circular sequence. Starting with the definition of key performance requirements, performance requirements are discussed, and goals are planned (Armstrong, 2000). After, employees carry on their work trying to implement the plan while being monitored by their supervisors (Aguinis, 2013). Employee outputs are then evaluated and discussed within a performance review session (Armstrong, 2000).

1.1 Artificial intelligence in performance management

Information technologies have changed the execution of many jobs and accordingly the management of those jobs (Vrontis et al., 2022). Developments in computer technologies and the introduction of artificial intelligence disrupted HRM practices. Current high-tech advancements are progressively providing alternate options to tasks that were originally conducted by human individuals (Vrontis et al., 2022).

One example is artificial intelligence (AI), which is described as machines that carry out cognitive functions traditionally done by humans (Graßmann & Schermuly, 2021). The adoption of AI within business tasks has increased by around 70% in the last five years and is heavily transforming workplaces through automating activities previously done by humans (Chowdhury et al., in press). Examples are the collection of data, interpretation of data, and following summary of the data into comprehensible feedback. Next to that, AI-software provides support in many other ways which are described in Appendix 4.

By applying artificial intelligence to performance management, managers are now able to continuously monitor their workforce. Big data can be collected, stored, analyzed, and summarized into customized feedback (Tong et al., 2020). Therefore, researchers suggest that the integration of AI-generated feedback will change the way performance management is done. However, this transformation of the performance management process will only take place if organizations are adapting to AI-generated feedback and if managers are realizing the full potential of new software features. The sensemaking process of individuals plays an important role in this case. It describes the procedure of giving meaning of a disruptive event (Helms Mills et al., 2010). This procedure influences opinions and whether individuals perceive AI-generated feedback as an opportunity or threat which in turn affects whether this new technology is used successfully or if it gets rejected.

1.2 Research objective

According to Buck and Morrow (2018), the integration of AI in performance management will lead to real-time feedback, abolishing annual feedback moments causing frequent data-driven conversations. In addition to that, Schrage et al. (2019) argue that the management of employee performance will become more future-oriented by focusing on individual development instead of previous productivity measures. However, these statements are displaying hypotheses of what the situation might look like but not much is known about how certain activities of the procedure might change. If algorithms can identify patterns in large amounts of data, does that affect the point in time where key performance indicators are defined? Is the planning still done in a traditional conversation between manager and subordinate? Does the monitoring of employees change? And lastly, is the performance review still conducted by line managers, or does the AI system send a feedback report to the employee?

Little is known about whether AI-generated feedback is as disruptive as suggested. This research aims to investigate how the process of performance management might change with the implementation of AI. Within this process, different stakeholders like HR managers, line managers, and employees are affected which is why sensemaking theory is applied to capture the opinions and perspectives of different individuals involved within the AI-generated performance feedback process. Researching the process of how sense is made of AI-generated feedback will give insights into how perceptions are formed which will give insights in how the AI software might need to be adjusted to ensure a successful implementation and usage.

It is valuable to understand how this process is done nowadays to educate students as well as employees on

recent possibilities. It is of interest how stakeholders of AI-generated feedback are making sense out of the new technology to support companies in finding best ways to introduce the new software. Moreover, this research aims to understand how line managers are developing the full potential of new technologies to find out whether there is a need for educating employees on technological possibilities. Buck and Morrow (2018) further suggest that AI-driven programs will assist managers in administrative tasks so they can shift their focus of operation to more strategic activities. Knowing about such possible disruptions is also beneficial for organizations since changes within the performance management process could mean that the organization must adapt to other organizational processes. Therefore, this research aims at answering the following research question:

How does the integration of AI-generated performance feedback change activities of the performance management process?

For a better understanding, the research question is divided into three sub-questions which indicate the focus of this paper.

A) *What new functions and applications does the integration of AI-generated feedback add to performance management software?*

B) *How does AI feedback change activities of the process of performance management conducted by line managers?*

C) *How do stakeholders concerned with AI-generated feedback make sense of the new software?*

To answer these questions, software developers designing AI-feedback programs and employees getting rated by AI-generated feedback have been interviewed.

This research applies qualitative methods to gain insights into the possible effects of AI on the performance management process. Moreover, a cross-sectional design is used to identify recent changes in the ways line managers are administering employee performance.

1.3 Research contribution

1.3.1 Academic relevance

This research aims to extend the existing literature on the newest developments within performance management by investigating recent technological improvements and their impacts on the process of employee performance management. Researchers proposed the possibility that performance management processes become fully automated and continuous; however, no confirmation of these hypotheses exists. The paper is therefore contributing to the academic field of Human Resources and especially Performance Management. This research specifically aims to find out in what ways the integration of artificial intelligence into performance management changes the sequence but also the procedure of giving feedback to employees to present an updated model of the performance management process.

1.3.2 Practical relevance

Regarding the practical relevance, this paper contributes to the understanding of how AI-feedback mechanisms are changing the process of how performance management is done. Moreover, this paper aims to add to the understanding of new technological capabilities and whether and how they are used and appreciated by different stakeholders. New insights will be useful for software developers to understand where the program might have to be adjusted. Additionally, further insights into line managers' behaviour might identify knowledge gaps within the usage of the newest technologies which can be resolved through extensive training conducted by organizations. Furthermore, a change within the process of performance management might force corporations to make adaptions to managerial activities towards more strategic tasks.

2. LITERATURE REVIEW

The following chapter will outline important concepts that are being used throughout this research to enhance the understanding of existing theories and to outline how this paper builds upon current work.

2.1 Traditional performance management

An overview of traditional appraisal methods is presented to understand how feedback was given before implementing artificial intelligence into the process. Classic performance management used to start with the formal setting of standards. Key performance indicators were established through supervisors and communicated to subordinates (Osmani & Maliqi, 2012). Next, managers would use work sampling techniques to collect data on employee behaviour at the workplace (Komaki, 1986). After comparing this data to the required standards, employees received a detailed written report containing feedback on their work (Heywood et al., 2017). Supervisors would then discuss the feedback with employees on an annual basis (Buck & Morrow, 2018).

In general, traditional performance management used to focus on previous performance and past behaviour with the overall aim to increase efficiency (Cappelli & Tavis, 2016; Justin & Joy, 2021). Data collection was done through single-rater appraisals and results concentrated on static rankings and often resulted in rewards concerning compensation or bonus payments (De Nisi & Pritchard, 2006; Ewenstein et al., 2016).

2.2 The process of performance management

In essence, the practice of managing employee performance consists of an initial performance agreement, the monitoring and evaluation of delivered performance, and a final review moment (Armstrong, 2000).

The process itself is continuous and starts over once completed. In detail, performance management begins with the definition of roles where key performance requirements are established (Armstrong, 2000).

During the planning stage, expectations are discussed, and a personal development plan is created for employees to summarize required results and behaviours at the workplace (Aguinis, 2013).

Next, performance is managed. Employees carry on with their daily operations and try to execute the terms discussed throughout the planning stage. Next to their work, they are being observed by supervisors and receive feedback and coaching through their managers (Aguinis, 2013; Armstrong, 2000). Managers are collecting data through observations and documentation and frequently assess employee outputs against previous set criteria.

Lastly, achievements, personal progress or problems are discussed within the performance review (Armstrong, 2000). During an appraisal meeting, managers and employees discuss the outcome of the performance evaluation and further feedback. At this point, rewards are introduced if employees managed to accomplish performance requirements. This is done to motivate employees and acknowledge efforts shown to perform well (den Hartog et al., 2004).

Figure 1. Performance Management Process (based on Armstrong, 2000; Aguinis, 2013)

Figure 1 shows the steps described above. After establishing key roles and requirements for a job position, a personal performance plan is established in cooperation with the line manager and the employee. After, employees try to implement their development plan into their day-to-day operations where they are being monitored by their manager to collect data on their individual performance. This information is then evaluated and compared to previously identified key requirements. Lastly, the outcome of the evaluation is discussed during a meeting between the manager and the subordinate.

2.3 Artificial intelligence in performance management

Changes in the workplace and recent technological developments have changed the way organizations are run. The latest trend of computerized advancements is the adoption of artificial intelligence mechanisms into organizational processes. According to Chowdhury et al. (in press), the implementation of AI within businesses has increased by 70% since 2017. Similarly, Drent et al. (in press) predicts a doubling in spending on artificial intelligence between 2020 and 2024.

In general, Artificial intelligence can be defined as "a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation" (Haenlein & Kaplan, 2019, p.5). AI applications are able to track employee behaviour at the workplace, evaluate performance and create individual feedback (Tong et al., 2020). Further, Kalischko and Riedl (2021) suggest that within the application of artificial intelligence, algorithms can be applied to recognize patterns, classify, and organize data and finally make automated or assisted decisions about employing, dismissing, or promoting employees. The system therefore differs from other computer systems by the ability to perform cognitive functions and therefore simulate human intelligence (Graßmann & Schermuly, 2021).

Within performance management, artificial intelligence can be applied by using data analytics which are tracking employee work behaviour, assessing work performance, and generating recommendations based on this data (Tong et al., 2021). Moreover, researchers suggest that AI is able to guide decisions within HRM processes. It is argued that artificial intelligence systems can define problems, identify the cause of a problem, and propose a solution (Chowdhury et al., in press). Adopting such a system for performance management can lead to several benefits. Many administrative activities can be automated which enables managers to focus on strategic tasks (Buck & Morrow, 2018). Next, AI can collect higher data volumes and structure this new information (Euchner, 2019). Ewenstein et al. (2016) suggest that data collection becomes more objective through real-time analysis and ratings. It is however noted that artificial intelligence operates on the basis of training data. Therefore, the statement of increased quality of data collection is not necessarily true since it highly depends on the quality of the algorithm.

2.4 How technology enhances performance management processes

Within an extensive literature review, Smither and London (2009) identified several ways in which technology can improve the performance management process. The researchers state that technology can recognize the required skills and knowledge of a job position through possessing a job analysis. Moreover, it enables employee participation in the definition of key roles and within the planning stage. Here, a personal development plan can be created by working in an online document where changes are displayed in real-time. If managers and subordinates are collaborating in the planning stage, employee commitment to performance goals is enhanced since they were part of the goal-setting process (Smither & London, 2009). Another possible benefit of using technology in performance management is, that the personal development plan can be linked to an online database of training opportunities which facilitates the stimulation of long-term growth (Schrage et al., 2019; Ewenstein et al.,

2016). AI can detect low performance and suggest suitable courses or support employees with enhancing their career (Kellogg et al., 2020; Cappelli et al., Tambe et al., 2019). Throughout the data collection phase, employees can be tracked consistently allowing for frequent reviews and self-appraisal (Buck & Morrow, 2018; Kalischko & Riedl, 2021, Kellogg et al., 2020). Additionally, Kellogg et al. (2020) suggest that artificial intelligence can predict future performance through analysing previous work behaviour and that the program is able to automatically generate hiring and firing advice or reward employees.

2.5 Current changes in performance management

Recently, researchers suggested a change within the management of employee performance. The modern workplace transformed into a dynamic, decentralized, and multifaceted design which also impacted the management of human capital (Gruman & Saks, 2010). Schrage et al. (2016) suggest that future performance management is a flexible, continuous process that is driven by big data with the goal of individual development. Additionally, Cappelli and Tavis (2016) found that many companies have abandoned yearly appraisals and are now trying to give instant feedback concentrating on the development of future activities instead of focusing on past behaviour.

Not only the focus of performance management has changed but also the technical capabilities. Businesses are highly implementing artificial intelligence programs into their operational processes including performance management.

2.6 Implementation of AI-systems

Successful implementation of AI-based systems is crucial so its full potential can be realized within the organization. Implementation is a process that starts once the decision to buy or use a new HRM practice is made. The practice will be used by HR actors and ends once it became routinized (Trullen et al., 2020). An implementation of such a new HR practice can be seen as successful, once the system is used consistently, competently, and once it is fulfilling the original purpose (Trullen et al., 2020). This implies that HR actors are using AI-generated feedback for assessing their employee performance and that they are capable of using the new features that the program offers.

According to Chowdhury et al. (in press), organisations face difficulties in the integration of AI within business processes resulting in limited generated business value for the corporation. Issues such as small data, ethical constraints or negative perceptions of AI are leading to implementation difficulties (Chowdhury et al., in press).

In addition to technical issues, it is widely known that organizational changes often result in human resistance (Kotter & Schlesinger, 2008). Managers might possess, that new technologies will diminish or overtake their job position within the company, or they do not understand the value or application of the system (Kotter & Schlesinger, 2008). In accordance with that, Wiblen et al. (2012) investigated the implementation of a new talent management software within a multinational corporation. Their findings suggest that the technological capabilities were largely unrealized, and managers often relied on traditional techniques or personal feelings to identify new talent. These findings illustrate that the implementation of new software programs into organizational processes is not necessarily working well and that technical possibilities are often not known or used (Bondarouk, 2011; Klein & Sorra, 1996; Parry & Tyson, 2010).

2.7 Sensemaking of new technologies

Next to the overall adaption to new technologies, the perception of new software also shapes how employees react to it. Research has found that the user's understanding of new technology has a great impact on technology success (Griffith, 1999). To understand how individuals give meaning to new computer systems, the theory of sensemaking is used. It refers to the approach to making sense of an experience that happened within our close environment (Helms Mills et al., 2010). According to Weick et al. (2005), sensemaking implies "turning circumstances into a situation that is comprehended explicitly in words and that serves as a springboard into action" (p.1). The overall procedure is described as a social psychological process that shapes organizational outcomes (Helms Mills et al., 2010).

After a disruptive event, organizational authorities tend to apply sensegiving which is the attempt to influence the sensemaking of other stakeholders (Maitlis & Lawrence, 2007). Employees then try to make sense of the situation themselves by making use of previous experiences and interpretive procedures (Maitlis & Lawrence, 2007). Finally, employees construct a personal framework that organizes the new reality (Maitlis, 2005). Research has found hierarchical structures within this process. It was discovered that leaders highly influence how issues are understood by subordinates (Maitlis, 2005; Smircich & Stubbart, 1985). Giving sense to stakeholders is even considered a key leadership activity guiding employees towards a desired belief (Maitlis & Lawrence, 2007).

When implementing AI-generated feedback, sensemaking can have a tremendous influence on how stakeholders perceive the new technology. First, Software developers and sales personnel would have an impact on organizational leaders to purchase such software. Leaders interpret the usability of AI-generated feedback and apply sensegiving to HR managers to introduce the new software to the workforce. Managers would then introduce AI-generated feedback to their subordinates. All in all, the usability of AI-generated feedback will be evaluated and guided by many different stakeholders which hold different opinions about the software. If the program is introduced as a useful tool in the beginning, it is likely to be explained in a positive manner later.

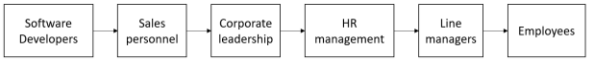

Figure 2. The possible hierarchy of sensemaking of AI-generated feedback (based on the social process of organizational sensemaking by Maitlis, 2005)

2.8 Conceptual Framework

As highlighted before, technological possibilities regarding assistance in performance management are increasing. Researchers suggest that the integration of AI-generated performance feedback will lead to disruptions within the process of performance management. These disruptions are however influenced through the degree of AI usage. The full potential of the software needs to be realized to transform the performance management process. However, the degree of AI-usage is itself also influenced by the sensemaking of stakeholders. Perceptions and beliefs of AI-generated feedback are shaping the willingness to implement this new technology into organizational processes and therefore have an overall impact on whether the integration of AI-generated feedback influences the process of managing employee performance.

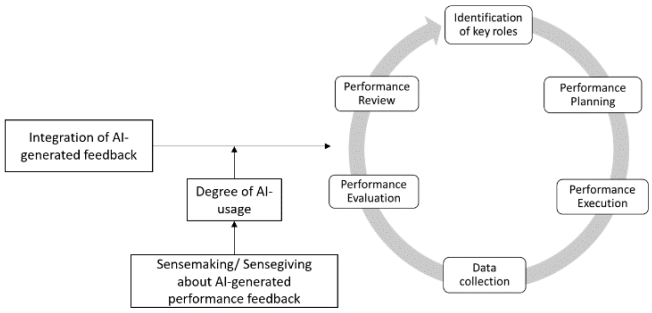

Figure 3. Conceptual Framework

With the support of this conceptual framework, this research aims to identify how the implementation of AI-generated feedback changes activities conducted within the performance management process. To do so, software developers and employees will be interviewed to gain insights into recent technological developments.

3. METHODOLOGY

In the following chapter, the overall research design and data collection methods are described.

3.1 Research Design

This research followed an exploratory purpose meaning that a topic is being explored that is of new interest in the field of study (Babbie, 2015). This was done to gain greater insights into the effects of AI-generated feedback on performance management processes. Since this area of overall performance management literature did not gain much attention through previous studies yet, the explorative design aimed to get an understanding of what effects new technologies can have on the procedure of employee appraisal.

The overall design of this research was qualitative, meaning that nonnumerical data was collected. New insights into a topic were researched to reduce uncertainties about technical capabilities and the usage of AI-feedback mechanisms in organizational operations. Therefore, a qualitative framework suited this paper best since it provides the opportunity for researchers to gain insights into individual experiences and opinions by asking open-ended questions (Sofaer, 1999).

Additionally, a cross-sectional research design was applied. This method indicates that interviews in this study are only made at one point in time (Babbie, 2015). This method was advantageous in this setting since it gave a clear picture of how performance management is done at this particular moment and can therefore extend the literature on current changes happening within performance management processes. However, it is noted that interview responses come with the risk of being biased because respondents might only reveal selective information about a topic (Alshenqeeti, 2014).

3.2 Research subjects

The population of this research got represented by software developers concerned with the establishment of AI-based performance management software as well as employees receiving AI-generated feedback. It was additionally planned to interview line managers, though no suitable respondents could be identified.

3.2.1 Inclusion criteria interviewees

Respondents complied with criteria regarding language, job position, field of knowledge, and work experience. Interviewees spoke English to ensure fluent communication and to avoid misunderstandings. They possessed at least 2 years of work experience to be in full knowledge of their job and the tasks it entails.

Moreover, specific requirements applied to all job positions interviewed. Software developers needed experience in working with artificial intelligence and worked in the development of employee performance management software. Employees had to be assessed by AI-generated performance management software.

Table 1. Inclusion criteria interviewees

Inclusion criteria *Software Developer*	**Inclusion criteria** *Employees*
- English speaking - Work experience > 2 years - Concerned with development of AI-performance management software	- English speaking - Rated by AI-based performance management software

Interviewees were recruited by contacting companies concerned with AI-performance management software and by getting in touch with LinkedIn members corresponding to the inclusion criteria.

3.3 Data collection

Semi-structured interviews were used to explore motivations, drivers, and sensemaking processes toward AI-based feedback. According to Barriball and While (1994), this interview method is specifically well suited for a research design that is trying to collect information on complex issues since it allows for probing into topics or clarifying answers. Questions were asked about how artificial intelligence can be applied to performance

management, how this application might change the feedback process and how individuals are making sense out of AI-generated feedback technologies (see Appendix 1 for interview protocol).

For data collection qualitative interviewing was used which implies that the interviewer possesses a general plan of the conversation but not a set of questions that necessarily must be asked (Babbie, 2015). This flexible method was used since it gives the opportunity to react to the interviewees' responses.

For this research 20 interview requests were made through LinkedIn, company contact information, or personal contacts. Interviews were held with two software developers and one employee concerned with AI-feedback mechanisms for performance management. Employees were an important source to gain insights into how feedback is received by AI programs and how employees perceive AI-generated feedback. Next, it was planned to interview HR managers and line managers to compare the intentional use of AI described by software developers to how the software is being used in companies. However, AI-generated feedback is still in its development and therefore no respondents were found which were using the software in Europe yet.

3.4 Data analysis

According to Bengtsson (2016), "the process of analysis reduces the volume of text collected, identifies and groups categories together and seeks some understanding of it" (p.8). Therefore, data analysis methods need to be clearly planned to ensure a valid examination of the information received through conducting interviews. Through qualitative content analysis an interpretation of the results is achieved (Bengtsson, 2016). Hereby, the recorded interviews were transferred into written transcripts for further analysis. Next, the text was coded by using an inductive coding technique. This method is beneficial in this context since it allows for a change within coding as the study progresses and knowledge of the field increases (Bengtsson, 2016). In the following categorization process, 12 codes are organized within themes and topics. The results of the classification will be summarized in a table to get an overview of the outcomes. Moreover, a tree diagram of the codes and underlying themes can be found in Appendix 2.

Table 2. Table of codes

AI in Performance Management
1. Current state of AI in PM
2. New functions AI adds to PM software
3. Overall goal of AI in PM
Changes in Performance Management Process
1. KPI identification
2. Performance Planning
3. Data collection
4. Data evaluation
5. Performance Review
6. Personal Development
Implementation of AI-generated feedback
1. Integration of new software at companies, Sensemaking
2. Possible issues faced by managers
3. Managers capability to use software

4. RESULTS

The following section of this paper will summarize the findings which were received during the conducted interviews. Interviews 1 and 2 were held with software developers, whereas Interview 3 was conducted with an employee being assessed by AI performance management software.

First, an overview of the main points will be given in form of a table that is based on the codes used for summarizing the interview transcriptions. Next, a detailed description of the findings will be provided which follows the sequence of topics given in Table 3.

Table 3. Summary of interview results

AI in Performance Management
1. **Current state of AI in PM:** AI in PM is still in its infancy, AI can support managers' decision-making
2. **New functions AI adds to PM software:** AI recognizes patterns in work behaviour and links it to performance, proactive nudging and alerting managers, adding data to evaluate and improve employee engagement, AI can warn managers of performance lows, skill development
3. **Overall goal of AI in PM:** time savings, automation, more objective and accurate feedback
Changes in Performance Management Process
1. **KPI identification:** Performance standards still have to be established manually
2. **Performance Planning:** still done manually
3. **Data collection:** Type of data collected depends on industry, company and job position, every keystroke used on laptop or phone can be captured, self-service capability to rate colleagues, collecting data from outside the organization
4. **Data evaluation:** AI analyses data based on performance requirements, AI summarizes data in accessible graphs, using data from a whole year to evaluate employees
5. **Performance Review:** Feedback is available each week, line managers see overview of employee performance, AI-generated feedback is used together with "human touch", performance review can be requested any time
6. **Personal Development:** AI gives overview how work can be improved; system compares work behaviour with performance requirements and suggests courses for development
Implementation of AI-generated feedback
1. **Integration of new software at companies:** Companies fail to customize product to their own needs, HR is still often administrative and not strategic **Sensemaking/ Sensegiving:** Software developers name only benefits and opportunities when trying to give sense to companies, companies' reaction towards AI is either positive or negative, the older generation in HR is afraid to lose their job due to a lack of understanding of the software
2. **Possible issues faced by managers:** Strict privacy laws in France and Germany, companies do not know what data the system should collect, managers often don't understand employee needs
3. **Managers capability to use software:** Managers do not understand the system, they are not educated enough, they do not understand the value and goal of AI-generated feedback

4.1 AI in Performance Management

First, an overview of the general application of artificial intelligence in Performance Management was given. It was found that the application of AI-generated feedback is still in the early stages of development and is supposed to support line managers in their decision-making. This statement was also confirmed within the data collection stage since no HR managers or line managers could be identified that were using such advanced software yet. It was also mentioned by interviewees, that the European market for AI-generated feedback is still small because of strict privacy laws in the EU and resisting employees.

Next, new functions were addressed that artificial intelligence can add to performance management software. In general, AI can help managers to make sense out of the collected datasets. It can analyse data and link it to performance requirements. Furthermore, it can then send a message to responsible line managers to inform them about exceptional performance so that the managers are able to act on it. This could be improvements, but the software can also predict whether employees are thinking about leaving the company. Lastly, artificial intelligence can identify room for improvement and suggest possible development courses or new job directions to employees.

In sum, the overall goals of adding artificial intelligence to performance management are to automate as many activities as possible and to generate accurate objective feedback that does not depend on the opinion of other people. This way, objective feedback can be provided that is not influenced by personal opinions. *"The technology should not necessarily be used for compliance and control and constraint. It should be used to coach and to make people better"* (Interview 1).

4.2 Changes within the Performance Management Process

When asking about changes in the process of giving feedback to employees, questions were based on the formal process of performance management mentioned in the theoretical framework. Interviewees stated that the establishment of performance requirements and KPIs still needs to be done by hand. "*The system cannot read non-verbal cues […] and will always require a human element*" (Interview 1).

Regarding the planning stage of the performance management process, no evidence was found that artificial intelligence supports this stage.

After planning personal performance, data will be collected. "*Every keystroke that I make on my laptop or even on my phone could be captured, aggregated [and] evaluated"* (Interview 1). This implies that, by adding artificial intelligence into the process, the whole digital footprint can be tracked. "*The system is proactively scraping a lot of [data] of other systems to collect information about [employees]*" (Interview 1). However, it was also mentioned, that the type of data collected heavily depends on the industry, company, and job position.

Next to collecting data through scanning other systems, recent developments in performance management software also allow for employees to measure the performance of their fellow colleagues. "*It's a tool [where] I can literally pull out my phone and I could say, Johan, you did such a good job in our call with these 20 folks today and it goes to him, […]to his manager and it goes into his performance management file.*" (Interview 1). Additionally, it is also possible to receive ratings from outside the organisation like in the context of a nurse who receives a rating from her patients.

After data is collected, AI-generated feedback programs automatically make sense of data files and summarize them into comprehensible graphs. The interpretation of performance data is fully conducted by the software program, automating the evaluation stage. "*You can see a wave and the different colours […] so you actually can see where you are and where other people are*" (Interview 3). These graphs are based on the required performance standards which the software compares to the yearly performance of employees and then summarizes the outcomes into accessible visuals.

Next, performance is reviewed and discussed with employees. Here, the frequency of feedback is customized and depends on the company. One employee declared: "*every week we have a coaching session where they discuss what you did great and what you need to improve on [but]if I have a question, I can send them a message and within five minutes we are having a zoom call*" (Interview 3). Software developers confirmed the statement and said the following: "*We went from one extreme to the other where we were [giving feedback] once a year and everyone was starving to see "Am I doing OK?" And then we kind of went nuts and the pendulum swung to the other side and said: let's give you feedback every 15 minutes.*" (Interview 1).

Afterward, it was found that performance is evaluated by artificial intelligence but also approved and adopted by managers. Therefore, the human touch is still part of the process and giving feedback is not fully automated. Support by managers is still needed since the system is not able to process verbal cues or consider sick leave or vacation days when assessing employee performance. *"Within artificial dimensions, the timing is something that [the software] cannot really [understand] and seasonality is something that it also cannot [understand]. When I'm sick I will not perform that well because I'm not feeling it, you know. But artificial intelligence is not measuring if someone is sick."* (Interview 3).

Lastly, it was asked how artificial intelligence then helps employees to improve and supports them in personal growth. The system is now able to analyse work behaviours and match it with typical characteristics for the job. Then it can suggest taking improvement courses in areas where one is still lacking knowledge. Furthermore, it is also able to suggest changing job positions by matching employees' skillsets to other jobs.

4.3 Implementation of AI-generated feedback in companies

When implementing AI performance management software, companies often fail to customize the product to their own needs. "*Maybe less than 20% of companies have their own dashboards.*" (Interview 2). Next to that, HR managers need further education since they usually lack understanding and knowledge about the software to be able to make use of its full potential. Another issue with implementation is the fact that software companies do not provide any support after sales and companies struggle to find fitting KPIs to measure performance and can therefore not use AI-generated feedback satisfactory. *"[Companies]struggle early on in implementations because they're like: "Well, what should we tell it to measure?" And we're like: "Well, we (software developers) don't know what your business is like.""* (Interview 1).

Another issue regarding implementation are strict privacy laws in Europe. *"In Germany or France, the unions, the Labour Council, are really strict [and] if you use a lot of data, you'll get in trouble. […] We sell [the software], people are happy and then we get a lot of pushbacks from the German Works Council because they don't want it.*" (Interview 2).

Regarding sensemaking theory, software developers are mentioning the great values and benefits of AI-generated feedback when trying to sell the software. *"We are really passionate. We like to talk and are really happy with our solution."* (Interview 2). Taking in account that corporative websites are additional sources where interested customers first learn about AI-generated feedback, it is important to know how the software is introduced. Software companies are advertising their AI programs solely positive way. An overview of mentioned benefits can be found in Appendix 4. Even though first contacts are of a positive nature, the reactions of companies differ tremendously: "*People either see it as a threat or an opportunity, and there is very few in the middle, right. It is kind of extreme*." (Interview 1). Next to that, software developers also experienced that especially older people who are working in HR are afraid to lose their job if they would start using AI-generated feedback. *"A lot of older people managing HR are afraid to lose their jobs"* (Interview 2). Additionally, it was found that the interviewed employee reacted positively to being reviewed by artificial intelligence and using the system. She learned about it in a class during her studies and got to know various benefits of AI and how it can support humans. *"It can help you so much with altering your message and see in what cities or neighbourhoods would my product fit or would be sold."* (Interview 3). In accordance with that, her perception of using AI-generated feedback was very positive. She enjoys using it and thinks of it as a helpful support mechanism.

5. DISCUSSION

This paper aimed to find out how AI changes Performance Management. In this context, the following research question was formulated: *"How does the integration of AI-generated performance feedback change activities of the Performance Management Process?"* To find answers to this topic, three sub-questions got established which are going to be addressed within this chapter. Additionally, a summary of literature findings which are supporting the interview results is displayed in Appendix 3.

5.1 How AI changes performance management

5.1.1 New functions added to PM software

"What new functions and applications does the integration of AI add to Performance Management software?"

It was found that the usage of artificial intelligence in performance management is still in its early stages. The following functions and changes are possible to use but are not widely utilized yet. In general, it can be said that PM software is flexible and can be adjusted and customized for company needs. Predominantly, as proposed by software developers, artificial intelligence is supposed to automate as many activities as possible. The software is now able to collect and analyse performance data. Moreover, it can send feedback notifications to managers and employees informing them about performance scores or reminding them of unfinished tasks (Ahmed, 2018; Chowdhury et al., in press; Guenole & Feinzig, 2018; SAP, n.d.; Schrage et al., 2019, Smith, 2019). Another new feature is the coaching opportunity where artificial intelligence compares employee skills to job requirements and suggests possible courses and training (Ahmed, 2018; Drent et al., in press; Guenole & Feinzig, 2018; Maity, 2018; SAP, n.d.; Schrage et al., 2019; Visma Raet, n.d.; Workday Talent Management, 2017; Zel & Kongar, 2020).

Lastly, Chowdhury et al. (in press) suggested that artificial intelligence can define problems, identify a cause of a problem, and suggest a solution. However, no evidence was found within interviews or the literature that problems can be defined automatically. The software rather works with saved settings and takes these performance requirements as a basis for the assessment of employee work behaviour (Jia et al., 2018; Maity, 2018).

In sum, AI-generated feedback mainly supports managers by automating most activities like data collection, evaluation, quick reviews, and training support. The main AI activities mentioned by software providers are summarized in Appendix 4.

5.1.2 How AI changes the PM process

"How does AI feedback change activities of the process of performance management conducted by line managers?"

Going through the stages of the performance management process, artificial intelligence takes effect at the data collection stage. No evidence was found that AI has effects on the establishment of KPIs and performance requirements or the planning of personal development plans. Accordingly, Maity (2018) and Jia et al. (2018) state that AI works with predefined measures to analyse performance.

However, when performance data gets collected, differences from traditional performance management are recognized. The "work sampling" method introduced by Komaki (1986) got eliminated. Data is now collected continuously and especially in an office environment; it is possible to collect data on every keystroke one makes use of (Buck & Morrow, 2018; Gikopoulos, 2019; Kalischko & Riedl, 2021; Kellogg et al., 2020; Oracle, n.d.; SAP, n.d.; Schrage et. al, 2019; Tong et al., 2021, Workday Talent Management, 2017). The amounts of data collected are greater and more extensive (Chakraborty et al., 2020; Euchner, 2019; Ewenstein et al., 2016). It is also possible for employees to rate each other or to get feedback from individuals outside of the organisation which abolishes the traditional single-rater appraisal and leads to more extensive feedback.

Next to larger amounts of data, artificial intelligence is also designed to establish objective feedback which is not influenced by the personal opinions of managers (Chakraborty et al., 2020; Chowdhury et al., in press; Ewenstein et al., 2016; Jiang et al., 2019).

Feedback is available whenever desired just by logging into the system (Chakraborty et al., 2020; de Laat et al., 2020; Oracle, n.d.; Schrage et. al, 2019; Stanely & Aggarwal, 2019; Workday Talent Management, 2017). Nevertheless, formal appraisal talks still exist. Here, managers make use of performance data generated by the system and add their opinion to the results. Compared to traditional methods, the generated feedback uses data from a long timeframe instead of a single observation as mentioned by Cappelli & Tavis (2016). Performance data is also not compared to static rankings but is customized to specific requirements for each employee and job position. Lastly, it was found that artificial intelligence adds to the personal growth of employees by suggesting training to improve their skill set and performance (Ahmed, 2018; Drent et al., in press; Guenole & Feinzig, 2018; Maity, 2018; SAP, n.d.; Schrage et al., 2019; Visma Raet, n.d.; Workday Talent Management, 2017; Zel & Kongar, 2020). This step is added to the performance management process established by Armstrong (2000) and Aguinis (2013) since personal development is now one of the main goals of giving feedback to employees.

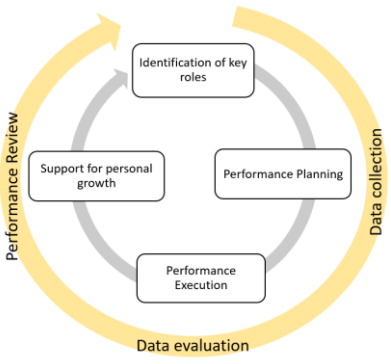

Figure 4. Performance Management Process with AI usage

Figure 4 shows the process of performance management when artificial intelligence is used. After key performance requirements are established and a plan is created to reach performance goals, employees are executing their work. What is different is, that data is now collected permanently. The software is connected to all digital systems and can collect extensive data at any point in time. This information is evaluated immediately and fed into a digital employee file. Another new feature is the flexible review moments. Employees can always access their performance data to check their scores. At the end of the process, the system can suggest training to support individuals in improving their performance. In comparison to the traditional procedure, this step was added and represents a new activity within the performance management process.

To conclude, artificial intelligence automatically conducts many administrative tasks of the process as Buck and Morrow (2018) suggested. Data collection got more extensive and the evaluation more objective. Moreover, feedback is available more often and can be customized to individual needs with the goal to support personal growth instead of improving production efficiency.

5.1.3 Sensemaking and adaption of AI-generated feedback

"How do stakeholders concerned with AI-generated feedback make sense of the new software?"

As mentioned by Griffith (1999), the perception of new technologies has a great impact on their successful implementation. Software managers did experience that most companies fail to realize the full potential of their software due to a lack of education and training in using the program which also finds support in the literature (Davenport & Ronanki, 2018; Scharma et al., in press). Another issue in the implementation of AI-generated feedback are strict laws and requirements within the European Union on AI usage (Madiega, 2022; Benjamin et al., 2022).

It was found that Sensegiving always took place positively. Software developers were emphasizing the opportunities and benefits of AI-generated feedback. Gioa and Chittipeddi (1991), Maitlis (2005) and Maitlis and Lawrence (2007), highlighted that high levels of leader sensegiving led to highly controlled sensemaking processes. However, interviewed software developers experienced differing outcomes. Companies either saw AI-generated feedback either as a threat or an opportunity. This result can be explained by Helms Mills et al. (2010), stating that individuals rely on past experiences as well as organizational rules, language and routines when trying to make sense of disruptive events.

In sum, interview outcomes and literature findings show that sensemaking is a complex process which is shaped by a variety of factors (Helms Mills et al., 2010). To understand the full sensemaking process of AI-generated feedback, factors influencing personal beliefs and perceptions need to be investigated in future research.

5.2 Theoretical implications

Throughout this research, several theoretical implications were found. First, this paper supports literature on general applications of AI in performance management. Findings are in accordance with the paper from Buck and Morrow (2018) stating that AI will lead to an automation of administrative performance management activities.

Next, this paper contributes to the literature regarding effects of AI on the performance management process. It updates the performance management process as introduced by Armstrong (2000) and Aguinis (2013) by adding a new activity, namely, the personal growth support and by discovering that data collection and evaluation are conducted continuously when AI-generated feedback is used.

Lastly, Sensemaking theory got applied. This research stays in contrast to the existing literature. It was found that leaders do not necessarily influence how new technologies are understood as proposed by Maitlis (2005) and Smircich and Stubbart (1985). Therefore, the suggested leadership control cannot be supported implying that Sensemaking theory needs to be further researched in the future.

5.3 Practical implications

The findings of this research suggest several practical implications. First, it was shown that European privacy laws are still hindering the usage of AI-generated feedback in several countries. This implies that companies need to carefully align the software to legal requirements.

Next, it was found that companies often struggle when implementing AI performance management software into their organizational processes. HR managers and line managers need more education and training in how AI works, how the software itself works, and how they can benefit from it so the scepticism towards this new technology can be reduced.

Lastly, companies must keep their organizational abilities to implement AI-generated feedback in mind. The successful measurement of employee performance highly depends on the job position and specific performance requirements. The KPIs need to be aligned with strategy and job to achieve helpful support through artificial intelligence.

6. CONCLUSION

This research aimed to gain insights into how the integration of AI-generated performance feedback will change aspects of the performance management process. Through conducting semi-structured interviews, it was found that the overall goal of using AI-generated feedback is to automate as many activities as possible. This brings changes to the process of giving feedback.

Collecting data can be done continuously and a broader picture of employee performance can be drawn by using many different sources of performance data. Next, individuals are not solely judged by their line managers anymore but also by the software, their colleagues, and external individuals. Additionally, feedback is available at any time and can be summarized in accessible graphs and tables. A formal appraisal talk still exists. Managers are making use of more extensive performance data which got collected by AI performance management throughout the year. Peaks and lows are accurately identified, and managers and subordinates can discuss further ways to improve their work. Here, artificial intelligence also supports employees in comparing their performance to their job position and suggesting training for personal development that suit the employees' weaknesses and their job requirements which is a newly added activity. In sum, artificial intelligence does change the performance management process. The sequence of some activities changes, and data is being collected and evaluated continuously. Additionally, a review of performance is available on request and the system adds support for personal growth to the process.

All in all, the integration of artificial intelligence into performance management leads to more accurate data that is analysed automatically and objectively. It does not add many new functions to performance management but is supposed to help managers and employees to do a better job by providing helpful and extensive feedback when it is needed.

7. LIMITATIONS

This paper contains several limitations. The exceptionally limited number of respondents of the qualitative research leads to a debatable validity of the statements presented in the Findings section since only a partial number of stakeholders perceptions is presented. Next to that, the small sample size leads to a limited number of perspectives regarding sensemaking and the use of artificial intelligence in performance management. For future research, more experts but also HR managers, line managers, and employees should be interviewed to collect data on various stakeholders working with AI performance management software.

Another limitation is the fact that all interviewees were working for a company that sells performance management software. Due to this, their opinions about artificial intelligence might be biased. Nevertheless, within this research, it was investigated in what ways the addition of AI changes the process of giving performance. This information is factual and does not depend on opinion. However, data about sensemaking might be biased by perceptions, experience, and personal beliefs which should be investigated further in future research.

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9. REFERENCES

Aguinis, H. (2012). *Performance Management* (3rd ed.). Pearson.

Ahmed, O. (2018). ARTIFICIAL INTELLIGENCE IN HR. *International Journal of Research and Analytical Reviews*, 971–978.

Almatrooshi, B., Singh, S. K., & Farouk, S. (2016). Determinants of organizational performance: a proposed framework. *International Journal of Productivity and Performance Management*, *65*(6), 844–859. https://doi.org/10.1108/ijppm-02-2016-0038

Alshenqeeti, H. (2014). Interviewing as a Data Collection Method: A Critical Review. *English Linguistics Research*, *3*(1). https://doi.org/10.5430/elr.v3n1p39

Armstrong, M. (2000). *Performance Management*. Kogan Page.

Armstrong, M., & Baron, A. (2004). *Managing Performance : Performance management in action (Developing Practice)* (2nd ed.). Chartered Institute of Personnel & Development.

Babbie, E. (2015). *The Practice of Social Research* (14 ed). Cengage Learning, Inc.

Barriball, K. L., & While, A. (1994). Collecting data using a semi-structured interview: a discussion paper. *Journal of Advanced Nursing*, *19*(2), 328–335. https://doi.org/10.1111/j.1365-2648.1994.tb01088.x

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open*, *2*, 8–14. https://doi.org/10.1016/j.npls.2016.01.001

Benjamin, M., Buehler, K., Dooley, R., & Zipparo, P. (2022, April 28). *What the draft European Union AI regulations mean for business*. McKinsey & Company. Retrieved 28 June 2022 from, https://www.mckinsey.com/business-functions/quantumblack/our-insights/what-the-draft-european-union-ai-regulations-mean-for-business

Bondarouk, T. (2011). Electronic HRM in Theory and Practice. *Advanced Series in Management Vol. 8*. https://doi.org/10.1108/S1877-6361(2011)0000008015

Bondarouk, T., & Ruël, H. (2009). Electronic Human Resource Management: challenges in the digital era. *The International Journal of Human Resource Management*, *20*(3), 505–514. https://doi.org/10.1080/09585190802707235

Brock, J. K. U., & von Wangenheim, F. (2019). Demystifying AI: What Digital Transformation Leaders Can Teach You about Realistic Artificial Intelligence. *California Management Review*, *61*(4), 110–134. https://doi.org/10.1177/1536504219865226

Buck, B., & Morrow, J. (2018). AI, performance management and engagement: keeping your best their best. *Strategic HR Review*, *17*(5), 261–262. https://doi.org/10.1108/shr-10-2018-145

Cappelli, P., & Tavis, A. (2016). The Performance Management Revolution. *Harvard Business Review*, 58–67.

Chakraborty, S., Giri, A., Aich, A., & Biswas, S. (2020). Evaluating Influence of Artificial Intelligence on Human Resource Management Using PLS-SEM. *International Journal of Science & Technology Research*, *9*(3), 5876–5880.

Chowdhury, S., Dey, P., Joel-Edgar, S., Bhattacharya, S., Rodriguez-Espindola, O., Abadie, A., & Truong, L. (in press). Unlocking the value of artificial intelligence in human resource management through AI capability framework. *Human Resource Management Review*.

Davenport, T. H., & Ronanki, R. (2018). Artificial Intelligence for the Real World. *Harvard Business Review*, 108–116.

de Laat, M., Joksimovic, S., & Ifenthaler, D. (2020). Artificial intelligence, real-time feedback and workplace learning analytics to support in situ complex problem-solving: a commentary. *The International Journal of Information and Learning Technology*, *37*(5), 267–277. https://doi.org/10.1108/ijilt-03-2020-0026

den Hartog, D. N., Boselie, P., & Paauwe, J. (2004). Performance Management: A Model and Research Agenda. *Applied Psychology*, *53*(4), 556–569. https://doi.org/10.1111/j.1464-0597.2004.00188.x

DeNisi, A. S., & Pritchard, R. D. (2006). Performance Appraisal, Performance Management and Improving Individual Performance: A Motivational Framework. *Management and Organization Review*, *2*(2), 253–277. https://doi.org/10.1111/j.1740-8784.2006.00042.x

Drent, E., Renkema, M., & Bos-Nehles, A. (in press). Reconceptualizing the HRM Role of the Line Manager in the Age of Artificial Intelligence. -.

Euchner, J. (2019). Little ai, Big AI—Good AI, Bad AI. *Research-Technology Management*, *62*(3), 10–12. https://doi.org/10.1080/08956308.2019.1587280

Ewenstein, B., Hancock, B., & Komm, A. (2016). *Ahead of the curve: The future of performance management*. McKinsey & Company. Retrieved 25 March 2022, from https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/ahead-of-the-curve-the-future-of-performance-management

Gikopoulos, J. (2019). Alongside, not against: balancing man with machine in the HR function. *Strategic HR Review*, *18*(2), 56–61. https://doi.org/10.1108/shr-12-2018-0103

Gioia, D. A., & Chittipeddi, K. (1991). Sensemaking and sensegiving in strategic change initiation. *Strategic Management Journal*, *12*(6), 433–448. https://doi.org/10.1002/smj.4250120604

Graßmann, C., & Schermuly, C. C. (2021). Coaching With Artificial Intelligence: Concepts and Capabilities. *Human Resource Development Review*, *20*(1), 106–126. https://doi.org/10.1177/1534484320982891

Griffith, T. L. (1999). Technology Features as Triggers for Sensemaking. *Academy of Management Review*, *24*(3), 472–488. https://doi.org/10.5465/amr.1999.2202132

Gruman, J. A., & Saks, A. M. (2011). Performance management and employee engagement. *Human Resource Management Review*, *21*(2), 123–136. https://doi.org/10.1016/j.hrmr.2010.09.004

Guenole, N., & Feinzig, S. (2018). The Business Case for AI in HR. *IBM Smarter Workforce Institute*.

Haenlein, M., & Kaplan, A. (2019). A Brief History of Artificial Intelligence: On the Past, Present, and Future of Artificial Intelligence. *California Management Review*, *61*(4), 5–14. https://doi.org/10.1177/0008125619864925

Helms Mills, J., Thurlow, A., & Mills, A. J. (2010). Making sense of sensemaking: the critical sensemaking approach. *Qualitative Research in Organizations and Management: An International Journal*, *5*(2), 182–195. https://doi.org/10.1108/17465641011068857

Heywood, J. S., Jirjahn, U., & Struewing, C. (2017). Locus of control and performance appraisal. *Journal of Economic Behavior & Organization*, *142*, 205–225. https://doi.org/10.1016/j.jebo.2017.06.011

Jiang, F., Du, C., Fu, T., & Xiao, R. (2019). Research on the Application of Artificial Intelligence in Human Resource Management. *Journal of Sciences Studies*, *4*, 258–262.

Justin M.A., E., & Joy, M. M. (2022). Managing the most important asset: a twenty year review on the performance management literature. *Journal of Management History*. https://doi.org/10.1108/jmh-04-2021-0023

Kalischko, T., & Riedl, R. (2021). Electronic Performance Monitoring in the Digital Workplace: Conceptualization, Review of Effects and Moderators, and Future Research Opportunities. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.633031

Kellogg, K. C., Valentine, M. A., & Christin, A. (2020). Algorithms at Work: The New Contested Terrain of Control. *Academy of Management Annals*, *14*(1), 366–410. https://doi.org/10.5465/annals.2018.0174

Klein, K. J., & Sorra, J. S. (1996). The Challenge of Innovation Implementation. *Academy of Management Review*, *21*(4), 1055–1080. https://doi.org/10.5465/amr.1996.9704071863

Komaki, J. L. (1986). Toward effective supervision: An operant analysis and comparison of managers at work. *Journal of Applied Psychology*, *71*(2), 270–279. https://doi.org/10.1037/0021-9010.71.2.270

Kotter, J. P., & Schlesinger, L. A. (2008). Choosing Strategies for Change. *Harvard Business Review*.

Madiega, T. (2022, January). *Artificial Intelligence Act*. European Parliament. Retrieved 23 June 2022, from https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/EPRS_BRI(2021)698792_EN.pdf

Maitlis, S. (2005). The Social Processes of Organizational Sensemaking. *Academy of Management Journal*, *48*(1), 21–49. https://doi.org/10.5465/amj.2005.15993111

Maitlis, S., & Lawrence, T. B. (2007). Triggers And Enablers Of Sensegiving In Organizations. *Academy of Management Journal*, *50*(1), 57–84. https://doi.org/10.5465/amj.2007.24160971

Maity, S. (2019). Identifying opportunities for artificial intelligence in the evolution of training and development practices. *Journal of Management and Development*, 651–663. https://doi.org/10.1108/JMD-03-2019-0069

Oracle. (n.d.). *Talent Management*. Oracle. Retrieved 23 June 2022, from https://www.oracle.com/human-capital-management/talent-management/

Osmani, F., & (Ramolli), G. M. (2012). Performance Management, Its Assessment and Importance. *Procedia - Social and Behavioral Sciences*, *41*, 434–441. https://doi.org/10.1016/j.sbspro.2012.04.052

Parry, E., & Tyson, S. (2010). Desired goals and actual outcomes of e-HRM. *Human Resource Management Journal*, *21*(3), 335–354. https://doi.org/10.1111/j.1748-8583.2010.00149.x

Pfeffer, J., & Veiga, J. F. (1999). Putting people first for organizational success. *Academy of Management Perspectives*, *13*(2), 37–48. https://doi.org/10.5465/ame.1999.1899547

Pulakos, E. (2004). *Performance Management A roadmap for developing, implementing and evaluating performance management systems*. SHRM Foundation.

Reim, W., Åström, J., & Eriksson, O. (2020). Implementation of Artificial Intelligence (AI): A Roadmap for Business Model Innovation. *AI*, *1*(2), 180–191. https://doi.org/10.3390/ai1020011

SAP. (n.d.). *SAP SuccesFactors Performance & Goals*. SAP. Retrieved 23 June 2022, from https://www.sap.com/products/performance-goals.html

Schrage, M., Kiron, D., Hancock, B., & Breschi, R. (2019, February). *Performance Management's Digital Shift*. MIT Sloan Management Review. https://sloanreview-mit-edu.ezproxy2.utwente.nl/projects/performance-managements-digital-shift/

Sharma, M., Luthra, S., Joshi, S., & Kumar, A. (in press). Implementing challenges of artificial intelligence: Evidence from public manufacturing sector of an emerging economy. *Government Information Quarterly*.

Siddiqui, M. N. (2014). Success of an Organization is a result of Employees Performance. *Advances in Social Sciences Research Journal*, *1*(4), 179–201. https://doi.org/10.14738/assrj.14.280

Smircich, L., & Stubbart, C. (1985). Strategic Management in an Enacted World. *Academy of Management Review*, *10*(4), 724–736. https://doi.org/10.5465/amr.1985.4279096

Smith, C. (2019). An employee's best friend? How AI can boost employee engagement and performance. *Strategic HR Review*, *18*(1), 17–20. https://doi.org/10.1108/shr-11-2018-0092

Smither, J. W., & London, M. (2009). *Performance Management* (Vol. 21). Wiley.

Sofaer, S. (1999). Qualitative methods: What are they and why use them? *Health Services Research*, *34*, 1101–11018.

Stanley, D. S., & Aggarwal, V. (2019). Impact of disruptive technology on human resource management practices. *International Journal of Business Continuity and Risk Management*, *9*(4), 350. https://doi.org/10.1504/ijbcrm.2019.10021173

Tambe, P., Cappelli, P., & Yakubovich, V. (2019). Artificial Intelligence in Human Resources Management: Challenges and a Path Forward. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3263878

Tong, S., Jia, N., Luo, X., & Fang, Z. (2021). The Janus face of artificial intelligence feedback: Deployment versus disclosure effects on employee performance. *Strategic Management Journal*, *42*(9), 1600–1631. https://doi.org/10.1002/smj.3322

Trullen, J., Bos-Nehles, A., & Valverde, M. (2020). From Intended to Actual and Beyond: A Cross-Disciplinary View of (Human Resource Management) Implementation. *International Journal of Management Reviews*, *22*(2), 150–176. https://doi.org/10.1111/ijmr.12220

Visma Raet. (n.d.). *Performance Management*. Visma Raet. Retrieved 23 June 2022, from https://www.vismaraet.nl/talentmanagement-software/performance-management/

Vrontis, D., Christofi, M., Pereira, V., Tarba, S., Makrides, A., & Trichina, E. (2021). Artificial intelligence, robotics, advanced technologies and human resource management: a systematic review. *The International Journal of Human Resource Management*, *33*(6), 1237–1266. https://doi.org/10.1080/09585192.2020.1871398

Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the Process of Sensemaking. *Organization Science*, *16*(4), 409–421. https://doi.org/10.1287/orsc.1050.0133

Wiblen, S., Dery, K., & Grant, D. (2012). Do you see what I see? The role of technology in talent identification. *Asia Pacific Journal of Human Resources*, *50*(4), 421–438. https://doi.org/10.1111/j.1744-7941.2012.00037.x

Workday Talent Management. (2017). Workday. Retrieved 23 June 2022, from https://www.workday.com/content/dam/web/uk/documents/datasheets/datasheet-workday-talent-management-uk.pdf

Zel, S., & Kongar, E. (2020). Transforming Digital Employee Experience with Artificial Intelligence. *2020 IEEE / ITU International Conference on Artificial Intelligence for Good (AI4G)*, 176–179. https://doi.org/10.1109/AI4G50087.2020.9311088

10. APPENDIX

10.1 Appendix 1 – Interview protocols

Table 4. Interview protocol Software Developer

Interview Guide – Software Developer
Opening 1. Greeting 2. Ask for approval to record the meeting 3. Clarify that form of consent was received, understood, and agreed upon ***General questions*** Could you please indicate your job position and years of experience? Can you describe your company's activities in the field of AI-generated performance management? ***AI in performance management*** How does AI work in performance management? Which data is being collected within the performance management process? How is this data collected? What happens with this data after collection? What new functions and applications does the integration of Artificial Intelligence add to performance management software? What impacts do these new functions have on performance management? What is the overall goal of AI-generated performance feedback? What do you want organizations to achieve with it? ***Questions regarding changes within the PM Process*** In what ways does AI impact the performance management process? In what ways does AI support the identification of KPI measures of performance in regard to employee performance requirements? How can AI be used to develop the personal development plan and requirements of employees? How is performance data evaluated and summarized through using AI? In what ways does AI support managers within the performance review stage, where outcomes of the performance evaluation are discussed, and feedback is given? How frequently do employees get performance feedback? How does AI support employees to develop themselves further and to improve their performance and their personal skillset? ***Implementation of AI-generated feedback*** How are line managers reacting on new AI performance software? Is the integration successful? What are issues that line managers and employees experience with using this software?

How would you rate line managers capability to realize the full potential of the software?

Sensegiving

If you would try to sell AI-performance management software to a company, how would you explain the product to them?

Sensemaking

How are companies reacting on your product and the possibility to use artificial intelligence?

Table 5. Interview protocol Employee

Interview Guide – Employee

Opening

1. Greeting
2. Ask for approval to record the meeting
3. Clarify that form of consent was received, understood, and agreed upon

General questions

Could you please indicate your job position and years of experience?

Questions regarding changes within the PM Process

How do you plan your performance requirements with your responsible manager?

How often do you receive performance feedback?

How does the performance management software support you in developing yourself and your performance?

Sensemaking/ Sensegiving

When and how did you first hear about the introduction of a new AI-based performance management software?

What did you think about this new system at this moment?

Did your opinion about an AI-based feedback system change?

How would you inform a new colleague about the system?

10.2 Appendix 2 – Code information

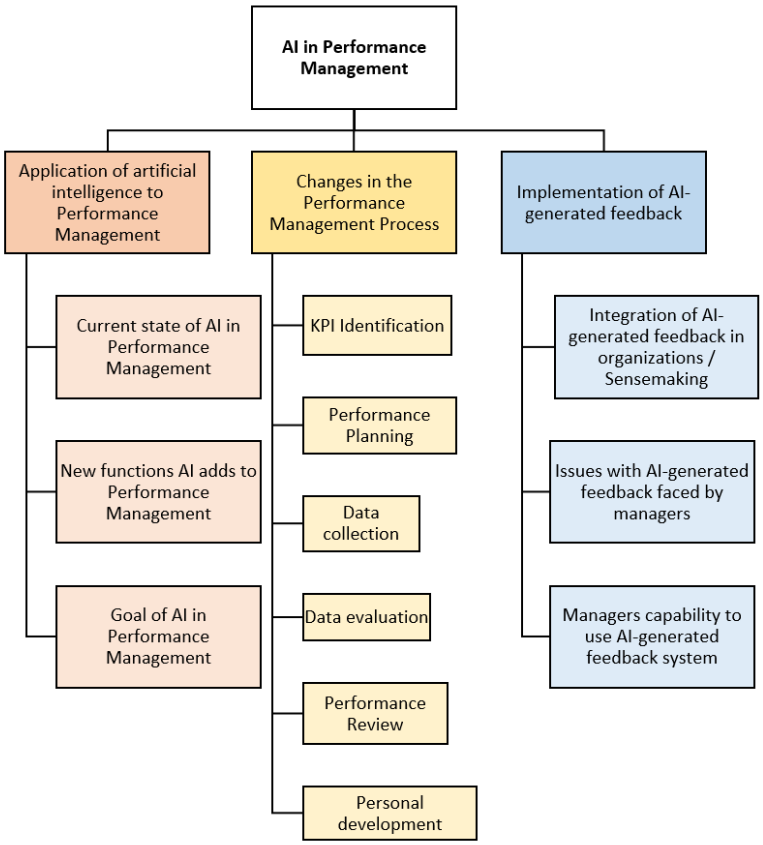

Figure 5. Data structure of codes

10.3 Appendix 3 – Literature review results

Table 6. Literature findings supporting research results

New functions AI adds to Performance Management	
Literature	*Information*
Ahmed (2018) Drent et al. (in press) Maity (2018) Schrage et al. (2019) Zel & Kongar (2020)	Coaching opportunities and skill development support
Ahmed (2018) Chowdhury et al. (in press) Schrage et al. (2019) Smith (2019)	AI actively informs managers and employees of special events (e.g., performance lows)
Changes in the performance management process	
Literature	*Information*
Jia et al. (2018) Maity (2018)	Pre-defined KPIs are used, AI does not support the establishment of performance requirements
Buck & Morrow (2018) Gikopoulos (2019) Kalischko & Riedl (2021) Kellogg et al. (2020) Schrage et al. (2019) Tong et al. (2021)	Data collection is done continuously
Chakraborty et al. (2020) Euchner (2019) Ewenstein et al. (2016)	Data evaluation is more extensive and done continuously
Chakraborty et al. (2020) de Laat et al. (2020) Schrage et al. (2019) Stanley & Aggarwal (2019)	Performance review became more flexible, employees can access performance scores at any time
Chakraborty et al. (2020) Chowdhury et al. (in press) Ewenstein et al. (2016) Jiang et al. (2019)	AI feedback is objective
Ahmed (2018) Drent et al. (in press) Maity (2018) Schrage et al. (2019) Tong et al. (2020) Zel & Kongar (2020)	Personal development by AI training recommendations
Implementation of AI-generated feedback	
Literature	*Information*
Davenport & Ronanki (2018) Sharma et al. (in press)	Managerial lack of understanding of software leads to implementation issues
Benjamin et al. (2022) Madiega (2022)	Strict EU laws are placing many requirements on companies, AI employee management system is qualified as a high-risk application within the EU

10.4 Appendix 4 – New functions AI adds to Performance Management software according to software providers

Table 7. AI opportunities in Performance Management

IBM (Guenole & Feinzig, 2018)	• Actively messaging managers about employee performance • Personalized learning • Giving career advice to employees • 24/7 chatbot assistance for HR matters
Workday (Workday Talent Management, 2017)	• Continuous feedback • Mentoring • 24/7 access to performance scores • Providing opportunity graph to employees comparing personal performance scores to performance requirements for open job positions
Visma Raet (Visma Raet, n.d.)	• E-learning
SAP SuccessFactors (SAP, n.d.)	• Writing and coaching assistant to guide managers in giving more comprehensible feedback • Continuous feedback • Automatically sending reminders to employees and managers to complete specific tasks • Analysis of the quality of performance review meetings between managers and subordinates to coach managers to give better feedback
Oracle (Oracle, n.d.)	• Continuous feedback • Flexible performance reviews and check-ins • Digital assistant for HR matters