Smart HRM in 2030: Conversational HR, Connected Robotics, and Controlled Analytics

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Shenzhen, February 29, 2030

Startup SpinerHR announces the next release of SPOON, the virtual HR management suite.

Based on the latest analytics and automatization technology, SPOON shifts the way of using HR services to the next level: it offers end-to-end HR process support, customized for line managers, employees, and the few people left in the HR department. SPOON offers all functionalities needed to provide administrative, first- and second-level support for internal and external customers of the HR function. For workforce planning, the system automatically calculates the quantitative and qualitative skill gaps in the workforce based on internal employee and freelancer data as well as external information about demand and supply on various labor markets, education systems, and competitors’ recruitment initiatives. It manages the recruiting process for commodity hires from job posting, CV screening and matching, interviewing, and contracting, including the whole real-time conversation with candidates. A “pay for skills” functionally crawls the talent market for hot skills and adjusts salary offerings accordingly. Employees get personal career coaching from the Avatar GO-WORN, a third-generation chatbot that generates original answers and learns from previous discussions. The new SPOON release comes with a FutureMe-well-being module: GEKKO, a friendly robot advisor that provides employees recommendations on how to optimize their investment portfolio—financials as well as investments in skills—throughout their lifetime. GEKKO uses data and statistical analysis to isolate demographic and behavioral characteristics to find the most successful options and tactics for employees.

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The Times They Are A-Changin’ . . . ?!

Of course, Bob Dylan was right: times are changing. But what direction will change take? And how will change practically materialize? To answer, one can try to picture the (HR) world in 2030—which immediately means to run the risk of making a fool out of yourself, as “nothing is more amusing than the prognosis of the past” (Peterson cited in Radkau 2017, p. 222). The anxiety that SPOON, GO-WORN, and GEKKO or the like will be deployed in every company by 2030 is rather unsubstantiated. Nevertheless, there are already prototypes that are, in principle, able to perform these tasks. In addition, technological changes are only a part of all the changes that we have seen in recent years: globalization, protectionism, re-localization, global warming, epidemics, terrorism, etc.

If we position ourselves in the year 2030 and look back, we see that while change is manifold, some fundamental topics remain, particularly if the focus is solely on human resource management (HRM). Since the mid-1990s, experts have been arguing that (HR) work is changing, primarily as a result of new information and communication technologies and secondly due to sociodemographic changes, above all the ageing population in western countries, and economic policy factors such as the internationalization of value creation chains, including outsourcing (Scholz 1995; Hoss 1996). Very little has changed since then. This is why we are focusing on the effects of information processing technologies, which lead to more strongly data-based and automated HRM (see Gärtner 2020).

Regardless of the drivers of change just mentioned, there has been one other constant in the discussion about HRM for decades: the issue of whether a person is just a means of economic action and performance or an end itself that should be at the focus of all actions. In other words, do companies primarily conceive of and manage their employees as a resource or as a value driver? The relevance of HR’s function depends on how this question is answered. While proponents of the second perspective view HR as (almost) the most critical function in the company, it merely plays a supportive role for all the others (they even think it may be done away with entirely). This dissent is in no way one which has only occurred in the past few decades with the increase in knowledge-intensive work. It can be seen in one of the first overview articles on the state of human resource departments in the USA (Donald and Donald 1929). It is most likely that the strategic and operational relevance of HRM have remained the same in 2030: organizations and divisions whose value creation is based on innovation, human interaction, and empathy or which provide knowledge-intensive services will put people (and therefore HR departments) at the center of their strategy. Others merely view them as a means among others.

In the next section, we describe three episodes that illustrate specific employee experiences of selected personas (Chap. 2). Before we outline HR practices that will be common along the HR value chain by 2030 in Chap. 4, we will explain four fundamental principles that underpin these HR practices in Chap. 3. The final chapter summarizes how the described changes in HR practices also lead to a change in the roles and responsibilities of the HR department.
2 “I Program my Home Computer, Beam Myself into the Future”: Employee Experiences in 2030

*Kraftwerk*, the pioneers of electronic music, anticipated a computer world in songs like “Home Computer” and others already in the 1970s and 1980s. We use parts of their songs as an intro for the three episodes on employee experiences and HR practices. We also adopt the persona approach which has become quite popular for analyzing and designing customer or employee experiences.

2.1 Sophia: “I Call This Number, for a Data Date”—*Kraftwerk, Computer Love*

Sophia is part of what happens to be known as Generation Z+, so she was born in the early 2000s (see Fig. 1). She studied computer and data science at one of the top universities in Europe (she was lucky enough to start her bachelor right after the coronavirus which boosted digital learning at universities throughout the world). After finishing her bachelor’s, she earned a master’s degree and achieved one of her most desired goals: to finish her PhD before she turned 30. While working on her thesis, she gained some experience as a freelancer and completed a couple of smaller data science projects for medium-sized companies. In the future, she aims to maintain a good work-life balance, so while she is familiar with working extra hours, she is not willing to do this every week. She is an open and agreeable person, but not too extroverted. There are a couple of things that she does not like—although not all of them keep her up at night (“pains”)—and some others that make her glad (“gains”). Some of the software packages she works with every day were introduced 15 years ago (around 2015, e.g., Keras, TensorFlow); others such as Python are even older but are still in use. When she interacts with machines, she either uses her hands (if there is a touchscreen) or a keyboard or just talks to them. The latter has been quite common for communication between machines and (end)users, but recently, it seems to work for developers as well. Apart from work, she has also tried some wearables, but most of the time she uses her smartphone to scan shopping items, view them in 3D, connect with beacons to see discounts, etc. Her motto shows that she is a firm believer in doing something right. Her motto helps explain why she contributes to various “maker communities” (just as her parents did), for example, Raspberry Pi and GitHub. Of course, she also uses and benefits from the version control and source code management functionalities that GitHub provides.

Since Sophia aims at achieving a good work-life balance, she is looking for a permanent job, at least for the next 2 years or so. Therefore, she attends a job fair that takes place at her university. There she meets a humanoid robot called “Pepper Jr.” She asks the robot some general questions about the company, compensation and benefits, usual career paths for data scientists, and the opportunity to take a sabbatical. Although the robot answers these questions satisfyingly, she is about to end the conversation and move on to the next booth. Unexpectedly, the guys from the booth next to them start playing the new Ped Sheran single. Sophia turns her head toward
Goals
(business, private)
• Work in and publish papers on Data Science
• Maintain a good work-life-balance

Personality
Neuroticism: 2
Extraversion: 3
Openness: 4
Agreeableness: 5
Conscientiousness: 1

Pains
• If cybersecurity is not taken seriously (e.g. if there are only little investments in IT-security)
• "management clowns" who only talk about costs and sales, but not about the quality of the apps and products
• If software code is written cumbersomely (by a few specific colleagues who grew up with C and Cobol)
• Too few sockets and USB ports in meeting rooms (mobile phone & laptop cannot be charged)

Gains
• Getting to work at 9:30 am without stress and with no delayed trains and buses
• Taking time to work on a software problem, discuss it with colleagues and experts via Github until the problem is solved
• Having access to the latest hard- and software (in particular in-memory-computing, machine learning libraries)
• Watch the crime scene on Sundays and chat with others via a second screen

Motto
Actions speak louder than words.

Technology/media usage

Peers
Tom (friend)
Lilian (colleague)

Scenes from an ordinary (business) day

Fig. 1 Description of persona “Sophia” (own illustration)
the music and so does Pepper Jr.—and the robot asks her whether she likes Ped Sheran. Since he has been one of her favorite singers since her youth (in the late 2010s), she confirms—and they linger on the past for a minute or so. Sophia is impressed that the dialogue module of the robot seems to be trained on a broad variety of topics and really can engage in a short chitchat.

Back at home, she sees a job advertisement from the company when she clicked on Ped Sheran’s new video on YouTube. It seems that Pepper Jr. and the job advertising system of the company are aligned and that the company is running a job advertising campaign on YouTube. Moreover, she sees not only the job ad but also the news about the company’s new investments in IT security—did she tell the robot about her interest in cybersecurity? Or did the company run a background check on her on social media and found some of the posts she left on one of the makers’ communities? The latter would have neither surprised nor shocked Sophia because she knew for a long time that almost nothing stays private in online communities. In fact, for Sophia, this is an indicator that the data science team seems to have done a good job: they seem to have the skills but also the hardware and software to achieve high accuracy on Natural Language Processing tasks and to make inferences across channels. The latter also means that processes and not only technologies are well prepared. These positive aspects outweigh the slightly scary feeling that she now has when she listens to Ped Sheran songs. So, she pushes the “apply now” button that automatically pulls the necessary information out of her LinkedIn account.

2.2 Ashley: “Interpol and Deutsche Bank, FBI and Scotland Yard—Business, Numbers, Money, People” – Kraftwerk, Computer World

Ashley is a woman in the prime of life. She was raised using progressive methods, and she sends her children to a Montessori school. Despite her post-heroic fundamental understanding of management, she has read her Machiavelli and knows about the role of power games. Something can still be achieved with “sufficient communication” in a few projects, but not without power—particularly in times in which changes need to be implemented against resistance. She has seen a lot of this in her many years in middle management at an automobile supplier, particularly between 2020 and 2030, with almost a third of the workforce being replaced and a further third needing to learn new skills. She now has to manage an organization of 500+ heterogeneous employees—and she has to cope with all the new digital-enabled HR services.

Last week and after a lengthy and nerve-wracking process, her company won a large double-digit million-euro contract with a premium car producer against their key competitor in this field. They are going to develop, produce, and supply next-generation sensors for autonomous driving. Integrating and connecting these hardware components with the software of other vendors require know-how in system architecture, software programming, and testing. To deliver in time and on budget
and meet the client’s rigorous quality standards are supposed to be the greatest challenge—as it always has been. Given the importance of this project, Ashley will be personally responsible to ensure its success.

Before she assigns the operational project work to a project manager, Ashley wants to understand how feasible the promised delivery in time and budget is. Over the weekend, Ashley puts together an initial project plan for the next 24 months, including the qualitative and quantitative resource needs. Back in the office on Monday, she plugs this into HR software. The result shown on her dashboard is better than expected. Only two out of the 15 roles (system architect and test engineer) that are needed to deliver are marked “red” and show a significant shortage.

Moreover, only a couple of the 25 “main tribe members” in her tribe have a high flight score risk, which means that the machine learning algorithm predicts that the vast majority is not about to leave. For those two high performers that have a flight score risk above 80 percent, the system recommends some retention measures that fit their personality profile (money and promotion for one, sabbatical for the other). Nevertheless, Ashley needs to prepare for the worst. Together with her HR business partner and a seasoned HR analytics expert, Ashley is running “close the gap” simulations on Tuesday and develops measures to overcome the skill gaps. The machine learning module of the HR software immediately recommended some measures based on past projects. Those measures, however, appear to be slightly off as they do not match her specific requirements. Nevertheless, they help get the thinking and discussion going. By the end of the week, the plan is finished and goes to the board for sign off.

2.3 Jeff: “I’m the Operator with my Pocket Calculator” – *Kraftwerk, Pocket Calculator*

After completing a degree in business administration in 2010, Jeff worked in the accounting division of a large logistics group for many years. He was never that interested in leadership tasks but in numbers and accounting rules. Unfortunately, the expert careers offered by the group rapidly turned out to be pure lip service and HR marketing jargon.

Many efficiency and reorganization programs in finance at his former company led to Jeff being happy he could still do his job for a while. When he started working, many partial processes were carried out by a service provider in India (e.g., updating master data, managing open posts, checking and booking travel expense bills, creating reports). From early 2020 onward, however, the outsourcing activities were gradually taken back, because software robots and machine learning algorithms were now cheaper. This affected debtor and creditor accounting (e.g., creating, validating, and updating customer and supplier master data but also the entire invoice production, including travel expense bills). Since the bots and algorithms still needed to be supervised in the beginning, Jeff helped with their introduction and training. This was an exciting and new task, but it took over 6 months for the machines to be able to handle the numbers and rules better than humans.
Jeff, therefore, made an effort to work on new activities, such as the creation of consolidated financial statements and liquidity management, and wanted to learn how to use various corporate financing tools. A couple of things had changed since he had originally studied them (or he simply forgot a few things). When Jeff contacted the HR department about this, a chatbot forwarded him a few videos and online tutorials that were freely available on the internet. After several emails to the HR department, Jeff found the HR consultant responsible for him. She told him, however, that due to the corporate crisis, personal and specialized training would not be offered at all until 2021 and after that would no longer be offered centrally to a significant extent. She did, though, encourage him to work on it himself and to train himself using one of the many online learning platforms. Ultimately, he would have a better idea of which qualifications and competencies were in demand in his area of expertise. Jeff started several online courses but did not manage to complete them. Learning alongside his work without any real contact with the teachers (one course had a reasonably good chatbot as a learning coach which tailored the tasks to Jeff’s needs but that was the only one) caused Jeff to lose his motivation quickly.

Jeff’s attempts to engage in the union and as an employee representative were too half-hearted and somehow petered out. Since 2025, he has been increasingly annoyed with his employer and wonders about what it will mean for the logistics industry if self-driving trucks and cars are allowed to drive within cities, which is still prohibited but has been subject of an ongoing debate over the last 5 years. The major distribution centers near the motorways have become more autonomous, and the intralogistics are already fully automated. What was horrifying to see was that all the hardware and software were delivered by Amazon’s logistics division.

Somehow Jeff does not think that his employer will survive on the market for very long, so he has also applied to the IT company which developed the software robots for his department. He actually thought he was already too old to start something new and focus more on the software side. The official reason he was rejected, though, was a mismatch in the cultural fit. Jeff had to do a half-hour online assessment with a personality test. The result was fast and sounded nice, but the content was devastating. The employees in the IT company, with whom he had worked on the introduction of the software robots, found him to be not particularly social or team oriented. And now his deficiencies were being flagged up. That, at least, was what it said in the report on the automatic assessment of the video taken during the online evaluation.

Exasperated, Jeff resigned from the logistics group 2 years ago. Initially, he was still used as a tester and quality assessor via an online platform when companies wanted to introduce software robots in the field of finance. But these were just occasional projects, and now there is not much of the work anymore—there are too many freelancers, clickworkers, etc. who undercut one another on these platforms. Since then, he has kept his head above water with fixed-term contracts and temporary employment. Both produce significantly lower earnings than he made years ago. He was recently even hired as a backup driver for his former employer. It transpired that the last mile in the cities was not so easy to supply autonomously. Too many real but mainly almost accidents with cars still being driven by humans led to robot cars
being banned from the centers of towns. The delivery process became bogged down, so in the short term, more subcontractors were commissioned to deliver packages.

3 The Three Plus One C of Smart HRM

In 2030, there are still three main activity areas that a Chief Human Resource Officer (CHRO) must take care of: (1) People and Talent Management, (2) Organization Design and Change, and (3) Management and Leadership of the HR Department. The primary tasks in the activity area “Talent Management” were the same as in 2020: attract and select, plan and deploy, perform and compensate, and develop and retain. In 2030, however, the delivery pattern of these four essential tasks is significantly influenced by technology that automatically processes data and communicates with humans. While the tasks remain somewhat stable, there are significant changes in how they are done. We circumscribe the latter in terms of the three Cs of Smart HRM that characterize HRM in 2030: “Conversational HR,” “Connected Robotics,” and “Controlled Analytics.”

Conversational HR denotes that the most used technology within HR and for interacting with HR is chatbots. The field of Natural Language Processing has improved due to new methods that combine the ever-increasing amount of data with domain-specific symbolic knowledge. This progress boosted not only the breadth and depth of topics that chatbots can cover but also the accuracy of their answers and tasks they can automatically process. Consequently, voice-based chatbots have achieved high levels of usability and performance for most tasks in the activity area “Talent Management,” which means that using these chatbots is the most common way of interacting with HR.

Connected Robotics encompasses the relation and collaboration between human workers and both physical and digital technologies. Humans are connected with various devices which are themselves connected: manufacturing and software robots, wearables (glasses, watches, phones, etc.), sewn or implanted sensors, and actuators. The implications of collaborative robotics for the three activity areas are manifold. Technologies that produce virtual and augmented realities are mostly used in the areas “attract and select” and “develop and retain”: For example, to provide candidates a “realistic” job preview and to have them perform tests virtually. In addition, the use of digital technologies to transfer information and virtual environments to acquire knowledge by conducting training has been pushed by the Corona pandemic. Wearables, on the other hand, are preferably used to “plan and deploy” employees as well as to measure their performance, because these technologies gather data about activities in a certain location at a certain time. The processing of these data is part of “Controlled Analytics.”

Controlled Analytics denotes the prevalence of data- and evidence-based recommendations to design work environments and processes (highly relevant for “Organization Design and Change” but also the other activity areas). This is a double-edged sword. On the one hand, making decisions based on scientifically processing data is likely to replace prejudice and biases in decision-making. On the
other hand, data protection and security issues become vital and give rise to different forms of worker resistance that range from individual action to platform organizing, discursive framing, and legal mobilization (Kellogg et al. 2020). The term “Controlled Analytics” reminds us that data and algorithms can be used to control workers (e.g., by recommending and restricting what they should do, evaluating their performance or replacing them) and thus should be controlled.

Together, the three Cs of Smart HRM drive HR practices in 2030, both in terms of efficiency and in terms of quality. The three Cs have produced, however, another “C” as an unintended consequence: they corroborate a chasm between digital winners and digital losers, and HR needs to address this divide. This divide is not only digital but has an effect on the analogue or physical world: it creates a divide between those who have lovely jobs and those who have lousy jobs and those who exploit and those who are exploited, and it separates those who are tech-savvy from the “people people” in the HR department. The three episodes illustrate several divides which form the great chasm.

First, there are “digital winners” such as Sophia and “digital losers” such as Jeff. Of course, the former encompasses not only data scientists and software and robot developers but also those who have accumulated a lot of monetary and social capital (e.g., owners of real estate in large cities, influencers, and others with a vast and robust social (media) network or the creative class). The digital losers are victims of what has been called digital capitalism and digital Taylorism, which denotes that software packages capture and codify an increasing body of professional knowledge that can then be automated and transferred to any location, where it is monitored ubiquitously (Brown et al. 2010, p. 71ff.). The profits that these efficiency enhancements generated have been distributed unequally, i.e. those who do the work still benefit less. In contrast, those who distribute work through technologies and data benefit more. In addition, working and employment conditions have deteriorated for clickworkers, self-employed or temporary workers, and others who work based on project-related contractual arrangements because traditional forms of employment and participation, which allow employees in companies to exercise influence and receive support for developing their employability, do not apply for them (see De Stefano 2016).

Second, the work itself and the jobs built on it are likely to be polarized. They might be characterized along dimensions such as “high tech” vs. “high touch” or “lovely jobs” vs. “lousy jobs.” For example, some high-tech and lousy jobs have emerged in the (social) media industries and include the assembly line like the publishing of cheap content or doing quality and compliance checks of posts in social media. Some critics referred to these as “digital sweatshops” (Cohen 2015, p. 104; Garson 1989). Of course, some lousy tasks have been automated. However, looking back, we see that for every lousy job that existed, new lousy jobs have been created.

Lastly, and as a consequence of what we have just described, there is a physical divide between those who exploit and those who are exploited in real, “analogue” sweatshops. In these factories with poor working conditions, humans perform highly manual work that cannot be digitalized or automated, at least not as cheaply as it can
be done by exploiting human resources. In this regard, focusing on and providing the human touch are still an essential aspect of human resource management. In 2030, however, the “people people” no longer represent the majority in HR departments as their new colleagues are robots, gig workers or clickworkers, and the like.

4   Smart HR Practices Along the HR Value Chain

We describe some selected use cases along the HR value chain that put the three Cs of Smart HRM (Conversational HR, Connected Robotics, Controlled Analytics) into practice (see Fig. 2 for an overview and Gärtner 2020, S. 51ff., for further use cases).

4.1   Attract and Select

In terms of attract and select, the three Cs can primarily be seen in the fact that chatbots automatically answer candidate questions, collect and analyze data, and prepare it for further decisions. In 2030, language-based bots have mostly replaced their text-based predecessors. They are able to carry out dialogues on a broad range of topics (job vacancies, career topics, or general information about the company) and not just retrieve topic-specific responses. They interact with most candidates before a human HR specialist is involved, both in the virtual and in the physical environment (e.g., the company website but also in the form of humanoid robots at job fairs). In the case of high potentials in narrow employment markets and high-ranking jobs, the primary contact is person to person, but there still are bots running in the background to identify information about skills, integrity, and intentions from the language patterns—of both the candidate and the recruiter. Before, during, and after the job interview, bots collect data to help both parties to decide (e.g., background information that bots found in the company’s databases or crawled on the internet such as qualifications confirmed by a candidate’s contacts on business platforms). We see here that chatbots are not just prominent examples of Conversational HR, but can also connect people via different devices (Connected Robotics) and use the data obtained in a controlled manner to make decisions (Controlled Analytics). Since these chatbots interact with people, aspects such as user experience, trustworthiness, security, and social support become as crucial as carrying out the task they were designed for.

Candidates are assessed by digital selection systems to estimate their suitability for a job: from the automatic assessment of CVs and web-based personality or creativity tests, to online games, to selections based on language samples or video interviews. Games or playful elements have been used in both internal and third-party selection since around 2010, which is why we also talk about game-based assessments or “recruitainment.” There have been various developments of language and video analyses: after the initial euphoria, there were then concerns about the relevance of their content and their ability to predict a candidate’s suitability and subsequent success (Gärtner 2020, p. 87). Most concerns with multimodal analysis
**Conversational HR**
Voice-based chatbots that engage in dialogues with candidates and employees about the company, policy & processes (e.g., vacation, time off, compensation, safety & security, health) as well as staffing, career and investment opportunities.

**Connected Robotics**
Wearables (e.g., glasses for augmenting reality, gloves for working and learning in virtual environments), physical and software robots that automatically connect various channels in order to provide a seamless candidate & employee experience but also track and manage performance.

**Controlled Analytics**
Data- and evidence-based recommendations about how to manage the workforce (e.g., how design work environments, which team composition works best, which trainings should be devised to whom, who to retain) as well as controlling which data should be uses (considering data protection issues).

**Chasm between digital losers and winners**
Divide between those who have lovely jobs and those who have lousy jobs (digital and physical sweatshops), those who exploit and those who are exploited, and the divide between the tech-savvy and the “people people” in the HR department.

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*Fig. 2* Overview of principles and Smart HR practices (own illustration)
systems have been alleviated by the constant improvement over the course of the 2020s. Our confidence is mainly rooted in the fact that several providers (e.g., Cyquest, HireVue, Knack, Mettl, Pymetrics) have been offering and improving their assessment platforms since the 2010s, which is why online testing became widely used for various groups of jobs and professions (e.g., developers, apprentices, and trainee managers).

In 2030, many large companies use technologies to analyze language and video data in selection processes. These analyses encompass not only whether somebody leaves the browser window during an online test (e.g., to search for the answer online) but also the tonality, pattern of words, and facial expressions, such as blinking, jumps in eye movements, and staring at a specific point. Part of the assessment includes personality analyses, in which language and image data are checked for patterns and links to known personality features (e.g., the Big Five) or other professionally relevant features (such as assertiveness and resilience). Simple regression analyses (and more sophisticated statistical techniques) of the applicant data with those of employees deemed to be high performers allow predictions about subsequent success. Applicants who are not accepted are given suggestions for career planning, for example, how they should further develop their skills and qualifications for future positions and which other roles could be interesting for them.

### 4.2 Plan and Deploy

As part of strategic and operative planning processes, HR is required to analyze how many employees are needed in which location at what time with which qualifications and at what costs in order to initiate suitable recruitment, staff development, succession planning, or redundancy measures. Metaphorically speaking, HR needs both a microscope and a telescope to analyze existing data precisely and predict future developments and scenarios for different futures. The aim is to reduce staffing costs by avoiding expensive overtime and idle times while simultaneously keeping employee motivation and increasing customer satisfaction, without infringing any legal requirements as well as ethical or moral principles—which includes implementing measures that avoid a deepening of the great chasm.

Companies have been making predictions for operational and quantitative planning for a long time: (food) retailers and the logistics industry use historical data on checkout transactions, new orders and quantities to be produced, incoming complaints, and customer inquiries to estimate the work to be done. They predict the workload concerning several dimensions time, location, and matter-based perspective. In 2030, the ability and desire of employees and their behavioral disposition are taken into account to a greater extent to put teams together in an optimal manner (Gärtner 2020, p. 94).

The degree of complexity of operational planning depends above all on the number of different groups of employees and how many features (e.g., skills, needs, company agreements, or rules) are considered. In what is known as
contingent workforce management, nontypical employment contracts (part-time, consultants, freelancers, contract workers, etc.) are considered in addition to classical full-time workers. Depending on the employee group, staffing and personnel costs vary. Companies, therefore, use their talent ecosystem to plan and deploy the increasing numbers of nontypical employees (gig workers, freelancers, etc.) efficiently. Employee questions with regard to working hours, absences, holidays, benefits, etc. can mainly be answered by chatbots, which are also used in medium-sized companies. Unlike their predecessors from the 2020s (e.g., Vinni, the HR chatbot run by Invia), in 2030, these chatbots can understand open questions and generate responses.

Here, too, the double role of Controlled Analytics must be considered: the algorithms control the staff but also need to be checked themselves because discrimination could creep in. If, for example, the data fed into the training of a machine learning algorithm are already biased, the results will also be biased. Also, an algorithm that aims at cost optimization could learn that female employees are more cost-effective (because they work part-time to a disproportionate degree and earn less for comparable jobs) and, therefore, would recommend female employees more often. In addition to gender-based discrimination, there are also other unwanted biases. If, for example, unionized employees receive additional payments for working at nights or on Sundays (but those who are not in unions do not), an algorithm aiming to minimize costs would systematically allocate cheaper employees who are not part of a workers union to the unpopular night and Sunday shifts, thereby discriminating against this group (Gärtner 2020, p. 95).

The qualitative dimension of planning (i.e., considering competencies, needs, etc.) will become more important than it has been at the start of the century. Strategic workforce management considers these abilities and develops long-term measures which ensure that competencies are available in the company and can be used. Companies such as 8works or Burning Glass currently provide external and internal data on the demand and availability of specific skills in the employment market. Microsoft offers something similar through its subsidiaries LinkedIn and GitHub and the Microsoft Workplace Analytics division. With the help of employee-based data and skills inferencing (i.e., drawing conclusions about skills profiles based on gathered data plus previous knowledge about employees’ skills), companies will find it relatively easy to create transparency about the current level of competence within the company, to identify skilled persons and to discover skill gaps (see the next section for more on this). In sum, there will be four Bs in workforce strategies: build, buy, borrow, and bot.

## 4.3 Perform and Compensate

Performance management covers several areas, ranging from the definition of the activities, processes, or structures to be measured (including suitable parameters), to deviation analyses, to the feedback and control process. Many companies used to measure and monitor individual aspects such as leadership styles (e.g., delegation,
information), work results (e.g., sales, percentage of positive quality tests), and personality features (e.g., openness, diligence). These formed the basis of assessments and feedback. In 2030, these individual, intra-department aspects are (at least in part) supplemented and in some cases even replaced by team- and customer-based criteria (e.g., project completions, recommendation rate).

Data from outside of the company will also be included automatically to identify competencies or strengths and weaknesses that drive performance. In business networks such as LinkedIn, participants can confirm one another’s skills and qualifications. Companies can either crawl this data or can retrieve it via performance management software solutions (e.g., BambooHR or WebHR) to validate their employees’ actual competencies. It may be the case that these endorsements, mutual assessments, and references are not as valid as those from independent third parties because there might be courtesy votes and competencies that can only be confirmed and not denied or rated negatively (Kern and Haep 2016, p. 14). Nevertheless, these critics may also apply to current assessment systems, and the benefits are the timeliness and effortlessness of the peer assessments. In this context, it is interesting to note that Microsoft acquired LinkedIn, GitHub, Lynda, and Glint. This means that Microsoft has access to both data about qualifications, competencies, strengths, and weaknesses of employees from their online profiles (LinkedIn, GitHub), the feedback they received (Glint), and their daily work behavior (Office products)—and it can offer them training via the learning platform Lynda (Gärtner 2020, p. 108).

There are various options for analyzing what the most important drivers and influencing factors for work performance are. In the simplest cases, the data needed for this are specially collected via employee surveys, so it is possible to check whether drivers which are theoretically possible are actually in place. Simple multiple regression analysis or a Bayesian network may be used to predict which factors are the most important ones and which measures are likely to influence these factors and what the overall impact on work performance is. The collection of performance data using wearables is a bit more complicated (technically, legally, and ethically). However, manual activities, for example, can be measured using beacons or position and acceleration sensors (Pentland 2014).

In large companies, remuneration is often based on a grading system in which the requirements of a position are assessed using defined criteria, for example, the breadth and depth of specialist and management skills which are required to work successfully in the role or the significance of the impact on the operating result. In contrast to performance assessment, it has thus far been the anticipated input rather than the output, which is measured to rank roles internally and to set the remuneration in a manner that reflects the requirements and the market (Skenes and Kleiner 2003). There are several digital tools on the market from established providers such as Mercer, Willis Towers Watson, or the Hay Group but also startups such as Gradar and Content. Content, for example, has developed a model that represents all the tasks and associated capacities as well as costs in a relational database. One advantage in comparison to the standard assessment process is that changes to job intersections can be shown more easily because the smallest units of a role—the
tasks and services carried out—are identified and recorded in the system. This flexibility is important in a dynamic work environment. The connection between input (grading) and output (performance assessment) goes one step further. In the simplest case, information about the requirements of a role is placed in what are known as calibration rounds, where they are used to determine target achievement and bonuses. An example for this is Zalando’s feedback and assessment system, called “Zonar,” which stores role structures and career paths in order to document the expectations and requirements of a job, conditions for promotion, and levels of development (Staab and Geschke 2019, p. 17). Another idea is to link the tasks not only to costs and capacities but also to the service provided in an IT system. The latter is achieved to some extent by technically enabling peer-to-peer performance assessments, although this comes with all of the problems and criticisms linked to an approach of this kind (see Gärtner 2020, p. 107 et seqq.).

In order to motivate employees to achieve their goals, some providers integrate gamification elements (levels, point or star ratings, leader boards, badges), which should keep players’ (intrinsic) motivation levels high. Betterworks and Engagedly offer these types of functions. For example, employees can collect points which can then be redeemed for vouchers or other rewards, or they can go up a level when they have achieved their goals. The visibility of what has been achieved within the organization is often used as a lever to offer immaterial stimuli such as recognition and an increase in status. Ultimately, the aim of gamification is for employees to be intrinsically motivated and encouraged to achieve self-optimization through play. The hype surrounding the use of gamification in the workplace has now, however, given way to more critical and realistic considerations (Vesa and Harviainen 2019).

While pay for skills has been challenging to master in 2020 due to lack of solid information on both pay and skills, in 2030, this approach has gained ground. For example, IBM asked managers to rigorously identify skills throughout the organization. The segmentation of skills today is strict: rewards are linked to those with in-demand skills, while those with skills that are not needed do not get any increase. Identifying and rewarding the right technical skills allow the company to innovate continuously. Employees whose skills appear to be obsolete are encouraged either to learn new skills—for which there are extensive training budgets—or to move on (Mercer 2020). Maintaining this link between planning, performing, developing, and outplacing (or retaining) is one of the robust principles within HRM that has not changed throughout the years—but in 2030, the technologies are ready to enable seamless integration.

### 4.4 Develop and Retain

In general, the digital tools for developing and retaining are primarily about analytics and chatbots that should enable adaptive, personalized learning as well as virtual and augmented reality as a replacement technology for face-to-face training sessions. In particular, the use of digital tools changes several aspects of training and competence development (see the chapter on “Learning in 2030” in this book or Gärtner (2020)).
- Learning content can more easily be tailored to individual needs and be adapted to the learning progress or learning objectives through “learning analytics” (a synonym for this is “Educational Data Mining”).
- Development methods and learning locations become more diverse: they range from informal and tactile learning in the workplace with or from others; to virtual training on the computer or via smartphone with the help of video libraries, curated blog posts, e-coaching sessions, playful tests, simulations, or online communities; to the use of sensors and augmented or virtual reality. Through these media and technologies, the previously text-intensive content can be communicated through images, with sound, interactively, and in a tactile manner. Digital technologies thereby enable multimodal and interactive learning, which both increase the quality of the training provided (Niegemann and Heidig 2019, p. 3). When it comes to how digital tools can support the self-organized or (partially) automated creation of learning content, it is less about quality and more about cost reduction (Meier et al. 2018, p. 22, 25).
- More responsibility is transferred to employees in development planning, with the employer in turn permitting more transparency. Tools like Fuel50, a career pathing platform, provide means to personalize career paths and connect with mentors, coaches, and colleagues. They use gamification, AI, and 360° feedback to drive succession and talent development as well as performance management.
- When controlling HR development measures, (almost) real-time data from the training situation can be used. In addition to the data which is typically collected about participants, trainers, and training sessions (equipment) such as the number, costs, times, and competencies, data are now available on the actual training process and the progress participants are making with their learning.
- The changes mentioned above result in new requirements placed on the skills of HR developers. In particular, they need to be able to estimate the opportunities and limits of the tools of digitized learning. Regardless of whether they consider them positive or negative, it is evident that digital technologies are the media of knowledge and action: we know more when we have access to global databases, and we act differently because we have these opportunities.
- Along with the tasks, the roles and expectations of HR developers, managers, employees, and providers of educational services change too. Since digital tools enable new forms of needs-driven, self-controlled, and social learning, the learners become the focus to a greater extent but also take on a driver role, with HR becoming the curator of learning content (Jenewein 2018, p. 273; Liebert and Talg 2018, p. 203 et seqq.). Learners determine the form, content, time, and fellow learners themselves, and the corresponding demand is satisfied through internal or external cloud services (from push to pull learning). HR is then responsible for providing continuously relevant, high-quality, and current learning content and will become the Spotify of learning because the content will be offered as a personal playlist. At the same time, the learners will be made more responsible for their development and “employability” than they used to be. A nontechnical argument for this is that where candidates are more specialized and the economy is more dynamic, it is increasingly only the management and the
employees themselves who know what they need. Another argument is that the training budgets do not cover the investment that is needed, and “employee self-service” is cheaper for the company.

It is not, however, just technologies that are changing but also the working conditions and, therefore, the sought skill profiles, which in turn results in an adjustment to strategic and operative knowledge and competency management (North and Maier 2018). This includes strategic issues about the knowledge and competencies which will be needed in the future based on the corporate strategy and about which business models are possible on the basis of the changed competencies. These questions are not addressed below, nor are aspects of pre-company or inner-company socialization (e.g., onboarding, cultural development) and career management (e.g., career pathways such as management, specialist, and project careers).

5 Conclusion

The described changes in HR practices also lead to a change in the roles and responsibilities of the HR department:

– Established IT providers and HR startups, fuelled by readily available risk capital, play an even more significant role in terms of new service offerings but also data security. Since these third-party providers reliably and continuously supply the market with new products, HR employees must be able to assess the offerings, negotiate contracts, and manage the collaboration.

– HR professionals need to know how “Natural Language Processing,” “machine learning,” “Robotic Process Automation,” and other techniques and technologies work in order to evaluate possibilities and risks. While these techniques and technologies translate into appealing labels such as “Conversational HR,” “Connected Robotics,” or “Controlled Analytics,” many of these ideas are rather buzzwords or fads. They are driven by vested interests and portray simple organizational concepts or long-standing ideas in HR in bright new colors and with a digital flavor. When such buzzwords are presented at conferences or award ceremonies, some HR managers will find themselves fidgeting in their chairs, cringing with embarrassment for the speaker, or are simply irritated—and buy the products and services just because they heard people say that “Google is also doing it.” Understanding the underpinning technologies, methodologies, and tools is a prerequisite to professionalize HR (for some of these underpinnings, see Gärtner 2020, p. 17ff).

– The Chief Human Resource Officer (CHRO) must manage and lead a more diverse HR team, composed of specialists who are data- and tech-savvy and often work as freelancers. In addition, there are a couple of “people people” and several of robots, gig workers, and clickworkers.
We suppose that digital tools will significantly influence the delivery of HR services. Of course, tools do not solve challenging organizational matters. The weather app and the iPhone won’t help if you have to go out in miserable weather because the dog needs a walk or the daycare center is closed. What you really need are good shoes, an umbrella, and a good understanding of the terrain (where to find shelter, which roads to avoid and which to take, etc.). And since it is often the case that you are not alone out there, you should also have learned how to behave as a social being in specific environments appropriately.

We believe that in 2030, the HR function will have made further progress both in terms of an increasing understanding of tools and the terrain. If HR lacks the motivation to move in this direction, there are external drivers: one is that the business is merely requesting HR to use these tools because they can improve the efficiency and effectiveness of HR practices. And even in 2030, an inability to attract, retain, and motivate the right numbers and right kinds of people will mean that human and nonhuman resources are wasted. Another driver is that managers of other functions threaten to overtake HR or vote for getting rid of HR. In our opinion, this is not going to happen until 2030. Still, those HR departments that do not consider the use of digital tools will attract less investment, and their reputation is going to deteriorate just as Scholz (1995) and others have projected.

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