Digital transformation of HR

– History, implementation approach and success factors –

Cumulative PhD Thesis

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Abstract

The digitisation of HR processes into cloud-based solutions is progressing continuously. This thesis examines such transformations, derives a concrete process model and identifies the critical success factors.

The methodology used for the investigation is of a qualitative nature. As a basis and preparatory measure to address the research questions, an extensive literature study in the HR field was carried out, with a special focus on publications on electronic human resources management (hereinafter e-HRM). Based on this knowledge and the combination of extensive practical experience with HR transformation projects, a study was published which presents the historical development of e-HRM and derived an optimised process model taking into account the technical HR requirements as well as the limitations of the new cloud technology. Subsequently, several HR experts who had already gained first-hand experience with HR processes in a cloud environment were interviewed to find out which success factors were relevant for such an HR transformation.

Main findings of this thesis are the derivation of a best-practice project procedure model for the transformation of HR processes into a cloud-based solution and the identification of potential obstacles in the implementation of such projects. In addition, the motives for such a transformation, the drivers within an organisation, the current degree of HR digitisation, the necessary operational and strategic parameters and ultimately the impact on working methods are worked out. As a further result, an assessment of the use of HR metrics is given and potential new key figures are derived.

Resumen (Castellano)

La digitalización de los procesos de RRHH en soluciones basadas en la nube progresa continuamente. Esta tesis examina tales transformaciones, deriva un modelo de proceso concreto e identifica los factores críticos de éxito.

La metodología utilizada para la investigación es de carácter cualitativo. Como base y medida preparatoria para abordar las cuestiones de investigación, se llevó a cabo un amplio estudio bibliográfico en el ámbito de los recursos humanos, con especial atención a las publicaciones sobre la gestión electrónica de los recursos humanos (en adelante, "e-HRM"). Basándose en este conocimiento y en la combinación de una amplia experiencia práctica con proyectos de transformación de RRHH, se publicó un estudio que presenta el desarrollo histórico de e-HRM y que ha derivado en un modelo de procesos optimizado que tiene en cuenta los requisitos técnicos de RRHH así como las limitaciones de la nueva tecnología de la nube. Posteriormente, se entrevistó a varios expertos en RRHH que ya habían adquirido experiencia de primera mano con los procesos de RRHH en un entorno de nube para averiguar qué factores de éxito eran relevantes para dicha transformación de RRHH.

Las principales conclusiones de esta tesis son la derivación de un modelo de procedimiento de proyecto de mejores prácticas para la transformación de los procesos de RRHH en una solución basada en la nube y la identificación de obstáculos potenciales en la implementación de dichos proyectos. Además, se elaboran los motivos de dicha transformación, los factores que impulsan el proceso dentro de una organización, el grado actual de digitalización de los recursos humanos, los parámetros operativos y estratégicos necesarios y, en última instancia, el impacto en los métodos de trabajo. Como resultado, se realiza una evaluación del uso de las métricas de HR y se derivan nuevas ratios potenciales.

Resumen (Catalán)

La digitalització dels processos de RRHH en solucions basades en el núvol progressa contínuament. Aquesta tesi examina tals transformacions, deriva un model de procés concret i identifica els factors crítics d'èxit.

La metodologia utilitzada per a la investigació és de caràcter qualitatiu. Com a base i mesura preparatòria per a abordar les qüestions d'investigació, es va dur a terme un ampli estudi bibliogràfic en l'àmbit dels recursos humans, amb especial atenció a les publicacions sobre la gestió electrònica dels recursos humans (en endavant, "e-HRM "). Basant-se en aquest coneixement i en la combinació d'una àmplia experiència pràctica amb projectes de transformació de RRHH, es va publicar un estudi que presenta el desenvolupament històric d'e-HRM i que ha derivat en un model de processos optimitzat que té en compte els requisits tècnics de RRHH així com les limitacions de la nova tecnologia del núvol. Posteriorment, es va entrevistar a diversos experts en RRHH que ja havien adquirit experiència de primera mà amb els processos de RRHH en un entorn de núvol per esbrinar quins factors d'èxit eren rellevants per a aquesta transformació de RRHH.

Les principals conclusions d'aquesta tesi són la derivació d'un model de procediment de projecte de millors pràctiques per a la transformació dels processos de RRHH en una solució basada en el núvol i la identificació d'obstacles potencials en la implementació d'aquests projectes. A més, s'elaboren els motius de la transformació, els factors que impulsen el procés dins d'una organització, el grau actual de digitalització dels recursos humans, els paràmetres operatius i estratègics necessaris i, en última instància, l'impacte en els mètodes de treball . Com a resultat, es realitza una avaluació de l'ús de les mètriques de HR i es deriven nous ràtios potencials.

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This work would not have been possible without the help of several people, whom I would like to thank warmly.

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Content

1. Introduction

Digitisation has become an integral part of the corporate world and is rapidly gaining ground. In the digitisation process, companies are not only trying to digitise the primary processes directly involved in the value-added chain, but also the secondary processes that were previously considered as subordinate. These secondary processes include the processes of the human resources department, which are now becoming increasingly important due to demographic development as well as the industrial change towards a knowledge society and the associated struggle for talent.

The HR processes can be assigned to three different process clusters: "Workforce Planning" (e.g. Recruitment, Succession Planning), "Talent Management" (e.g. Development, Learning Management) and the "operative HR core processes" (e.g. Payroll, Organisational Management). If these processes are already established in companies, many of them are either analogue (pen & paper) or digitally supported. The digital mapping of HR processes takes place in so-called e-HRM (electronic Human Resources Management) solutions, which today often digitise one or more HR processes. However, there was no e-HRM solution that digitally offered all or most of the HR process landscape in a holistic way - this paradigm has changed with the advent of cloud computing and Software-as-a-Service which offer HR processes in a cloud-based environment (hereinafter HR Cloud).

Literature shows that the digitisation of HR processes has existed for almost 80 years. However, research in this field did not pick up speed until the mid-1990s, when attempts were made to define the term e-HRM in a generally accepted way, which remains a challenge due to the rapid technological development. Even today, various researchers demand that e-HRM should be researched more widely and, above all, more systematically. This thesis starts by looking at the evolution of e-HRM and how digitisation can support HR work. The special technological features of the new HR Cloud solutions and their limitations in process mapping are outlined in detail. Based on the combination of different classical project procedure models, one model is derived that makes it possible to optimally transform the technical HR requirements into an HR Cloud solution. The peculiarities to be considered are highlighted and a best practice approach is recommended. After the HR processes have been transformed into an HR Cloud, the question of project success arises and what impact it has on the way HR works. The degree of digitisation of the processes, the stumbling blocks during implementation and changes in HR working methods are therefore examined subsequently. The extent to which the currently measured HR metrics such as key performance indicators (hereinafter KPI) and potentially redefined key figures contribute to the adoption of the new HR Cloud is examined separately.

The results of the dissertation and its relevance to closing research gaps are manifold. The contribution consists on the one hand of a concrete project procedure model for the realisation of an HR

transformation and on the other hand of a clear examination of the stumbling blocks as well as the effects of such a transformation. In addition, the new analytical possibilities offered by cloud technology and concrete HR metrics are developed.

2. Research methodology

The research methodology used in this thesis is described in the following chapter.

2.1. General

Research is a collective effort to gather and share knowledge about the world that surrounds us. Früh (2015) defines empirical research as the systematic, intersubjective verifiable collection, control and criticism of experiences. He adds that the starting point of the research is a question, idea or assumption about real facts, thus something thought, a term or problem. Following, assumptions or theories are generated to explain them. These theoretical explanation attempts are then to be examined by using certain methodology which test them against concrete, experiential facts.

2.2. Literature Review

The review of the literature was a precondition to find an overview of current topics in the field of HR and especially in the context of digitisation. In total, more than 350 articles have been sighted, dealing with e-HRM. This includes articles describing the evolution of e-HRM, its legal a security implication as well as the adoption of e-HRM. Topics suchs as the barriers and benefits of digital transformations and HR analytics are also reviewed.

The result of the literature was that so far there have been few studies on the transformation of HR into cloud-based environments. This served as the working hypothesis for the first article and resulted in the derived procedure model. Logically based on this and tested against the literature, the hypotheses for the following qualitative study was built up. The factors that influence transformations were identified here.

The following three problems were derived, dealt with in the articles and possible solutions worked out.

Problem 1: It is not known what the optimal process model for transforming HR processes into a cloud-based e-HRM solution looks like.

Problem 2: It is not known which factors contribute to a successful HR Cloud transformation from an HR perspective.

Problem 3: It is not known whether companies currently use HR KPIs for HR process control/optimisation and whether the new HR Cloud technology can contribute by providing new KPIs.

2.3. Qualitative Research

This study is conducted using a qualitative, also called theory-generating approach. These new theories can be examined in greater depth, for example, as part of a subsequent quantitative analysis (Gläser

and Laudel 2010). The methodology used for data collection were expert interviews and the subsequent evaluations were based on qualitative content analyses. Both, data collection and evaluation were carried out using the procedure model for qualitative research by means of expert interviews and qualitative content analysis by Gläser and Laudel (2010). Gläser and Laudel (2010) point out that there is no holistic representation of the procedure model in empirical social research and that the existing textbooks focus on the fundamental principles of qualitative research, which in practice leads to a more intuitive rather than systematic research. Additionally, Bogner et al. (2014) suggest that there is no canonised procedure for the evaluation of expert interviews, so that it is possible to use or combine different methods.

The reason for the choice of this qualitative approach lies in the relatively new topic and the resulting limited access to a large group of experts. This leads to a high degree of uncertainty in the definition of restricted question categories when applying a quantitative approach and also questions the possibility of statistical evaluation, since it requires that a certain population can make a statistically reliable statement (Raithel 2008). Another prerequisite of the study was that a rather technical topic, namely the success of a digital transformation of HR processes, should be evaluated by the HR employees themselves. This presupposes that the appropriate HR terminology is used to make the questions understandable, which in turn is easier to accomplish in qualitative interviews. Besides, quantitative methods are not suitable for collecting specific expert knowledge (Gläser and Laudel 2010) and Gummesson (2006) points out that the new global digital environment favours the use of qualitative research methods.

2.3.1. Survey methodology

In total 10 expert interviews, including a pre-test were conducted from February to October 2017. All interviews were conducted in German. Although the confidence in the majority opinion generally increases with the number of surveyed experts (Dorussen et al. 2005), there are several determinants (Baker and Edwards 2012) that limit the number of experts in this case. These determinants were among other things the access and availability (Gorden 1987) of potential experts, as well as the effort for them.

All of them received a questionnaire beforehand and the interviews were conducted using a prepared interview guideline. The questionnaire served various purposes. On the one hand, self-reporting is intended to ensure that the potential to be interviewed corresponds to the defined expert criteria. On the other hand, it is intended to comply with ethical requirements regarding the transparency of the process, the research objective and the handling of personal data (Gläser and Laudel 2010). Data collection to answer the research question is carried out through semi-structured expert interviews based on an interview guideline. A semi-structured approach was chosen because although the

questions are asked openly, the interview follows a clear structure. The structure of the interview guideline is derived from the pre-defined question categories and the derived assumptions. In general, when designing the questions, attention was paid to creating a suggestion for the interviewee to tell a story (Gläser and Laudel 2010). At the end of the interviews, these were literally transcribed and timestamped, but omitting the non-verbal elements, so that it was possible to trace who said what and when. This type of transcription is also called "literal transcription with literary script" (Mayring 2016). These transcriptions served as a basis for the following evaluation.

2.3.2. Evaluation methodology

A structured content analysis was used to analyse the transcribed interviews. A combination of the approaches of Schreier (2012) as well as Gläser and Laudel (2010) was applied, whereby the evaluation was computer-assisted. The approach of Gläser and Laudel (2010) modifies the procedure for content analysis of Mayring (2010) to the extent that the categories for coding are not predefined in advance but can be adapted during coding. In contrast to Schreier (2012) no trial coding was carried out but mostly the categories were coded directly in vivo, with the original words of the participants. The given structure of the interview guideline was helpful in determining the main categories and the subcategories contained in them could be derived from the findings as well. The inductive derivation of categories and the adjustments distinguish this procedure. In addition to the definition of the categories, extraction rules have been defined which clearly specify the allocation of the statements to the individual categories, also called codes (Krippendorff 2004; Bogner et al. 2014). Tesch (1990) notes that these codes serve to identify topics and are not an abbreviation of the content. The coding rules recommended by Kuckartz et al. (2008) are also applied, for example, by coding at least one whole sentence containing relevant information. Quality of coding was assured by having extracts from the interviews re-assigned by a third independent person to the existing categories. This cross-checking procedure is called an intercoder agreement and helps to increase objectivity, reliability and validity (Guest et al. 2012).

The last step of the evaluation was the interpretation of the categorised and thus filtered text passages, to understand the essence of the idea. The inferences (Krippendorff 2004) and interpretation of the results was influenced by the history and experience of the researcher (Creswell 2013; Früh 2015). Special attention was paid to causal mechanisms and connections (Bogner et al. 2014). This means that findings were summarised, sorted according to criteria relevant for the evaluation and checked for redundancies and contradictions (Gläser and Laudel 2010).

2.4. Ethics

In social research observations and investigations are carried out on humans, which raises ethical questions. It was not until the 1950s and 1960s that discussions began in the USA on this subject, and

much later, in 1992, the German Society for Sociology began to draw up an ethics code (Gläser and Laudel 2010; Deutsche Gesellschaft für Soziologie and Berufsverband Deutscher Soziologinnen und Soziologen 2017). There are publications that elaborate concrete procedural models in order to meet ethical requirements (E. Sieber 2018), because ultimately a violation of this code of ethics can prevent the publication of the research results (Gläser 1999). This study is based on the guidelines of the Ethics Code of the German Society for Sociology (Deutsche Gesellschaft für Soziologie and Berufsverband Deutscher Soziologinnen und Soziologen 2017) which deals with the integrity and objectivity of research in general, as well as the rights of the test participants and takes into account the stipulations of the German Federal Data Protection Act (Bundesministeriums der Justiz und für Verbraucherschutz 2017) in its current edition.

The following exemplary measures to ensure compliance with the two guidelines were taken as part of this study:

- Presenting the research process and the research objective to the interview participants.
- Obtaining the interviewee's consent to participate and to the later publication of the results in advance.
- Assuring the transfer of the research results to the participants.
- Representation of the interests and dependencies by pointing out that this current study is part of a doctoral thesis and assuring that the data will not be used for purposes other than those described.
- Anonymisation of personal data so that no conclusions can be drawn about individual persons or companies.
- Responsible handling of the personal data (among other things, recordings and transcriptions are only stored on password encrypted hard disks).
- Clear definition and detailed documentation of theories, methods and research design.

One of the challenges in complying with these guidelines is to mention the assumptions in advance to the interviewees, although this potentially entails the risk of influencing the research results (Diener and Crandall 1978) and this is why Gläser and Laudel (2010) recommend the communication of the abstract description of the research goal.

3. Articles

The following section consists of five articles. Their contents as well as their structure and logical interdependence are described below.

Article one was published in 2016 in German and is a study based primarily on the experience of various transformation projects. The aim of this article was to derive a process model for the digital transformation of HR and at the same time to point out the potential stumbling blocks in such a project. Due to the great popularity of this article, the publisher asked if it would be possible to create an extended version with more background knowledge and an extended model, as part of a book about cloud computing. The result of this request was the **second article**, which is a completely revised and enhanced version of the first. Among other things the article described and discussed the following: (a) a historical development of e-HRM; (b) an overview of the current state of research; (c) an extension of the challenges and a revised model were added. This article has also been written in German. In an attempt to make the content available to a wider audience, the article was translated into English and revised completely. The article was accepted by the "International Journal of Intelligent Information Technologies" of IGI Global and is included here as the **third article** (*"e-HR Cloud transformation. Implementation approach and success factors"*). In the following section, there is therefore no English translation of the first article, since the second article completely complements this content and the third article already provides an English translation. In addition, the content of the third article was further supplemented and optimized by feedback from the two previous publication. The **fourth article** (*"Adoption and success of e-HRM in a cloud computing environment"*) is a completely different work in content. Here, a qualitative research approach was chosen to determine which influencing factors are relevant for the digital transformation. This article is written in English and will be published in "The International Journal of Cloud Applications and Computing". The **fifth and final article** is a systematic literature search that was submitted and is currently undergoing peer-review. This research formed the basis for articles 1-4 and was completely covered in a separate article.

All articles were written by Robert-Christian Ziebell under supervision from the professors named in the acknowledgments.

3.1. Article 1: "HR-Cloud-Transformation – Vorgehen und Erfolgsfaktoren"

Title:	HR-Cloud-Transformation – Vorgehen und Erfolgsfaktoren
DOI:	10.1365/s40702-016-0251-8
Format:	Journal Article
Journal:	HMD Praxis der Wirtschaftsinformatik Schwerpunktheft Dezember 2016: Human Capital Management https://www.springerprofessional.de/hmd-praxis-der-wirtschaftsinformatik/5049046
Language:	German
Status:	Published December 2016

3.1. Article 1: "HR-Cloud-Transformation – Vorgehen und Erfolgsfaktoren"

Zusammenfassung

Zunehmend digitalisieren und transformieren Unternehmen Human-Resource-Prozesse (HR-Prozesse) in neuartige cloudbasierte Lösungen. Diese Lösungen bieten nicht nur technologische, sondern vor allem fachliche Vorteile, denn Prozesssilos werden aufgebrochen und durch eine gesamtheitlich abgebildete HR-Prozesswelt ersetzt. Dies ermöglicht dem HR-Bereich eine neue Form von Personalarbeit, weg von der Personaladministration hin zu einem proaktiven Human Capital Management. Gleichwohl ergeben sich im Rahmen der Transformationsprojekte neue Herausforderungen, die sich beispielsweise durch die Speicherung von Personaldaten in der Cloud, aber auch durch die eingeschränkten Prozesskonfigurationsmöglichkeiten der Lösungen ergeben.

Der Beitrag behandelt, welche Vorgehensmodelle für HR-IT-Projekte und im Besonderen bei der Transformation in cloudbasierte Lösungen prinzipiell angewendet werden können. Auf Basis von Praxiserfahrungen wird ein Vorgehensmodell für HR-Transformationsprojekte abgeleitet, wobei Erkenntnisse aus den Bereichen Organisation, Fachlichkeit und IT geschildert, Entscheidungen und kritischen Erfolgsfaktoren aufgezeigt und die Besonderheiten im Kontext cloudbasierter HR-Lösungen herausgearbeitet werden.

Abstract

More and more companies digitize and transfer their human resource (HR) processes into innovative cloud-based solutions. These solutions not only offer technological but especially process advantages because process silos are broken and replaced by a holistic HR process landscape. This allows HR a new way of working, away from personnel administration to a proactive human capital management. However, in the context of transformation projects new challenges arise, for example, by storing personnel data in the cloud but also with respect to limited process configuration options offered by cloud solutions.

The paper covers process models for HR IT projects and in particular for HR transformation projects. Based on the authors' experience an applied process model for HR transformation projects is derived. Findings from the fields of organization, business and IT are shown, decisions and critical success factors in the specific context of cloud-based HR solutions are identified.

IT-Unterstützung im HR-Bereich

Bisher ist die Digitalisierung von HR-Prozessen im Vergleich zu Primärprozessen von den meisten Unternehmen nachrangig behandelt worden. Zum einen gibt es dafür fachliche Gründe, wie die bisher untergeordnete Rolle der HR in der Organisation (Brockbank 1997) und die Herausforderung einer direkten Nachweisbarkeit des Wertbeitrages der Personalprozesse zum Unternehmenserfolg (Klein 2012). Zum anderen schränkte die benötigte Rechenleistung sowie die Verfügbarkeit adäquater technologischer Lösungen (Zapotocny 2015) die Gestaltungsmöglichkeiten der HR ein. Diese Beschränkung ergibt sich im Wesentlichen aus den bisher am Markt verfügbaren on-premise Standardsoftwarelösungen, die HR-Teilprozesse (z.B. Rekrutierung oder digitales Lernen) als Prozesssilos digitalisieren, aber noch keine gesamtheitliche und vor allem durchgängige HR-Prozesswelt abbilden. Einen Überblick über die HR-Prozesswelt gibt Abbildung 1, die die wesentlichen HR-Prozesscluster sowie die darin enthaltenen HR-Prozesse darstellt. Die gestrichelten Verbindungen deuten potentielle Prozessschnittstellen (z.B. bei der Festlegung von Lernzielen in der Zielvereinbarung) an.
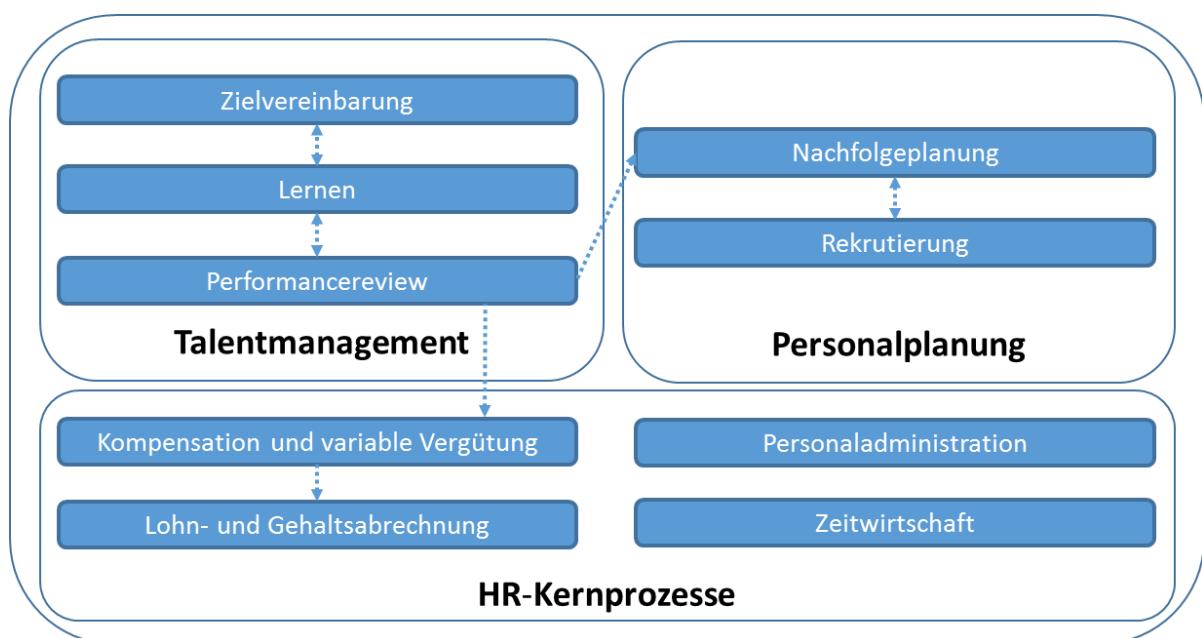

Abbildung 1: HR-Prozesswelt

Der technologische Wandel von einer on-premise Welt in eine cloudbasierte Software as a Service (SaaS) Umgebung ermöglicht es nun, die Herausforderung einer ganzheitlichen Digitalisierung von HR-Prozessen anzugehen (Jafari Navimipour et al. 2015). So gibt es beispielsweise im Bereich Personalplanung die fachliche Anforderung, Karrierepfade aufzuzeigen und eine Nachfolgeplanung zu etablieren. Um dies zu realisieren, werden die Anforderungen an einen Mitarbeiter mit ihren spezifischen Kompetenzen und Skills – sowie deren jeweiligen Ausprägungen – mit den Anforderungen

auf vakanten Positionen abgeglichen. Die Komplexitätstreiber sind dabei die möglichen Kombinationen sowie die Anzahl der Rollen und Mitarbeiter. Erst heute wird die dafür notwendige Rechenleistung in Form von HR-SaaS-Lösungen (i.F. HR-Cloud) angeboten (Zapotocny 2015).

Neben den allgemeinen SaaS-Vorteilen wie Performanceverbesserungen (Lin and Chen 2012) bietet die HR-Cloud durch einen gesamtheitlichen Prozessdigitalisierungsansatz noch weitere Vorteile gegenüber bisherigen on-premise HR-Lösungen. Hier können beispielhaft die integrierten und aufeinander abgestimmten Module sowie die zugrundeliegende gemeinsame Datenbasis angeführt werden, die bisher in dieser Form nicht verfügbare Prozesssynergien ermöglichen. Aus technologischer Sicht ist zudem der fortgeschrittene Lebenszyklus der on-premise HR-Systeme zu nennen. Bei genauer Betrachtung der Pläne von HR-Softwareherstellern wird klar, dass on-premise Systeme zwar weiterhin gewartet, perspektivische Weiterentwicklungen aber eher in den HR-Cloud-Lösungen stattfinden werden. So haben Unternehmen beispielsweise die Möglichkeit, in eigens dafür geschaffenen Foren Erweiterungsvorschläge zu diskutieren und zu priorisieren (z.B. in der SAP SuccessFactors Kundencommunity). Bereits Mitte der 2000er stellen Gueutal und Stone (2005) zur HR-IT fest: „Today technology has finally begun to deliver on the promises of the 1990s."

Auf Basis der neuen Technologien wird die HR-Cloud angeboten (u.a. von SAP, Oracle und Workday), die vor allem auf die Steigerung des Wertbeitrages von HR abzielt. Ein Beitrag dazu sind Einsparpotentiale, die sich durch die Digitalisierung von HR-Prozessen und den Rückbau von on-premise HR-Systemen sowohl in den HR-Fachbereichen als auch in der IT heben lassen. Zudem sorgen die neuen HR-Cloud-Lizenzmodelle durch eine nutzer- und/oder prozessbezogene Verrechnung für eine Kostentransparenz und ermöglichen eine detaillierte Weiterverrechnung an die Fachbereiche.

Um die beschriebenen Potenziale nutzen zu können, werden HR-Transformationsprojekte zunehmend interessanter für Unternehmen. Wesentliche exogene Faktoren, die aktuell die Anzahl der HR-Cloud-Transformationsprojekte beeinflussen, sind die demographische Entwicklung und der industrielle Wandel zu einer Wissensgesellschaft (Eisner 2005; Roehling et al. 2005) sowie der damit einhergehende Kampf um Talente. Diese Talente für die Organisation zu gewinnen, zu halten und zu entwickeln, ist die große Herausforderung der Personalabteilungen (Stone and Deadrick 2015).

Herausforderungen von HR-Transformationsprojekten

Projekte zur Transformation von Prozessen in die HR-Cloud bringen neue Herausforderungen mit sich. Neben dem Aufwand der Dokumentation von existierenden Ist-Prozessen und der Ausarbeitung von Soll-Prozessen im Rahmen der Vorarbeiten kommt erschwerend die Limitierung der Prozesskonfigurationsmöglichkeiten in der HR-Cloud hinzu. So sind kundenspezifische Erweiterungen aktuell nicht oder nur bedingt abbildbar und die konfigurierbaren Prozessvarianten der HR-Cloud

fordern eine Anpassung und Standardisierung der Prozesse im Unternehmen ein. Gerade der letzte Punkt führt zu einem, in der ERP-Welt schon länger diskutierten (Luo and Strong 2004), Paradigmenwechsel, denn die Ablauforganisation muss sich gegebenenfalls an die in den Softwarelösungen implementierten Prozessen anpassen und nicht, wie bisher, die HR-IT-Lösungen an die definierten Soll-Prozesse der Fachabteilung. Daraus resultiert auch eine technisch erzwungene Prozesstreue, da Prozessabkürzungen (Workarounds, Shadow-Systeme), die beispielsweise eine direkte Freigabe sowie die Besetzung von Stellen ermöglichen, entfallen.

Erschwerend kommt hinzu, dass die in der HR-Cloud abgebildeten Prozesse zusammen mit den dort verarbeiteten personenbezogenen Daten einer besonderen Sorgfaltspflicht durch die Vorgaben des Bundesdatenschutzgesetzes (BDSG §28) unterliegen. Zudem schränken das Betriebsverfassungsgesetz (BetrVG §80) und die sich darauf berufende deutsche Mitbestimmung den Handlungsspielraum in der Datenverarbeitung und in der Prozessgestaltung im HR-Bereich ein.
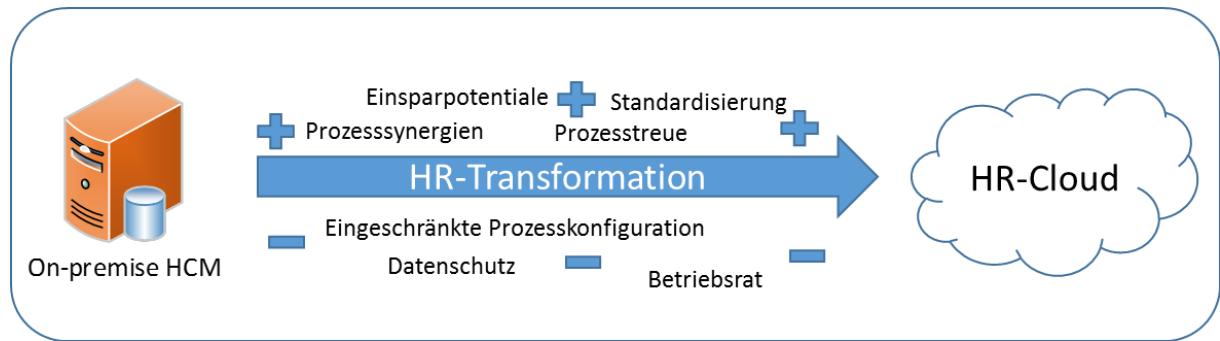

Abbildung 2: Chancen und Herausforderung der HR-Cloud-Transformation

Zusammenfassend bietet die Einführung der HR-Cloud-Technologie die Chance und Herausforderung (siehe Abbildung 2), neue prozessuale Wege zu beschreiten. Dieser Ansatz ermöglicht den HR-Fachbereichen durchgängig, - von der Rekrutierung bis zur Nachfolgeplanung („from hire to retire") – die Mitarbeiterdaten nicht nur zu verwalten, sondern ein proaktives Human Capital Management zu etablieren.

Vorgehensmodelle für HR-IT-Projekte

Auch im HR-Bereich gilt, dass ein in der Organisation eingebettetes professionelles Projektmanagement die Grundvoraussetzung für ein positives Projektergebnis ist. Die Vielfalt von IT-Projekten spiegelt sich in diversen Vorgehensmodellen wider. Die Auswahl des passenden Modells orientiert sich dabei an der jeweiligen Projektart, wobei global nach klassischem und agilem Projektvorgehen unterschieden wird (Wagner 2011). Unternehmensspezifische Anpassungen der Modelle sind dabei keine Seltenheit.

Klassische, agile und hybride Modelle

Klassische Modelle sind beispielsweise das Wasserfallmodell und das V-Modell XT. Typische Merkmale dieser Modelle sind klar definierte, lineare Prozessphasen, von der Anforderungsanalyse bis zum Go-Live sowie den je Phase zu erarbeitenden Ergebnistypen. Das V-Modell XT ist der Standard für die Durchführung von IT-Projekten im öffentlichen Sektor und legt einen Fokus auf die konkreten Aktivitäten pro Projektphase sowie auf das Rollenmodell. In 2015 wurden ca. 10 % des Bruttoinlandproduktes als Beschaffungsvolumen der öffentlichen Hand angegeben, was den hohen Nutzungsgrad dieses Vorgehensmodells in der freien Wirtschaft erklärt (BMWi 2016; Destatis 2016).

Klassische Modelle legen einen hohen Wert auf die formal definierten Vorgaben, die ausführliche Dokumentation, die vertragliche Erbringung von Leistung sowie die stringente Verfolgung eines Projektplans. Daraus resultieren ein administrativer Aufwand zur Erbringung aller formalen Anforderungen und eine klare Vorabplanung von Projektergebnissen, was gerade bei kleineren oder kurzfristig umzusetzenden IT-Entwicklungsprojekten von Nachteil ist. Immer mehr Softwareentwicklungscenter setzen daher verstärkt auf agile Methoden (Vlietland et al. 2016).

Mit agilen Methoden wird das Ziel verfolgt, im Projekt schnell einen sichtbaren Mehrwert zu generieren und zeitnah auf neue Anforderungen reagieren zu können (Boehm und Turner 2004). Anstatt einen vorab geplanten Ergebnispfad einzuschlagen, wird im Projekt bedarfsorientiert priorisiert, was wiederum eine zeitnahe Berücksichtigung neuer Anforderungen ermöglicht. Der Auftraggeber ist in diesem Prozess nicht nur Betroffener, sondern Beteiligter, der die Projektergebnisse anhand von Prototypen zu bewerten und über die nächsten Schritte mitzuentscheiden hat. Die Dokumentation der Ergebnisse findet rudimentär und nachgelagert statt, da inhaltliche Anpassungen im Fokus stehen, regelmäßig in fest definierten Zeitfenstern erfolgen und im Gegensatz zu den klassischen Vorgehensmodellen, geplant in dieser Methodik verankert sind.

Hybride Modelle sind eine Kombination aus klassischen und agilen Methoden, die wiederrum – in Abhängigkeit von der Aufgabenstellung - Potentiale aus beiden Vorgehen heben (Habermann 2012).

Besonderheiten von HR-IT-Projekten

Im HR-IT-Kontext finden je nach Projektart klassische und agile Projektvorgehen Anwendung. Eine Hürde, die die agile Methodik gerade im Kontext von größeren HR-IT-Projekten zu nehmen hat, ist die Projektbudgetierung, die typischerweise vor Projektbeginn abgeschlossen sein muss. Als Unterstützungsprozess für die wertschöpfenden Primäraktivitäten ergibt sich in der Praxis für HR-Projekte zudem eine Limitierung bezüglich des freien Umgangs mit den monetären Ressourcen. Als Resultat finden daher Mischformen Anwendung, in denen beispielsweise die Projektphasen nach klassischem Vorgehen strukturiert, die konkreten Umsetzungsinhalte aber iterativ oder agil bearbeitet werden. Auch nimmt die Projektdokumentation aufgrund der Sorgfaltspflicht bei der Verarbeitung von HR-Daten einen besonderen Stellenwert ein, was den agilen Methoden eher widerspricht.

Vorgehensmodell für HR-Cloud-Transformationsprojekte

HR-Transformationsprojekte in die Cloud sind eine spezielle Ausprägung von HR-(IT-)Projekten und stellen eine neue Herausforderung dar, da die Freiheitsgrade der Umsetzung durch die Limitierung der HR-Cloud-Technologie eingeschränkt sind. Vorgegebene Prozessschritte können konfiguriert werden; ein komplett freies Prozessdesign hingegen ist nicht mehr möglich. Nach klassischem Vorgehen erstellte fachliche Anforderungen an die HR-IT-Systeme können daher nicht vollumfänglich umgesetzt werden, sondern dienen als Vorlage für einen Soll-Prozess innerhalb der Anpassungsmöglichkeiten der HR-Cloud. Abbildung 3 stellt ein Vorgehensmodell für HR-Cloud-Transformationsprojekte dar, das klassische, iterative und agile Aspekte enthält.
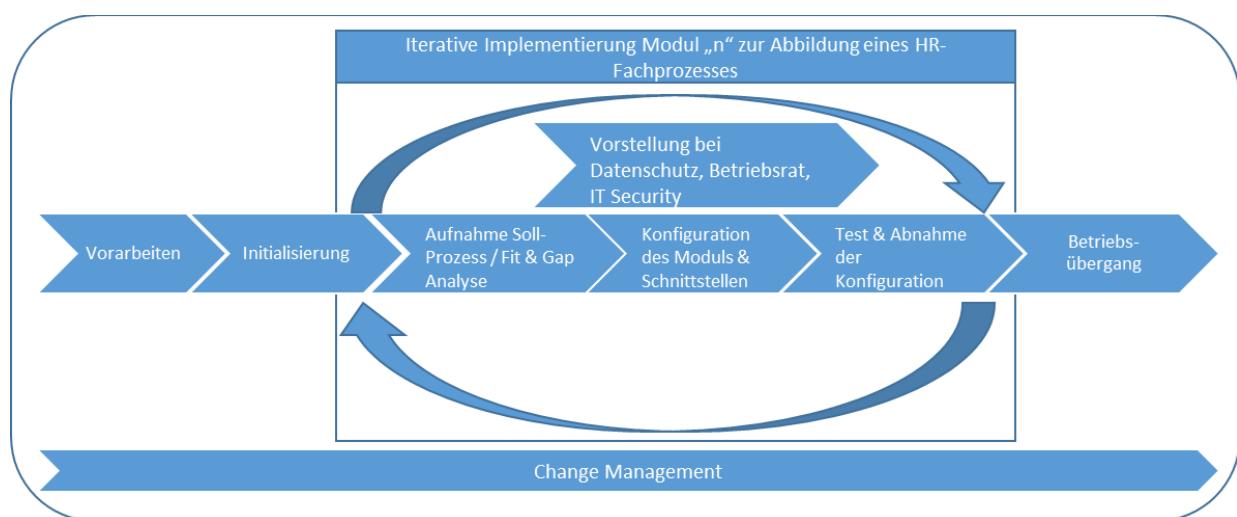

Abbildung 3: Vorgehensmodell HR-Cloud-Transformation

Die vier Projektphasen (Vorarbeiten, Initialisierung, Implementierung und Betriebsübergang) orientieren sich an einem klassischen Vorgehensmodell. Das projektbegleitende Change Management unterstützt in allen Projektphasen.

Eine Besonderheit findet sich in der Phase der Implementierung, die einen Regelkreis enthält, sodass Teilergebnisse der Prozesskonfiguration in einzelnen Iterationen als Prototyp vorgestellt, bewertet und angepasst werden können. Agile Elemente finden dadurch Anwendung, dass die Anzahl und die Zeiträume der Iterationen, auf Basis von Erfahrungswerten bei vorherigen Implementierungen limitiert sind.

Das Vorgehen innerhalb der Implementierungsphase ist für alle zu konfigurierenden HR-Teilprozesse (siehe Abbildung 1) identisch; eine Prozessdifferenzierung erfolgt nur auf Basis der Prozessgestaltung, der Benutzergruppen und der potentiellen Schnittstellen.

Exemplarisches HR-Cloud-Transformationsprojekt

Die im Folgenden beschriebenen Erfahrungen basieren auf mehreren durchgeführten HR-Cloud-Implementierungsprojekten aus der Praxis.

Rahmenbedingungen

Die Digitalisierung aller Prozesse des Talentmanagements, der Personalplanung und der HR-Kernprozesse ist im Scoping der Projekte vorgegeben (vollständige Digitalisierung in der HR-Cloud). Die einzelnen HR-Prozesse werden in Modulen (z.B. Modul „Rekrutierung") der HR-Cloud abgebildet, die separat voneinander konfiguriert werden können, optional aber Schnittstellen untereinander anbieten. So besteht beispielsweise die Möglichkeit, im Teilmodul „Zielvereinbarung" ein Absprung in das Teilmodul „Lernen" vorzunehmen, wenn das vereinbarte Ziel die Absolvierung eines dort angebotenen Lerninhalts sein soll. Bei allen Implementierungen wird die Nutzung dieser Prozesssynergien angestrebt.

Projektphase: Vorarbeiten

Schon während der Vorarbeiten ist das generelle Commitment des höheren Managements für eine HR-Cloud-Lösung einzuholen. Das HR-Cloud-Paradigma, welches keine komplett freie Prozessgestaltung zulässt, sowie die externe Speicherung von Personaldaten muss verstanden, mitgetragen und kommuniziert werden.

Auch müssen die Ziele der HR-Cloud-Transformation klar herausgearbeitet sein. Neben der antizipierten Prozessoptimierung durch Digitalisierung sowie modulübergreifende Synergien wird häufig eine Kosteneinsparung prognostiziert. Die Berechnung dieser potentiellen Einsparungen und des Nutzens in einem Business Case hängt dabei von verschiedenen Faktoren ab. Dies können beispielsweise der aktuelle HR-Digitalisierungsgrad, die Anzahl der HR-Applikationen sowie deren Position im Produktlebenszyklus sein. Ein ebenso relevanter Faktor für die Kostenkalkulation ist die

Flexibilisierung des Lizenzmodells, denn als SaaS werden die HR-Cloud-Lizenzen nur über die definierte Vertragslaufzeit beschafft und müssen nach Ablauf neu verhandelt werden. Die Reduktion von IT-Betriebsaufwänden wird bei SaaS-Lösungen grundsätzlich antizipiert.

Um nun die richtige HR-Cloud-Plattform auszuwählen, hat sich im Rahmen von Anbieterpräsentationen eine Fit & Gap Analyse zum Abgleich der HR-Ist- oder -Soll-Prozesse des Unternehmens mit den konfigurierbaren HR-Prozessen der jeweiligen Lösung bewährt.

Da eine direkte Abbildung der Prozesse nicht möglich ist, können nachfolgende Punkte als zentrale Entscheidungskriterien herangezogen werden:

- Quantität und Qualität der Prozessabdeckung
- Lösungsreife im Allgemeinen
- Integrationsfähigkeit in die existierende IT-Infrastruktur
- Gesamtkosten der Plattform

Die HR-Fachbereiche müssen aktiv am Ausschreibungsprozess partizipieren, damit die HR-Cloud-Lösung nicht als reine, durch die IT getrieben Entscheidung wahrgenommen wird. Das spätere Projektteam setzt sich daher idealerweise aus Mitarbeitern der (HR-)IT und den jeweiligen HR-Fachbereichen zusammen.

Zusätzlich zur HR-Cloud-Plattform muss ein Implementierungspartner gefunden werden, der die Konfiguration der Prozesse in der Cloud-Umgebung übernimmt. Neben dem Kostenaspekt spielt hier die Projekterfahrung eine ausschlaggebende Rolle. Die interne IT kann die initiale Konfiguration oftmals nicht übernehmen, da das Spezialwissen je nach HR-Cloud-Lösung sehr komplex und kurzlebig ist. Für einen gesicherten nachgelagerten Betrieb ist ein Wissenstransfer (z.B. durch Joint Teams oder Schulungen) mit dem Implementierungspartner zu vereinbaren, so dass spätere Konfigurationsanpassungen aufwandsarm möglich sind.

Bereits vor Beginn der Umsetzung sind die Organisationeinheiten Betriebsrat, Datenschutz, IT-Architektur und IT-Security in das Projekt einzubinden sowie in den nachfolgenden Phasen zu informieren. Aufgrund der verarbeiteten Personaldaten werden regelmäßige Termine mit dem Betriebsrat während der gesamten Projektlaufzeit empfohlen; die Abstimmung mit den anderen Bereichen kann fallbezogen (z.B. die Vorstellung einer neuen Schnittstelle bei der IT-Security) stattfinden.

Projektphase: Initialisierung

Die Phase der Initialisierung beinhaltet die Definition des formalen Projekts sowie die technische Einrichtung der HR-Cloud-Umgebung.

Während der Definition des Projekts wird ein Fokus auf zwei Themen gelegt: auf das Stakeholdermanagement sowie auf den Projektauftrag.

Bereits während der Vorarbeiten sind die ersten Fachbereiche in die Kommunikation eingebunden; nun sind weitere Stakeholder und Multiplikatoren zu identifizieren, die am Projekt direkt partizipieren oder von diesem betroffen sind. Eine Empfehlung ist hier, Key User aus Nicht-HR-Fachbereichen zu benennen, diese frühzeitig zu informieren und im Projektverlauf proaktiv zu involvieren (u.a. bei den User Acceptance Tests). Ein projektbegleitendes Change Management, welches die systematische und organisationelle Veränderung, gerade im Hinblick auf die neue Rolle der HR, professionell begleitet, ist eine weitere erfolgskritische Maßnahme zur Verbessung der Zusammenarbeit und Kommunikation mit den Stakeholdern. Die Einführung der HR-Cloud hängt weniger von der technologischen Umsetzung als von einem professionellen Change Management ab, denn die Komplexität der initialen technischen Installation und des Betriebs einer Cloud ist im Vergleich zu reinen on-premise Projekten geringer. Die Einrichtung von on-premise Human Capital Management (i.F. HCM) Umgebungen ist aufwändiger, da die Gestaltungsfreiheit dazu verleitet, komplexe Systeme zu implementieren. Die prozessualen Vorgaben in der HR-Cloud sowie die klar abgegrenzten Konfigurationsmöglichkeiten sorgen implizit für eine Komplexitätsreduktion.

Um in den Workshops der späteren Implementierungsphase effizient arbeiten zu können, ist es notwendig, dass die jeweils relevanten auskunfts- und entscheidungsfähigen Ansprechpartner an diesen teilnehmen. Die Erfahrung hat gezeigt, dass Fachbereiche bei IT-nahen Projekten dazu neigen, als betroffene und weniger als proaktive, mitgestaltende Beteiligte zu agieren. Eine Methode, das Involvement der Fachbereiche zu steigern, ist das bereits im Rahmen der Vorarbeiten eingeholte und kommunizierte Commitment des höheren Managements, aber auch die aktive Teilnahme der HR-Leiter an den Implementierungsworkshops. Die frühzeitige Benennung von Modulverantwortlichen hat sich ebenso in der Praxis bewährt. Diese übernehmen während des Projekts die Verantwortung für ein oder mehrere Module und nehmen im späteren Regelbetrieb Anpassungen vor. Eine hohe Affinität zu HR und zu IT ist Voraussetzung für den Stelleninhaber.

Im Projektauftrag ist noch einmal klar der Scope des Projekts zu definieren. Dabei sind vor allem zwei Grundsatzentscheidungen zu treffen: über die Art der Integration der HR-Cloud in die existierende Infrastruktur und über die Reihenfolge der Modulimplementierung.

Projektphase: Initialisierung

Die Auswahl des passenden Integrationsszenarios hängt davon ab, ob und welche HR-Prozesse auf wie vielen verschiedenen Applikationen bereits digitalisiert sind und welche davon in der HR-Cloud zukünftig konsolidiert werden. Man unterscheidet zwischen zwei Szenarien. Besteht ein führendes on-premise HCM-System weiterhin und wird ein reduzierter Stammdatensatz mit der HR-Cloud synchronisiert, so wird dies „side-by-side"-Szenario genannt. Hat ein Unternehmen bisher keine HCM-Lösung im Einsatz oder entscheidet sich für die Transformation aller HR-Prozesse in die HR-Cloud, so spricht man von einem „Green-Field"-Ansatz. Gerade deutsche Unternehmen präferieren aufgrund der komplexen Gehaltsabrechnung, deren Abbildung in der HR-Cloud qualitativ noch nicht an die on-premise Lösungen heranreicht, das „side-by-side"-Szenario. Zudem sind in den on-premise HCMs unternehmensspezifische Anpassungen (u.a. Reporting, Bonusregelung) vorgenommen worden, auf die die HR-Fachbereiche nicht verzichten können.

Eine weitere Entscheidung, die direkt aus dem gewählten Integrationsszenario resultiert, sind die Anzahl und Art der neu zu gestaltenden Schnittstellen. Fällt die Entscheidung auf das side-by-side-Szenario, so muss eine abgesicherte Schnittstelle vom on-premise HCM an die HR-Cloud geschaffen werden. Sollen alle Prozesse in der HR-Cloud abgebildet werden, so kann diese Schnittstelle entfallen. Es ist lediglich eine einmalige Migration der Daten notwendig. Die modulinternen Schnittstellen (z.B. zur Übertragung einer Zielerreichung an das Modul für die variable Vergütung) vervielfachen sich mit der Anzahl der umgesetzten Module sowie der Entscheidung darüber, welche Prozesssynergien genutzt werden sollen. Rückschnittstellen in andere HR-spezifische Applikationen außerhalb der HR-Cloud (z.B. bei einer externen Gehaltsabrechnung) müssen ebenso bedacht werden. Im Kontext einer Kosten-Nutzen-Betrachtung empiehlt es sich, die Schnittstellen aufwandsarm umzusetzen, wenn perspektivisch die Ablösung der HR-Kernprozesse geplant und somit die HR-Prozesswelt ganzheitlich in der HR-Cloud digitalisiert werden soll.

Ebenso beeinflusst die Art und Menge der umzusetzenden Schnittstellen die Reihenfolge der Modulimplementierung. Diese Reihenfolge hängt noch von weiteren Randbedingungen ab. So kann es sein, dass eine HR-Altapplikation zeitnah abgelöst werden muss, da sich diese in einer fortgeschrittenen Phase des Systemlebenszyklus befindet. Auch ist denkbar, dass Prozesssynergien nur unter der Berücksichtigung von Modulabhängigkeiten gehoben werden können. Beispielhaft kann hier die Nachfolgeplanung genannt werden, die von identifizierten Talenten abhängt; beide Prozesse werden in separaten Modulen abgebildet. Die Talentbewertung ist als eigenständiges Modul lauffähig; eine Nachfolgeplanung ohne einen existierenden Talentpool ist fachlich zu hinterfragen. Die Erfahrung aus Projekten zeigt, dass eine sukzessive Modulimplementierung einer parallelen vorzuziehen ist, auch wenn der Fachprozess modulübergreifend abgebildet wird. Zudem kann die Entscheidung zur Umsetzungspriorisierung eines Moduls in Abhängigkeit zu dessen fachlicher und technischer

Komplexität stehen. Um in einer früheren Projektphase bereits den Arbeitsmodus kennenzulernen, empfiehlt sich zu Beginn die Umsetzung eines weniger komplexen Moduls.

Projektphase: Implementierung

Nachdem die Infrastruktur und die initialen Schnittstellen eingerichtet sind, beginnt die Umsetzung der Module anhand der festgelegten Reihenfolge.

Die Implementierungsphase besteht aus Iterationen, deren Anzahl je nach Modul variiert, wobei erfahrungsgemäß drei Iterationen notwendig sind. Eine Iteration wird jeweils in Workshopreihen abgearbeitet, deren Länge sich an der Komplexität des jeweils umzusetzenden Moduls orientiert. Das iterative Vorgehen hat den Vorzug, dass neben der Präsentation eines bereits lauffähigen Standardprozesses, die neuen fachlichen Anforderungen direkt mit diesem abgeglichen werden können (Fit & Gap Analyse). Zudem kann im Rahmen der Konfigurationsmöglichkeiten eine Umsetzung und Präsentation des Ergebnisses zeitnah erfolgen. Die aus klassischen Modellen bekannte längere Wartezeit, bis der Fachabteilung erste Umsetzungsergebnisse präsentiert werden, entfällt somit. In den nachfolgenden Iterationen wird dann jeweils auf den vorherigen Ergebnissen und Tests aufgebaut, sodass der Fertigstellungsgrad eines Moduls ständig steigt.

Ein weiterer positiver Aspekt für den Projektleiter ist eine akkuratere Einschätzung der gesamten Projektdauer, da der zeitliche Aufwand pro Modul auf Basis von Erfahrungen aus vergleichbaren Projekten besser eingeschätzt werden kann. Zudem gibt die Begrenzung auf eine vorgegebene Anzahl von Iterationen einen klaren Ordnungsrahmen vor. Theoretisch könnten auch mehr als drei Iterationen durchlaufen werden, aber der Grenznutzen nimmt erkennbar nach drei Durchläufen ab.

Teilnehmer der Workshops sind die jeweiligen Prozessverantwortlichen, die Modulverantwortlichen, der Implementierungspartner und mindestens ein Mitarbeiter aus der IT, der die technischen Implikationen ableiten kann. Das strukturierte Testen und die Aufnahme von Anpassungen sind von dem Projektteam eng zu begleiten.

Die folgenden Aktivitäten finden in der ersten Iteration statt:

- Vorstellung des Moduls und dessen Standardprozesse
- Abgleich der vom Fachbereich gewünschten HR-Soll-Prozesse mit den Konfigurationsmöglichkeiten in der HR-Cloud
- Aufzeigen von Lösungsalternativen in der Prozesskonfiguration und/oder Anpassung des Soll-Prozesses
- Dokumentation des abzubildenden Soll-Prozesses in der HR-Cloud und optionaler Schnittstellenanpassungen

- Vorstellung der Dokumentation und Einholen der Zustimmung beim Datenschutz, Betriebsrat, IT-Security und IT-Architektur
- Konfiguration im HR-Cloud-Entwicklungssystem und ggf. die Anpassung von Schnittstellen
- Vorstellung der Konfigurationsergebnisse durch den Implementierungspartner
- Testen der Konfiguration durch den Fachbereich und Rückmeldung von Änderungswünschen

Die zweite Iteration setzt sich aus den folgenden Aktivitäten zusammen:

- Dokumentation des angepassten HR-Cloud-Prozesses und der optionalen Schnittstellenanpassungen basierend auf den Änderungswünschen der Iteration 1
- Bei grundlegender Änderung des Prozesses und/oder der Schnittstellen erneute Vorstellung beim Datenschutz, Betriebsrat, IT-Security und der IT-Architektur
- Konfiguration der Änderungen in der HR-Cloud
- Vorstellung der angepassten Konfiguration durch den Implementierungspartner
- Testen der Konfiguration durch den Fachbereich und Aufnahme von weiteren Änderungswünschen

Nach Abschluss der Iteration 2 sind ca. 80-90% des Prozesses im Modul konfiguriert. In der finalen dritten Iteration finden daher nur noch kleinere, oftmals optische Anpassungen statt. Die Aktivitäten sind identisch zu Iteration 2 und werden durch die folgenden ergänzt:

- Finale Konfiguration der HR-Cloud-Prozesse in Joint Teams, bestehend aus Implementierungspartner und Modulverantwortlichem
- Übernahme des final konfigurierten Moduls in die produktive HR-Cloud
- Ggf. Migration von existierenden Daten und Abschaltung von Altsystemen
- Übergabe der Dokumentation in den Betrieb

Ein hoher Migrationsaufwand bei der Übernahme von Altdaten kann vermieden werden, wenn im Projekt entschieden wird, dass parallel zur Einführung des neuen Prozesses auch mit einer neuen Datenbasis in der HR-Cloud gestartet wird (z.B. keine Übernahme von Zielvereinbarungen aus Altsystemen).

Auch darf in den Fachbereich kommuniziert werden, dass in der finalen Phase weiterhin Änderungsanforderungen aufgenommen werden können. Die Umsetzung wird aber nicht mehr durch den Implementierungspartner erbracht, sondern vom Regelbetrieb übernommen. Die Begleitung der

Konfiguration der letzten Änderungen durch die späteren Modulverantwortlichen in Joint Teams ist zu empfehlen, sodass ein direkter Transfer des Knowhows in die Organisation stattfinden kann.

Projektphase: Betriebsübergang

Für einen reibungslosen Betriebsübergang ist zu entscheiden, wann der optimale Zeitpunkt für die Einführung eines Moduls ist. Alle Module sind alleine lauffähig, können aber erst im Verbund ihre übergreifenden Prozesssynergien entfalten. Empfohlen werden die Auswahl eines weniger komplexen Moduls und/oder die Einschränkung auf einen vorher definierten Kreis von Key Usern, um Erfahrung mit der neuen Technologie und den neuen Prozessen zu sammeln.

Ab jetzt übernimmt der Modulverantwortliche das Demand Management für sein Modul und bietet somit den Fachbereichen einen hohen Grad von Autarkie gegenüber der IT an. Der Wissenstransfer zum Modulverantwortlichen hat bereits mit der letzten Iteration begonnen und kann nun durch separate Modulschulungen vertieft werden. Spätestens jetzt ist auch das Betriebskonzept zu finalisieren, das alle den Betrieb der HR-Cloud betreffenden Aktivitäten beschreibt und regelt.

Die Schulung der Endnutzer ist ein ebenso kritischer Erfolgsfaktor, da die Mitarbeiter an vielen HR-Prozessen nun proaktiv partizipieren können und dadurch eine Reduktion der administrativen HR-Aufgaben antizipiert wird.

Da die Supportverträge mit den HR-Cloud-Herstellern typischerweise viele Wartungsaufgaben (z.B. Upgrades) inkludieren und nur die Schnittstellen weiterhin in der Verantwortung des lokalen IT-Betriebs liegen, wird ebenfalls der Administrationsaufwand des IT-Betriebs reduziert. Durch die zusätzliche Abschaltung von HR-Altsystemen werden zudem weitere Ressourcen frei.

Implikationen von HR-Cloud-Transformationen

Stone et al. (2015) stellen fest, dass der Reifegrad der Lösungen für digitalisierte HR-Prozesse variiert und dass es bisher wenige Untersuchungen dazu gibt, ob das Ziel von digitalisierter HR die Effizienz- oder Effektivitätssteigerung ist. Die Frage, inwiefern Technologie die persönliche Bindung zwischen HR und Mitarbeiter teilweise ersetzen kann oder soll, steht ebenso im Raum.

Dieser Artikel zeigt, dass die Grundsteine zur Akzeptanz einer HR-Cloud-Lösung im Transformationsprojekt gelegt werden. Ob und welche Effizienz- oder Effektivitätssteigerungen daraus resultieren, kann bisher nicht objektiv bestimmt werden, da zum einen viele Unternehmen keine Projektnachbetrachtung vornehmen und zum anderen aktuell noch objektive Kenngrößen zur Messung fehlen.

Ein möglicher Ansatz sind die HR-Key-Performance-Indikatoren (KPI), die vor und nach einer Projekteinführung zu vergleichen sind. Ebenso ist es möglich, im Rahmen des Erwartungsmanagements von Stakeholdern vor Projektbeginn die relevanten Erfolgsfaktoren zu erheben und mit den Ergebnissen nach der Umsetzung abzugleichen und daraus Rückschlüsse zu ziehen.

Welches die adäquaten Indikatoren für den Erfolg eines HR-Cloud-Transformationsprojekts sind und wie diese objektivierbar und in der Konsequenz vergleichbar werden, sind zukünftige Forschungsfelder.

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3.2. Article 2: "Vom traditionellen Personalmanagement hin zu e-HRM in der Cloud - Implementierungsansätze einer digitalen HR-Transformation"

Title:	Vom traditionellen Personalmanagement hin zu e-HRM in der Cloud Implementierungsansätze einer digitalen HR-Transformation
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Zusammenfassung

Zunehmend digitalisieren und transformieren Unternehmen Human-Resource-Prozesse (HR-Prozesse) in neuartige cloudbasierte Lösungen. Diese Lösungen bieten nicht nur technologische, sondern vor allem fachliche Vorteile, denn Prozesssilos werden aufgebrochen und durch eine gesamtheitlich abgebildete HR-Prozesswelt ersetzt. Dies ermöglicht den Personalabteilungen eine neue Form von Personalarbeit, weg von der Administration hin zu einem proaktiven Human Capital Management. Gleichwohl ergeben sich im Rahmen der Transformationsprojekte neue Herausforderungen, die sich beispielsweise durch die Speicherung von Personaldaten in der Cloud, aber auch durch die eingeschränkten Prozesskonfigurationsmöglichkeiten der Cloud-Lösungen ergeben.

Der Beitrag gibt einen Überblick über die Entwicklung der digitalen HR, sowohl in der Forschung als auch in der praktischen Anwendung. Es werden die Herausforderungen und Chancen diskutiert, die cloudbasierte HR-Lösungen bieten, sowie ein Vorgehensmodell für HR-IT-Projekte zur Transformation in cloudbasierte Umgebungen abgeleitet. Auf Basis von Praxiserfahrungen wird ein exemplarisches HR-Transformationsprojekt geschildert, in dem Erkenntnisse aus den Bereichen Organisation, Fachlichkeit und IT dargelegt, Entscheidungen und kritischen Erfolgsfaktoren aufgezeigt und die Besonderheiten im Kontext cloudbasierter HR-Lösungen herausgearbeitet werden. Der Beitrag schließt mit einem Ausblick auf die Entwicklung des Cloud Computings im Kontext von HR und stellt die sich daraus potentiell ergebenen Forschungsfeldern dar.

Einführung und Ziele

Das Forschungsfeld der elektronischen Personalprozesse (i.F. e-HRM = Electronic Human Resource Management) tangiert zwei Forschungsdisziplinen, die inhaltlich weit auseinanderliegen: Informationstechnologie (IT) und Human Resources Management (i.F. HRM). Ziel dieses Kapitels ist es, beide Felder ganzheitlich und praxisnah zu analysieren und dadurch einen Beitrag zur Forschung zu leisten. Wie und mit welchem Aufwand eine Brücke zwischen IT und HRM geschlagen werden und inwiefern Cloud-Technologie hier unterstützen kann, wird ebenso adressiert.

Im Kontext der HR-Digitalisierung gibt es drei Schwerpunkte: die „digitalen Mitarbeiter" (digital employees), die „Arbeitsinhalte" (work content) und das „digitale Mitarbeitermanagement" (digital employee management) (Bondarouk and Ruël 2009; Strohmeier and Parry 2014). Der Begriff der „digitalen Mitarbeiter" referenziert auf die zukünftig in den Arbeitsmarkt eintretende Generation von Fachkräften, die eine hohe IT-Affinität aufweist (Prensky 2001). Der „Arbeitsinhalt" definiert, wie in einer digitalen Umgebung zu arbeiten ist, während sich das „digitale Mitarbeitermanagement" auf die Planung, Umsetzung und Nutzung von Systemen bezieht, die die Personalarbeit unterstützen und vernetzen. Diese Systeme und insbesondere die Frage, wie HR-Prozesse mit Hilfe von Cloud-Technologie in die digitale Welt transformiert werden können, stehen im Mittelpunkt dieses Kapitels. Dabei wird insbesondere auf die Vorteile und Herausforderungen bei der Nutzung von Cloud-Technologie im HR-Umfeld eingegangen.

IT-Unterstützung im HR-Bereich

Im Folgenden wird die stetige Weiterentwicklung der IT zur Unterstützung der HR-Digitalisierung diskutiert sowie auf die Definition des e-HRM Begriffs eingegangen. Es folgen ein Abriss der bisherigen Forschung und deren Auswirkung auf die Praxis. Abschließend wird auf die besonderen Herausforderungen von HR-Transformationsprojekten eingegangen.

Entwicklung und Definition von e-HRM

Bereits 1940 mit dem Aufkommen von ersten Computern sind die Verwaltung von Personalakten sowie die Gehaltsabrechnung frühe Anwendungsfälle des „mechanischen" HRM. In den darauffolgenden 20 Jahren werden erste Anwendungen zur Verwaltung von Mitarbeiterfähigkeiten (Kompetenzmanagement) sowie von Bildschirmtests von der Luft-, Raumfahrt- sowie der Rüstungsindustrie entwickelt (DeSanctis 1986). 1960 sind sowohl die Verwaltung von Mitarbeitern und ihren Sachbezügen als auch die Gehaltsabrechnung automatisiert (Martinsons 1997). Tetz (1974) stellt fest, dass sich seit den späten 60er Jahren die Notwendigkeit der Einbeziehung eines breiteren Spektrums an HR-Informationen mehr und mehr durchsetzt, um einen effektiven

Entscheidungsprozess im Personalwesen sicherzustellen. Dieser Trend wird in den 70er Jahren fortgesetzt, indem mehr als die Hälfte der größten US-amerikanischen Banken und Versicherungen bereits Computer zur Verwaltung von Personalprozessen nutzen und in dem gesamten Jahrzehnt Unternehmen mit einigen tausend Mitarbeitern neue HR-Systeme implementieren (DeSanctis 1986). Mit der Akzeptanz des durch Computer ermöglichten Wettbewerbsvorteils (McFarlane 1984) steigt das Interesse für digitale HR, was dazu führt, dass ca. 40% der Unternehmen über ein HR-System sowie über Ressourcen zu dessen Betreuung verfügen.

HRIS (Human Resource Information System) ist der in diesem Kontext neu aufkommende Begriff, der von Kavanagh u. a. (1990) als ein integriertes Computersystem definiert wird, das eine Organisation befähigt, Personaldaten zu speichern, zu analysieren und zu verteilen. Broderick und Boudreau (1992) fügen dieser Definition hinzu, dass während der frühen 90er Jahre HRIS meist dazu genutzt wurde, Personalentscheidungen mit verbesserten Informationen anzureichern, was durch die Digitalisierung der Personalakten, der Gehaltsabrechnung und den Vergütungsinformationen ermöglicht wurde.

Ein weiteres Synonym einer digitalen HR taucht in den 90er Jahren auf. Mit dem Einzug des „E"- Trends (z.B. E-Commerce) in die Geschäftswelt geht e-HR (electronic HR) einher. e-HR entwickelt sich in drei Phasen: von der einfachen Bereitstellung von HR-Informationen über die Automatisierung von HR-Transaktionen bis hin zu der anspruchsvollen HR-Transformation, die es den Personalbereichen sukzessive ermöglicht, den Fokus von operativen Tätigkeiten auf strategischen Aufgaben zu lenken (Lengnick-Hall and Moritz 2003).

Zafar (2013) stellt fest, dass der Unterschied zwischen HRIS und e-HR der jeweilige Endanwender ist. Während HRIS den Fokus auf Endanwender innerhalb der Personalabteilung legt, spricht e-HR alle Mitarbeiter eines Unternehmens an.

Lepak und Snell (1998) definierten den alternativen Begriff der „Virtual HR" als "[…] the network-based structure built on partnerships and typically mediated by information technologies to help the organization acquire, develop, and deploy intellectual capital". Dabei differenzieren sie die Auswirkung der IT-gestützten „Virtual HR" in die folgenden Kategorien: operativ (z.B. Kostenreduktion), relational (z.B. den Zugriff auf HR-Informationen bzw. die Möglichkeit, HR-Prozesse als Self-Service auszuführen) und transformal (z.B. die Transformation zu einem strategischen HR-Business Partner).

Anfang der 2000er, mit dem Vormarsch des Internets, wird HRIS webfähig und in unternehmensinternen Intranets angeboten, was es den Mitarbeitern ermöglicht, HR-Prozesse als Self-Service zu nutzen (Raiden et al. 2001; Bondarouk and Ruël 2009). Die Zielgruppe von HRIS sind alle Mitarbeiter eines Unternehmens, was im Gegensatz zu der von Zafar (2013) gegebenen Definition von HRIS steht.

Strohmeier (2007) formuliert eine weithin akzeptierte Definition von e-HRM als "[…] application of information technology for both networking and supporting at least two individual or collective actors in their shared performing of HR activities".

Mit der Weiterentwicklung der (Internet-)Technologie im letzten Jahrzehnt nimmt die Einführung und Anwendung von e-HRM stetig zu (Strohmeier 2007). Unterstützend sind neue Cloud-Technologien (Lin and Chen 2012), die cloudbasierte e-HRM Lösungen ermöglichen (Jafari Navimipour et al. 2015b; Zapotocny 2015). Neben den antizipierten Kosteneinsparungen durch Cloud-Lösungen sind es fachlich prozessuale Vorteile, die zu einem Anstieg von Implementierungsprojekten beitragen (Harris and Spencer 2016).

Zusammenfassend zeigt sich, dass trotz des langen Zeitraums, über den sich die Digitalisierung von HR bereits entwickelt hat, die Begriffsdefinition weiterhin unscharf bleibt. e-HRM sei "[…] an umbrella term covering all possible integration mechanisms and contents between HRM and Information Technologies aiming at creating value within and across organizations for targeted employees and management" konstatieren Bondarouk und Ruël (2009) und fordern abschließend eine allgemeingültige Begriffsdefinition ein.

Forschung im Bereich e-HRM

Strohmeier (2007) stellt fest, dass sich das wissenschaftliche Interesse an e-HRM ab Mitte der 90er Jahre entwickelt hat. Er weist darauf hin, dass die bisherigen empirischen Forschungsarbeiten inhaltlich, aufgrund des weitreichenden Themenfeldes breit gefächert sind und nur in etwa 20% auf theoretischen Konzepten beruhen. Weiter merkt er an, dass sich die Forschung eher auf die Personalabteilung als Endanwender von e-HRM als auf alle Mitarbeiter eines Unternehmens konzentriert. Zudem kritisiert er, die bisher vernachlässigte Beantwortung der Frage, inwiefern Technologie bei strategischen HR-Entscheidungen unterstützen kann. Daher empfiehlt er mehrere Forschungsfelder, um den Begriff e-HRM zu schärfen.

Stanton und Coovert (2004) fordern Wissenschaftler auf "[…] to identify key research questions at the intersection of HR and IT, produce viable theoretical perspectives to frame those research questions, collect meaningful data across multiple organizational settings, and translate their findings into useful advice for practitioners".

Die aktuelle Forschung konzentriert sich auf verschiedene Aspekte von e-HRM. Exemplarische Themen und Beiträge aus der e-HRM Forschung sind nachfolgend aufgeführt.

HR-Prozesse

Mehrere Artikel untersuchen die Digitalisierung einzelner HR-Prozesse wie die der Mitarbeiterbeurteilung (Nura and Osman 2013), des Lernmanagements (Colchester et al. 2017), des Talentmanagements (Nura and Osman 2013; Martin 2015) oder der Personalbeschaffung (Lee 2007; Furtmueller et al. 2011; B. Holm 2014; Kumar and Lalitha 2016). Schnittstellen zu anderen Managementsystemen, wie wissensbasierte Systeme, werden ebenso diskutiert (Martinsons 1997).

Technologie und Integration

Darüber hinaus werden neue (mobile) Zugangskanäle auf e-HRM (Mülder 2016), die Integration von e-HRM in existierende soziale Netzwerke (Pilarski et al. 2016) und die potentielle Unterstützung des HR-Digitalisierungsprozesses durch neuartige (Cloud-)Technologien, erforscht (Jafari Navimipour et al. 2015b; Stone et al. 2015; Zapotocny 2015; Hahn 2016).

Sicherheitsaspekte und rechtliche Fragen

Sicherheitsaspekte und rechtliche Fragen im Kontext zu e-HRM, insbesondere bei der Nutzung von Cloud-Technologien, werden ebenso untersucht (Zafar 2013; Lehnert and Dopfer-Hirth 2016).

Auswirkung, Nutzen und Wertbeitrag von e-HRM

Die Auswirkung von e-HRM ist ein prominentes Forschungsthema (Ensher et al. 2002; Lengnick-Hall and Moritz 2003; Hussain et al. 2007; Ruël et al. 2007; Parry and Tyson 2011; Maier et al. 2013; Strohmeier and Parry 2014; Stone et al. 2015; Bellou 2016), genau wie die Wahrnehmung und Akzeptanz von e-HRM innerhalb einer Organisation (Fisher and Howell 2004; Voermans and Veldhoven 2007). Weitere Studien befassen sich mit der wechselseitigen Beziehung zwischen e-HRM und strategischem HR-Management (Marler and Fisher 2013; Bondarouk et al. 2017b). Wieder andere mit der Einführung von e-HRM (Strohmeier and Kabst 2009) sowie mit der praktischen und theoretischen Umsetzung von e-HRM (Florkowski and Olivas-Luján 2006; Ngai and Wat 2006; Hooi 2006; Olivas-Lujan et al. 2007; Bondarouk 2011; Varma and Gopal 2011). Darüber hinaus werden das ungenutzte Potential von e-HRM (Wirtky et al. 2016) sowie die grundsätzliche Frage, welche strategischen Entscheidung zur Implementierung von e-HRM führen (Schalk et al. 2013), untersucht.

Zusammenfassend lässt sich sagen, dass die Forschung zum digitalen Personalwesen im Vergleich zur praktischen Anwendung zeitlich verzögert begonnen hat. Die Auswirkung und der Nutzen von e-HRM sind Schwerpunktthemen, neben denen es noch weitere breitgefächerte Forschungsfelder gibt.

Praktische Anwendung von e-HRM

Bisher ist die Digitalisierung von HR-Prozessen im Vergleich zu Primärprozessen von den meisten Unternehmen nachrangig behandelt worden. Zum einen gibt es dafür fachliche Gründe, wie die bisher

untergeordnete Rolle der HR in der Organisation (Brockbank 1997) und die Herausforderung einer direkten Nachweisbarkeit des Wertbeitrages der Personalprozesse zum Unternehmenserfolg (Klein 2012). Zum anderen schränkte die benötigte Rechenleistung sowie die Verfügbarkeit adäquater technologischer e-HRM Lösungen die Gestaltungsmöglichkeiten der HR ein (Olivas-Lujan et al. 2007; Zapotocny 2015). Diese Beschränkung ergibt sich im Wesentlichen aus den bisher am Markt verfügbaren on-premise e-HRM Standardsoftwarelösungen, die HR-Teilprozesse (z.B. Rekrutierung oder das Lernmanagement) als Prozesssilos digitalisieren, aber noch keine gesamtheitliche und vor allem durchgängige HR-Prozesswelt abbilden. Einen Überblick über die HR-Prozesswelt, die sich in die Bereiche Talentmanagement, Personalplanung und die operativen HR-Kernprozesse aufteilt, gibt Abb. 1. Die gestrichelten Verbindungen deuten potentielle Prozessschnittstellen (z. B. bei der Festlegung von Lernzielen in der Zielvereinbarung oder den Einfluss einer Mitarbeiterbeurteilung auf die Berücksichtigung in der Nachfolgeplanung) an.
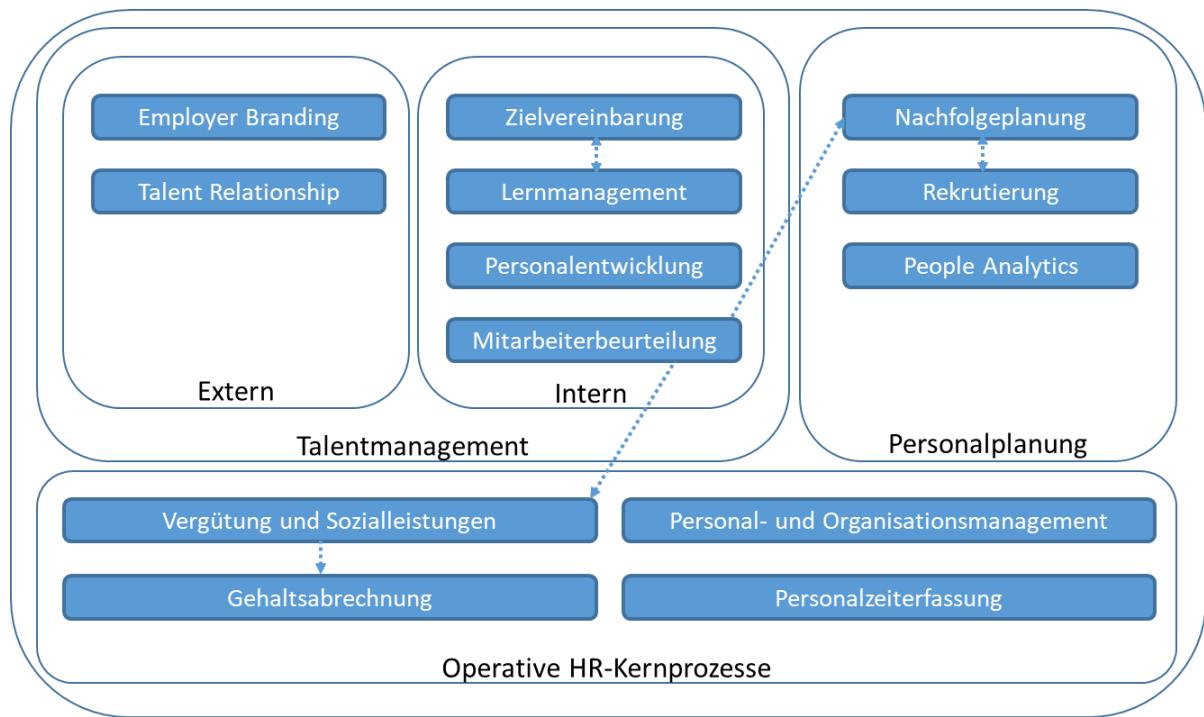

Abbildung 1: HR-Prozesswelt

Der technologische Wandel von einer on-premise Welt in eine cloudbasierte Software as a Service (SaaS) Umgebung ermöglicht es nun, die Herausforderung einer ganzheitlichen Digitalisierung von HR-Prozessen anzugehen (Jafari Navimipour et al. 2015b). So gibt es beispielsweise im Bereich der Personalplanung die fachliche Anforderung, Karrierepfade aufzuzeigen und eine Nachfolgeplanung zu etablieren. Diese Karrierepfade setzen sich aus verschiedenen Rollen zusammen, die wiederum die Anforderungen (Skills und Kompetenzen) an eine Position beschreiben. Im Nachfolgeprozess werden die individuell ausgeprägten Eigenschaften eines Mitarbeiters mit den angebotenen Karrierepfaden

abgeglichen, was aufgrund der zahlreichen Kombinationsmöglichkeiten von Rollen, vakanten Positionen und Mitarbeitern beliebig komplex werden kann. Erst heute wird die dafür notwendige Rechenleistung in Form von HR-SaaS Lösungen (i.F. HR-Cloud) angeboten (Zapotocny 2015).

Nach Harris und Spencer (2016) bieten cloudbasierte Technologien Unternehmen die Möglichkeit, bessere Beziehungen zu ihren Mitarbeitern aufzubauen. So können beispielsweise über die HR-Cloud die gestellten Anforderungen und Erwartungen an die Mitarbeiter sowie die unternehmensinternen Angebote kommuniziert werden. Der Zugriff auf diese Angebote kann dort ebenso stattfinden. Die Nutzung der Technologie hat somit einen direkten Einfluss auf das individuelle Mitarbeitererlebnis und bietet HR eine weitere Möglichkeit zur langfristigen Positionierung als strategischer Business Partner (Lepak and Snell 1998; Bell et al. 2006).

Neben den allgemeinen SaaS-Vorteilen, wie Performanceverbesserungen (Lin and Chen 2012), bietet die HR-Cloud durch einen gesamtheitlichen Prozessdigitalisierungsansatz noch weitere Vorteile gegenüber bisherigen on-premise HR-Lösungen. Hier können beispielhaft die integrierten und aufeinander abgestimmten Module sowie die zugrundeliegende gemeinsame Datenbasis angeführt werden, die bisher in dieser Form nicht verfügbare Prozesssynergien ermöglichen. Aus technologischer Sicht ist zudem der fortgeschrittene Lebenszyklus der on-premise HR-Systeme zu nennen. Bei genauer Betrachtung der Pläne der HR-Softwarehersteller wird klar, dass on-premise Systeme zwar weiterhin gewartet, perspektivische Weiterentwicklungen aber eher in den HR-Cloud-Lösungen stattfinden und langfristig on-premise durch cloudbasierte Lösungen substituiert werden (Harris and Spencer 2016). Ein Beispiel für diesen Trend sind Produktforen (z. B. die SAP SuccessFactors Kundencommunity), die es allen Kunden einer spezifischen HR-Cloud-Lösung ermöglichen, Verbesserungsvorschläge und Wünsche zu adressieren, neue Funktionen zu priorisieren oder auch die praktische Anwendung der Software zu diskutieren. Bereits Mitte der 2000er stellen Gueutal und Stone (2005) zur HR-IT fest: „Today technology has finally begun to deliver on the promises of the 1990s".

Basierend auf diesen neuen Technologien offerieren verschiedene Anbieter (u. a. SAP, ADP, Kronos, Oracle, Workday) HR-Cloud-Lösungen, die darauf abzielen, eine Steigerung des Wertbeitrages von HR zu erreichen. Zu diesem Ziel tragen die Steigerung der HR-Effizienz, die Standardisierung von Prozessen, die Verbesserung der HR-Services, die Erhöhung der strategischen Ausrichtung (Ruël et al. 2004; Strohmeier 2009) und schließlich die Kostensenkung (Marler 2009; Schalk et al. 2013) bei. Darüber hinaus bietet die neue Form der HR-Cloud-Lizenzierung eine verbesserte Kostentransparenz durch das Angebot von „pay-as-you-go"-Abrechnungsmodellen (Wu et al. 2012) (z.B. auf Basis der Anzahl von Endanwendern, von genutzten Modulen oder in Abhängigkeit von ausgeführten Transaktionen), die eine nachträgliche Kostenzuordnung auf Geschäftseinheiten und eine grundsätzlich optimierte Kostenallokation ermöglichen.

Um die beschriebenen Potenziale nutzen zu können, werden HR-Transformationsprojekte zunehmend interessanter für Unternehmen. Wesentliche exogene Faktoren, die aktuell die Anzahl der HR-Cloud-Transformationsprojekte beeinflussen, sind die demographische Entwicklung und der industrielle Wandel zu einer Wissensgesellschaft (Eisner 2005; Roehling et al. 2005) sowie der damit einhergehende Kampf um Talente. Letzterer wird durch eine e-HRM-Lösung insofern unterstützt, als dadurch eine adäquate Besetzung von Vakanzen ermöglicht sowie der optimale Einsatz der knappen internen Ressourcen optimiert (Laumer et al. 2010) werden können. Die Rekrutierung, Bindung und Entwicklung der Talente im Unternehmen sind die größten Herausforderungen für die Personalabteilungen (Stone and Deadrick 2015), die durch e-HRM-Lösungen unterstützt werden können.

Das Sierra-Cedar 2016-2017 HR Systems Survey White Paper (Harris and Spencer 2016) bestätigt die Tendenz, dass Unternehmen zunehmend HR-Prozesse digitalisieren und dabei sukzessive auf HR-Cloud-Technologie setzen. Seit 2014 gehen die meisten großen und mittleren Unternehmen davon aus, dass die Ausgaben für HR-Technologie kontinuierlich steigen werden, wobei die Budgets für Großunternehmen ab 2017 stabil bleiben. Bei direktem Vergleich von on-premise und HR-Cloud-Lösungen erkennt man eine klare Tendenz zu Gunsten letzterer: 72% der Unternehmen, die das Talentmanagement digitalisierten, realisierten dies auf Basis einer HR-Cloud. Zudem bevorzugen Endanwender HR-Cloud-Lösungen, was ein besserer „User Experience Score" von 2.49/5 (on-premise) versus 3.46/5 (Cloud) zeigt. Auch sehen kleine und mittlere Unternehmen, die bereits HR-Technologien einsetzen, eine Umsatzsteigerung in Kombination mit einem verbesserten Geschäftsergebnis, was mit einer 75%igen Wahrscheinlichkeit dazu führt, dass HR eher als strategischer Partner akzeptiert wird. Zudem planen 24% der befragten Unternehmen, ihr derzeitiges HRM in eine cloudbasierte Lösung zu transformieren. Weitere Umfragen (KPMG and Bitkom 2017) bestätigen, dass 65% der deutschen Unternehmen cloudbasierte Services bereits nutzen und die Mehrheit der Befragten davon überzeugt ist, dass die dort abgelegten Daten sicher sind.

Herausforderungen von HR-Transformationsprojekten

Projekte zur Transformation von HR-Prozessen in die HR-Cloud stehen vor neuen Herausforderungen. Neben dem Aufwand der Dokumentation von existierenden Ist-Prozessen und der Ausarbeitung von Soll-Prozessen im Rahmen der Vorarbeiten kommt erschwerend die Limitierung der Prozesskonfigurationsmöglichkeiten in der HR-Cloud hinzu. So sind kundenspezifische Erweiterungen aktuell nicht oder nur bedingt abbildbar, und die konfigurierbaren Prozessvarianten der HR-Cloud fordern eine Anpassung und Standardisierung der Prozesse im Unternehmen ein. Gerade der letzte Punkt führt zu einem im ERP-Umfeld schon länger diskutierten Paradigmenwechsel (Luo and Strong 2004), denn die Ablauforganisation muss sich gegebenenfalls an die in den Softwarelösungen

implementierten Prozesse anpassen und nicht, wie bisher, die HR-IT-Lösungen an die definierten Soll-Prozesse der Fachabteilung. Daraus resultiert auch eine technisch forcierte Prozesstreue, da Prozessabkürzungen (Workarounds, Shadow-Systeme), die beispielsweise eine direkte Freigabe sowie die Besetzung von Vakanzen ermöglichen, entfallen.

Erschwerend kommt hinzu, dass die in der HR-Cloud abgebildeten Prozesse zusammen mit den dort verarbeiteten personenbezogenen Daten einer besonderen Sorgfaltspflicht durch die Vorgaben des Bundesdatenschutzgesetzes (BDSG §28) unterliegen. Zudem schränken das Betriebsverfassungsgesetz (BetrVG §80) und die sich darauf berufende deutsche Mitbestimmung den Handlungsspielraum in der Datenverarbeitung und in der Prozessgestaltung im HR-Bereich ein. Lehnert und Dopfer-Hirth (2016) geben einen kurzen Überblick über die notwendigen Maßnahmen zur Einhaltung dieser gesetzlichen Vorgaben im Kontext zu den on-premise HRM-Lösungen, die größtenteils auch auf die HR-Cloud angewendet werden können. Kovach u. a. (2002) betonen zudem die Bedeutung der Absicherung und der Zugriffsbeschränkung auf personenbezogene Daten innerhalb von IT-Systemen.

Im Kontext der rechtlichen Anforderungen weisen Strohmeier und Kabst (2009) darauf hin, dass die Bestimmungen des nationalen Datenschutzes eine Hürde zur Übermittlung von Personaldaten über das Internet darstellen. Eine Vereinfachung, zumindest im europäischen Raum, schafft hier die europäische Datenschutzrichtlinie durch die Harmonisierung der Datenschutzgrundsätze und ermöglicht in gewissem Maße einen „Binnenmarkt" für personenbezogene Daten (Robinson et al. 2009). In den Vereinigten Staaten ist der Datenschutz weniger restriktiv als in der Europäischen Union, gleichwohl existieren mehrere gesetzliche Vorgaben (z.B. Federal Information Security Management Act of 2002 (Public Low 107-347 2007) oder der USA Patriotic Act (One Hundred Seventh Congress of the United States of America 2001)). Aufgrund der unterschiedlichen Gesetzgebungen muss bei der Auswahl einer HR-Cloud-Lösung über die Implikationen auf die darin gespeicherten Personaldaten Klarheit herrschen. Komplizierter wird es, wenn Unternehmen eine einzige unternehmensweite Cloud-Lösung einführen, aber ausländische Tochtergesellschaften haben, die wiederum nationalen Gesetzgebungen unterliegen (Zafar 2013). Folglich müssen die rechtlichen Beschränkungen der jeweiligen Landesgesellschaft berücksichtigt werden, da oftmals keine lokalen HR-Cloud-Lösungen angeboten oder eingeführt werden. Trotz des hohen Aufwandes schlussfolgern Townsend und Bennett (2003), dass Unternehmen mit erarbeiteten und umgesetzten Datenschutzrichtlinien im Vergleich mit solchen, die den Datenschutz vernachlässigt haben, eher in der Lage sein werden, Arbeitskräfte anzuwerben und zu halten. Harris und Spencer (2016) stellen außerdem fest, dass Unternehmen mit einer HR-Cloud-Lösung ein um 21% erhöhtes Vertrauen in die Datenschutzprozesse im Vergleich zu einer on-premise Lösung haben.
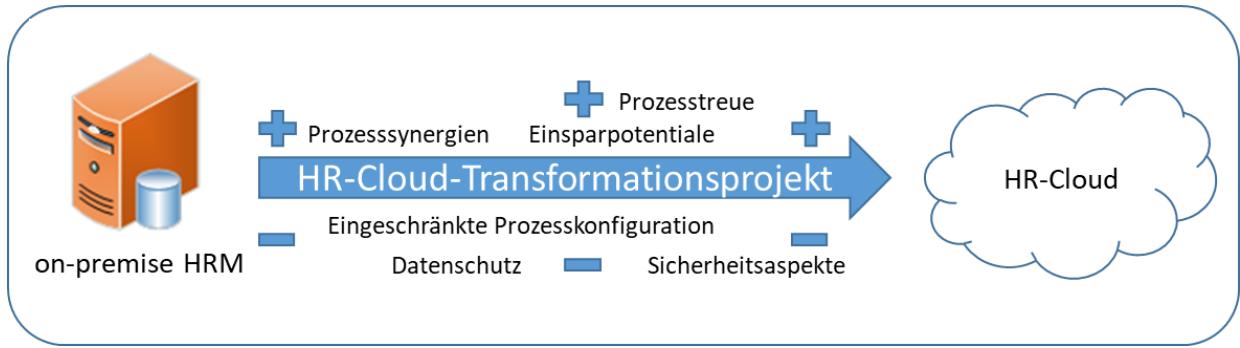
Abbildung 2: Chancen und Herausforderungen von HR-Transformationsprojekten

Zusammenfassend bietet die Einführung der HR-Cloud die Chance und Herausforderung (siehe Abb. 2), neue prozessuale Wege zu beschreiten. Aus IT-Sicht beschäftigen sich die Anbieter von HR-Cloud-Lösungen intensiv mit Sicherheitsaspekten (Successfactors 2012; Sepstrup 2015) und den rechtlichen Fragestellungen, was sich bereits in erheblichen Investitionen in die IT-Sicherheit und dem Aufbau von regionalen Datenzentren widerspiegelt (Successfactors 2016). Aus Sicht der Personalabteilung ermöglicht die Automatisierung von HR-Prozessen eine Fokussierung auf strategische Aktivitäten (Cabrera and Bonache 1999). So ermöglicht die HR-Cloud durchgängig, – von der Rekrutierung bis zur Nachfolgeplanung („from hire to retire") – die Mitarbeiterdaten nicht nur zu verwalten, sondern ein proaktives Human Capital Management zu etablieren.

Vorgehensmodelle für IT-Projekte im HR-Kontext

Auch im HR-Bereich gilt, dass ein in der Organisation eingebettetes professionelles Projektmanagement die Grundvoraussetzung für ein positives Projektergebnis ist. Die Vielfalt von IT-Projekten spiegelt sich in diversen Vorgehensmodellen wider. Die Auswahl des passenden Modells orientiert sich dabei an der jeweiligen Projektart, wobei grundsätzlich zwischen einem klassischen und einem agilen Ansatz (Wagner 2011) unterschieden wird. Unternehmensspezifische Anpassungen der Modelle sind dabei keine Seltenheit.

Klassische, agile und hybride Modelle

Klassische Modelle sind beispielsweise das Wasserfallmodell und das V-Modell XT. Typische Merkmale dieser Modelle sind klar definierte, lineare Prozessphasen, von der Anforderungsanalyse bis zum Go-Live sowie den je Phase zu erarbeitenden Ergebnistypen. Das V-Modell XT ist der Standard für die Durchführung von IT-Projekten im öffentlichen Sektor und legt einen Fokus auf die konkreten Aktivitäten pro Projektphase sowie auf das Rollenmodell. In 2015 wurden ca. 10% des Bruttoinlandproduktes als Beschaffungsvolumen der öffentlichen Hand angegeben, was den hohen Nutzungsgrad dieses Vorgehensmodells in der freien Wirtschaft erklärt (BMWi 2016; Destatis 2016).

Klassische Modelle legen einen hohen Wert auf die formal definierten Vorgaben, die ausführliche Dokumentation, die vertragliche Erbringung von Leistung sowie die stringente Verfolgung eines Projektplans. Daraus resultieren ein administrativer Aufwand zur Erbringung aller formalen Anforderungen und eine klare Vorabplanung von Projektergebnissen, was gerade bei kleineren oder kurzfristig umzusetzenden IT-Entwicklungsprojekten von Nachteil ist. Immer mehr Softwareentwicklungscenter setzen daher verstärkt auf agile Methoden (Vlietland et al. 2016).

Agile Methoden zielen darauf ab, im Projekt schnell einen sichtbaren Mehrwert zu generieren und zeitnah auf neue Anforderungen zu reagieren (Boehm and Turner 2004). Anstatt einen vorab geplanten Ergebnispfad einzuschlagen, wird im Projekt bedarfsorientiert priorisiert, was wiederum eine zeitnahe Berücksichtigung neuer Anforderungen ermöglicht. Der Auftraggeber ist in diesem Prozess nicht nur Betroffener, sondern Beteiligter, der die Projektergebnisse anhand von Prototypen zu bewerten und über die nächsten Schritte mitzuentscheiden hat. Die Dokumentation der Ergebnisse findet rudimentär und nachgelagert statt, da inhaltliche Anpassungen im Fokus stehen, regelmäßig in fest definierten Zeitfenstern erfolgen und im Gegensatz zu den klassischen Vorgehensmodellen geplant in dieser Methodik verankert sind.

Hybride Modelle sind eine Kombination aus klassischen und agilen Methoden, die wiederum – in Abhängigkeit von der Aufgabenstellung – Potentiale aus beiden Vorgehen heben (Habermann 2012).

Besonderheiten von HR-IT-Projekten

Im HR-IT-Kontext finden je nach Projektart klassische und agile Projektvorgehen Anwendung. Eine Hürde, die die agile Methodik gerade im Kontext von größeren HR-IT-Projekten zu nehmen hat, ist die Projektbudgetierung, die typischerweise vor Projektbeginn abgeschlossen sein muss. Als Unterstützungsprozess für die wertschöpfenden Primäraktivitäten ergibt sich in der Praxis für HR-Projekte zudem eine Limitierung bezüglich des freien Umgangs mit den monetären Ressourcen. Als Resultat finden daher Mischformen Anwendung, in denen beispielsweise die Projektphasen nach klassischem Vorgehen strukturiert, die konkreten Umsetzungsinhalte aber iterativ oder agil bearbeitet werden. Auch nimmt die Projektdokumentation aufgrund der Sorgfaltspflicht bei der Verarbeitung von HR-Daten einen besonderen Stellenwert ein, was den agilen Methoden eher widerspricht.

Vorgehensmodell für HR-Cloud-Transformationsprojekte

HR-Cloud-Transformationsprojekte sind eine spezielle Ausprägung von HR-(IT-)Projekten und stellen eine neue Herausforderung dar, da die Freiheitsgrade der Umsetzung durch die Limitierung der HR-Cloud-Technologie eingeschränkt sind. Vorgegebene Prozessschritte können konfiguriert werden; ein komplett freies Prozessdesign hingegen ist nicht mehr möglich. Nach klassischem Vorgehen erstellte

fachliche Anforderungen an die HR-IT-Systeme können daher nicht vollumfänglich umgesetzt werden, sondern dienen als Vorlage für einen Soll-Prozess innerhalb der Anpassungsmöglichkeiten der HR-Cloud. Abb. 3 stellt ein Vorgehensmodell für HR-Cloud-Transformationsprojekte dar, das klassische, iterative und agile Aspekte enthält.
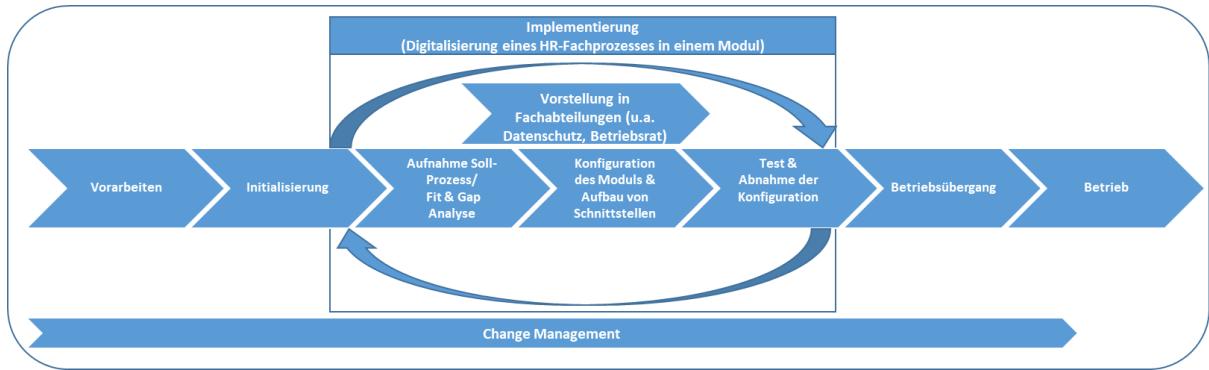

Abbildung 3: Abgeleitetes Vorgehensmodell für eine HR-Cloud-Transformation

Die fünf Projektphasen (Vorarbeiten, Initialisierung, Implementierung, Betriebsübergang und Betrieb) orientieren sich an einem klassischen Vorgehensmodell. Das projektbegleitende Change Management unterstützt in allen Projektphasen.

Eine Besonderheit findet sich in der Phase der Implementierung, die einen Regelkreis enthält, sodass Teilergebnisse der Prozesskonfiguration in einzelnen Iterationen als Prototyp vorgestellt, bewertet und angepasst werden können. Agile Elemente finden dadurch Anwendung, dass die Anzahl und die Zeiträume der Iterationen, auf Basis von Erfahrungswerten bei vorherigen Implementierungen limitiert sind.

Das Vorgehen innerhalb der Implementierungsphase ist für alle zu konfigurierenden HR-Teilprozesse (siehe Abb. 1) identisch; eine Prozessdifferenzierung erfolgt nur auf Basis der Prozessgestaltung, der Benutzergruppen und der potentiellen Schnittstellen.

Exemplarisches HR-Cloud-Transformationsprojekt

Die im Folgenden beschriebenen Erfahrungen basieren auf mehreren durchgeführten HR-Cloud-Implementierungsprojekten aus der Praxis.

Rahmenbedingungen

Die Digitalisierung aller Prozesse des Talentmanagements, der Personalplanung und der HR-Kernprozesse ist im Scoping der Projekte vorgegeben (vollständige Digitalisierung in der HR-Cloud). Die einzelnen HR-Prozesse werden in Modulen (z. B. Modul „Rekrutierung" oder Modul „Mitarbeiterbeurteilung") der HR-Cloud abgebildet, die separat voneinander konfiguriert werden

können, optional aber Schnittstellen untereinander anbieten. So besteht beispielsweise die Möglichkeit, im Teilmodul „Zielvereinbarung" ein Absprung in das Teilmodul „Lernmanagement" vorzunehmen, wenn das vereinbarte Ziel die Absolvierung eines dort angebotenen Lerninhalts sein soll. Bei den Implementierungen wurde die Nutzung dieser Prozesssynergien angestrebt. Ein Modul bildet nicht unbedingt die HR-Prozesswelt (siehe Abbildung 1) trennscharf 1:1 ab. So kann beispielsweise im Modul „Mitarbeiterbeurteilung" auch der Fachprozess „Zielvereinbarung" enthalten sein. Alle Implementierungsprojekte basieren auf HR-Cloud-Lösungen im EU-Rechtsraum, sodass die Personaldaten auf Servern innerhalb der EU gespeichert werden.

Projektphase: Vorarbeiten

Schon während der Vorarbeiten ist das generelle Commitment des höheren Managements für eine HR-Cloud-Lösung einzuholen. Das HR-Cloud-Paradigma, welches keine komplett freie Prozessgestaltung zulässt, sowie die externe Speicherung von Personaldaten voraussetzt, muss verstanden, mitgetragen und kommuniziert werden.

Fisher und Howell (2004) betonen die Notwendigkeit, dass IT-Systeme an den Unternehmenswerten ausgerichtet sein müssen. Die Werte und die Mission des Unternehmens müssen vorab klar definiert sein und sich in den einzelnen Initiativen, also u. a. in den Projekten und deren Zielen, widerspiegeln. Daher müssen die Ziele der HR-Cloud-Transformation klar herausgearbeitet werden.

Neben der antizipierten Prozessoptimierung durch Digitalisierung und den modulübergreifenden Synergien wird häufig eine Kosteneinsparung prognostiziert. Die Berechnung dieser potentiellen Einsparungen und des Nutzens anhand eines Business Cases hängt dabei von verschiedenen Faktoren ab. Lengnick-Hall und Moritz (2003) betonen die Bedeutung eines überzeugenden Business Cases, der auf verfügbaren, verständlichen und konkreten Metriken basiert, da die kostenintensiven Investitionen in e-HRM begründet sein müssen. Dagegen drängen Harris und Spencer (2016) darauf, Implementierungsprojekte für HR-Cloud-Lösungen im Grundsatz zu überdenken und durch konstante Change Management Prozesse zu substituieren. Eine differenzierte Betrachtung des Cloud-Betriebs, der einem kontinuierlichem Change-Prozess unterliegt und dem Implementierungsprojekt, welches zeitlich und monetär limitiert ist, wird empfohlen. Die praktische Erfahrung zeigt, dass ein kontinuierlicher Change-Prozess nicht die gleiche Verbindlichkeit hat wie konkrete Ziele im Rahmen eines zeitlich begrenzten Projekts.

Einflussfaktoren auf die Kostenkalkulation können beispielsweise der aktuelle HR-Digitalisierungsgrad, die Anzahl der HR-Applikationen sowie deren individuelle Position im Produktlebenszyklus sein. Ein ebenso relevanter Faktor für die Kostenkalkulation ist die Flexibilisierung des Lizenzmodells, da in einem SaaS-Modell die HR-Cloud-Lizenzen nur über die definierte Vertragslaufzeit beschafft und nach

Vertragsende neu verhandelt werden. Die Reduktion von IT-Betriebsaufwänden sowie des IT-Personals, wird bei SaaS-Lösungen grundsätzlich antizipiert. Demgegenüber ist der Personalabbau in der HR ein heikles Thema. Die Einführung der HR-Cloud verändert und optimiert nicht nur „wie" in der HR gearbeitet wird, sondern hebt dadurch auch Einsparungspotential bei den HR-Ressourcen. Gleichwohl müssen die HR-Mitarbeiter eine aktive Rolle in diesem Transformationsprozess einnehmen, sodass dieses Eisparpotential überhaupt gehoben werden kann. Das Konzept des „moderaten Voluntarismus" (Strohmeier 2009) beschreibt dieses Dilemma. Roberts (1999) vertritt die Ansicht, dass bei der Berechnung des „Return on Investments" von HR-Systemen, gerade im Kontext neuer Technologien, Kreativität bei dem Herausarbeiten von Vorteilen gefordert ist. Daher kann die Einbeziehung der Personalabteilung zur Erstellung von "weichen" Faktoren (z.B. „bessere Mitarbeiter"), dazu beitragen, die Investition zu rechtfertigen – selbst wenn die strategische Neuausrichtung von HR mithilfe von IT schon Grund genug ist oder die folgende Aussage gilt "e-HRM costs money, but ignoring e-HRM costs a fortune" (Aluvala 2017).

Um nun die richtige HR-Cloud-Plattform auszuwählen, hat sich im Rahmen von Anbieterpräsentationen eine Fit & Gap Analyse zum Abgleich der HR-Ist- oder -Soll-Prozesse des Unternehmens mit den konfigurierbaren HR-Prozessen der jeweiligen Lösung bewährt.

Da eine direkte Abbildung der Prozesse nicht möglich ist, können nachfolgende Punkte als zentrale Entscheidungskriterien herangezogen werden:

- Quantität und Qualität der Prozessabdeckung,
- Lösungsreife im Allgemeinen,
- Integrationsfähigkeit in die existierende IT-Infrastruktur,
- Gesamtkosten der Plattform.

Die HR-Fachbereiche müssen aktiv am Ausschreibungsprozess partizipieren, damit die HR-Cloud-Lösung nicht als reine, durch die IT getrieben Entscheidung wahrgenommen wird. Das spätere Projektteam setzt sich daher idealerweise aus Mitarbeitern der (HR-)IT und den jeweiligen HR-Fachbereichen zusammen.

Zusätzlich zur HR-Cloud-Plattform muss ein Implementierungspartner gefunden werden, der die Konfiguration der Prozesse in der Cloud-Umgebung übernimmt. Neben dem Kostenaspekt spielt hier die Projekterfahrung eine ausschlaggebende Rolle. Die interne IT kann die initiale Konfiguration oftmals nicht übernehmen, da das Spezialwissen je nach HR-Cloud-Lösung sehr komplex und kurzlebig ist. Für einen gesicherten nachgelagerten Betrieb ist ein Wissenstransfer (z. B. durch Joint Teams oder Schulungen) mit dem Implementierungspartner zu vereinbaren, sodass spätere

Konfigurationsanpassungen aufwandsarm möglich sind. Umfragen (Harris and Spencer 2016) bestätigen, dass die häufigste Unterstützungsaufgabe (78%) der Implementierungspartner die initiale Konfiguration der HR-Cloud und die zweithäufigste das Geben von Trainings (35%) ist.

Bereits vor Beginn der Umsetzung sind die Organisationeinheiten Betriebsrat, Datenschutz, IT-Architektur sowie IT-Security in das Projekt einzubinden und in den nachfolgenden Projektphasen zu informieren. Aufgrund der verarbeiteten Personaldaten werden regelmäßige Termine mit dem Betriebsrat während der gesamten Projektlaufzeit empfohlen; die Abstimmung mit den anderen Bereichen kann fallbezogen (z. B. die Vorstellung einer neuen Schnittstelle bei der IT-Security) stattfinden.

Projektphase: Initialisierung

Die Phase der Initialisierung beinhaltet die Definition des formalen Projekts sowie die technische Einrichtung der HR-Cloud-Umgebung. Während der Definition des Projekts wird ein Fokus auf zwei Themen gelegt: auf das Stakeholdermanagement sowie auf den Projektauftrag.

Bereits während der Vorarbeiten sind die ersten Fachbereiche in die Kommunikation eingebunden; nun sind weitere Stakeholder und Multiplikatoren zu identifizieren, die am Projekt direkt partizipieren oder von diesem betroffen sind. Eine Empfehlung ist hier, Key-User aus Nicht-HR-Fachbereichen zu benennen, diese frühzeitig zu informieren und im Projektverlauf proaktiv zu involvieren (u. a. bei den User Acceptance Tests). Ein projektbegleitendes Change Management, welches die systematische und organisationale Veränderung, gerade im Hinblick auf die neue Rolle der HR, professionell begleitet, ist eine weitere erfolgskritische Maßnahme zur Verbesserung der Zusammenarbeit und Kommunikation mit den Stakeholdern. Nach einer Studie von Harris und Spencer (2016) unterstützen nur 43% der großen und 46% der mittelgroßen Unternehmen Schlüsselprojekte mit Initiativen aus dem Veränderungsmanagement obwohl gerade die Einführung der HR-Cloud weniger von der technologischen Umsetzung als von einem professionellen Change Management abhängt. Dies liegt u. a. an der geringeren Komplexität der initialen technischen Installation und des Betriebs einer Cloud-Lösung im Vergleich zu reinen on-premise Systemen. Die Einrichtung von on-premise HCM-Umgebungen ist vergleichsweise aufwändiger, da die Gestaltungsfreiheit dazu verleitet, komplexe Systeme zu implementieren. Im Gegensatz dazu tragen die prozessualen Vorgaben in der HR-Cloud sowie die klar abgegrenzten Konfigurationsmöglichkeiten implizit zu einer Komplexitätsreduktion bei.

Um in den Workshops der späteren Implementierungsphase effizient arbeiten zu können, ist es notwendig, dass die jeweils relevanten auskunfts- und entscheidungsfähigen Ansprechpartner an diesen teilnehmen. Die Erfahrung hat gezeigt, dass Fachbereiche bei IT-nahen Projekten dazu neigen, als betroffene und weniger als proaktive, mitgestaltende Beteiligte zu agieren. Eine Methode, die

Einbeziehung der Fachbereiche zu steigern, ist das bereits im Rahmen der Vorarbeiten eingeholte und kommunizierte Commitment des höheren Managements, aber auch die aktive Teilnahme der HR-Leiter an den Implementierungsworkshops. Die frühzeitige Benennung von Modulverantwortlichen hat sich ebenso in der Praxis bewährt. Diese übernehmen während des Projekts die Verantwortung für ein oder mehrere Module und nehmen im späteren Regelbetrieb Anpassungen vor. Eine hohe Affinität zu HR und zu IT ist Voraussetzung für den Stelleninhaber. DeSanctis (1986) definiert den idealen HR-IT-Manager als eine Person, die Kompetenzen sowohl in der Datenverarbeitung (IT) als auch in der Anwendung von HR besitzt und ergänzend kommen Hall und Torrington (1986) zu dem Schluss, dass aufgrund mangelnder IT-Affinität solche Mitarbeiter im Personalbereich eher weniger anzufinden sind. Diese Herausforderung stellt sich 30 Jahre später immer noch.

Im Projektauftrag ist noch einmal klar der Scope des Projekts zu definieren. Dabei sind vor allem zwei Grundsatzentscheidungen zu treffen: über die Art der Integration der HR-Cloud in die existierende Infrastruktur und über die Reihenfolge der Modulimplementierung.

Die Auswahl des passenden Integrationsszenarios hängt davon ab, ob und welche HR-Prozesse auf wie vielen verschiedenen Applikationen bereits digitalisiert sind sowie welche davon in der HR-Cloud zukünftig konsolidiert werden. Man unterscheidet hier zwischen drei Integrationsszenarien (Harris and Spencer 2016). Besteht ein führendes on-premise HRM-System weiterhin und wird ein reduzierter Stammdatensatz mit der HR-Cloud synchronisiert, so wird dies „side-by-side" oder auch „hybrides" Szenario genannt. Beispielsweise kann ein Unternehmen alle Talentmanagement-Prozesse in eine Cloud-Umgebung transformieren, hingegen die operativen Kernprozesse on-premise belassen. Hat ein Unternehmen bisher keine HRM-Lösung im Einsatz oder entscheidet sich für die Transformation aller HR-Prozesse in die HR-Cloud, so spricht man von einem „Green-Field"- oder „Rip & Replace"-Ansatz. Ein „paralleles" oder auch "Patchwork" Szenario zeichnet sich dadurch aus, dass gleichzeitig auf mehreren HR-Cloud-Systemen, on-premise HRMs oder auch mit externen Dienstleistern gearbeitet wird. Es gibt kein universelles Transformationsprojekt, sondern es wird fallbezogen entschieden, ob und welches System abgelöst werden.

Bezugnehmend auf die Sierra-Chedar Studie (Harris and Spencer 2016), nutzten 28% der Unternehmen, die eine HR-Transformation vornahmen, einen „Rip & Replace"-Ansatz, gefolgt von einem „Parallel/Patchwork"-Szenario, dem 21% folgten. Von den Unternehmen, die eine Transformation in Planung haben, bevorzugen 35% hingegen den hybriden Ansatz, wobei besonders große Unternehmen, mit mehr als 10.000 Mitarbeitern, eine 48%igen Präferenz für dieses Szenario bekunden. Gerade deutsche Unternehmen bevorzugen aufgrund der komplexen Gehaltsabrechnung, deren Abbildung in der HR-Cloud qualitativ noch nicht an die on-premise Lösungen heranreicht, dieses Szenario. Zudem sind in den on-premise HRMs unternehmensspezifische Anpassungen (u. a.

Reporting, Bonusregelung) vorgenommen worden, auf die die HR-Fachbereiche nicht verzichten können.

Eine weitere Entscheidung, die direkt aus dem gewählten Integrationsszenario resultiert, sind die Anzahl und Art der neu zu gestaltenden Schnittstellen. Fällt die Entscheidung auf das hybride Szenario, so muss oftmals eine abgesicherte Schnittstelle vom on-premise HRM an die HR-Cloud geschaffen werden. Sollen alle Prozesse in einem „Rip & Replace-"Ansatz in die HR-Cloud transformiert werden, so kann diese Schnittstelle entfallen. Es ist dann lediglich eine einmalige Migration der Daten notwendig. Die modulinternen Schnittstellen vervielfachen sich mit der Anzahl der umgesetzten Module sowie der Entscheidung darüber, welche Prozesssynergien genutzt werden sollen. Rückschnittstellen in andere HR-spezifische Applikationen außerhalb der HR-Cloud (z. B. bei einer externen Gehaltsabrechnung) müssen ebenso bedacht werden. Im Kontext einer Kosten-Nutzen-Betrachtung empfiehlt es sich, die Schnittstellen aufwandsarm umzusetzen, wenn perspektivisch die Ablösung der HR-Kernprozesse geplant und somit die HR-Prozesswelt ganzheitlich in der HR-Cloud digitalisiert werden soll.

Ebenso beeinflusst die Art und Menge der umzusetzenden Schnittstellen die Reihenfolge der Modulimplementierung. Diese Reihenfolge hängt noch von weiteren Randbedingungen ab. So kann es sein, dass eine HR-Altapplikation zeitnah abgelöst werden muss, da sich diese in einer fortgeschrittenen Phase des Systemlebenszyklus befindet. Auch ist denkbar, dass Prozesssynergien nur unter der Berücksichtigung von Modulabhängigkeiten gehoben werden können. Beispielhaft kann hier die Nachfolgeplanung genannt werden, die von identifizierten Talenten abhängt; beide Prozesse werden in separaten Modulen abgebildet. Die Talentidentifikation im Rahmen der Mitarbeiterbeurteilung ist als eigenständiges Modul lauffähig; eine Nachfolgeplanung ohne einen existierenden Talentpool ist fachlich zu hinterfragen. Auch beeinflusst die zeitliche Fälligkeit von HR-Prozessen sowie deren fachlichen Abhängigkeiten untereinander die Implementierungsreihenfolge. Beispielhaft kann hier die jährliche Bonuszahlung, die wiederrum von den Ergebnissen der Mitarbeiterbeurteilung abhängt, genannt werden. Die Erfahrung aus Projekten zeigt, dass eine sukzessive Modulimplementierung einer parallelen vorzuziehen ist, auch wenn der Fachprozess modulübergreifend abgebildet wird. Zudem kann die Priorisierung eines Moduls in Abhängigkeit zu dessen fachlicher und technischer Komplexität stehen. Um in einer frühen Projektphase bereits den Arbeitsmodus kennenzulernen, wird zu Beginn die Umsetzung eines weniger komplexen Moduls empfohlen.

Harris und Spencer (2016) sehen zudem einen direkten Zusammenhang zwischen der Größe eines Unternehmens sowie dem zeitlichen Aufwand des HR-Cloud-Implementierungsprojekts. Während kleine Unternehmen mit bis zu 2.500 Mitarbeitern ca. sieben Monate zur Transformation der

Personalprozesse in zwei Modulen einplanen, veranschlagen große Unternehmen mit mehr als 10.000 Mitarbeitern für den gleichen inhaltlichen Umfang bis zu 13 Monate.

Projektphase: Implementierung

Nachdem die Infrastruktur und die initialen Schnittstellen eingerichtet sind, beginnt die Umsetzung der Module anhand der festgelegten Reihenfolge.

Die Implementierungsphase besteht aus Iterationen, deren Anzahl je nach Modul variiert, wobei erfahrungsgemäß drei Iterationen notwendig sind. Eine Iteration wird jeweils in Workshop-Reihen abgearbeitet, deren Länge sich an der Komplexität des jeweils umzusetzenden Moduls orientiert. Das iterative Vorgehen hat den Vorzug, dass neben der Präsentation eines bereits lauffähigen Standardprozesses, die neuen fachlichen Anforderungen direkt mit diesem abgeglichen werden können (Fit & Gap Analyse). Zudem kann im Rahmen der Konfigurationsmöglichkeiten eine Umsetzung und Präsentation des Ergebnisses zeitnah erfolgen. Die aus klassischen Modellen bekannte längere Wartezeit, bis der Fachabteilung erste Umsetzungsergebnisse präsentiert werden, entfällt somit. In den nachfolgenden Iterationen wird dann jeweils auf den vorherigen Ergebnissen und Tests aufgebaut, sodass der Fertigstellungsgrad eines Moduls ständig steigt.

Ein weiterer positiver Aspekt für den Projektleiter ist eine akkuratere Einschätzung der gesamten Projektdauer, da der zeitliche Aufwand pro Modul auf Basis von Erfahrungen aus vergleichbaren Projekts besser eingeschätzt werden kann. Zudem gibt die Begrenzung auf eine vorgegebene Anzahl von Iterationen einen klaren Ordnungsrahmen vor. Theoretisch könnten auch mehr als drei Iterationen durchlaufen werden, aber der Grenznutzen nimmt erkennbar nach drei Durchläufen ab.

Fisher und Howell (2004) empfehlen, dass HR- und IT-Professionals während der Entwurfs- und Implementierungsphase eng zusammenarbeiten, da dies die spätere Akzeptanz durch die Endanwender erhöht. Demensprechend setzen sich die Teilnehmer der Workshops aus den Prozessverantwortlichen, den Modulverantwortlichen, dem Implementierungspartner und mindestens einem IT-Mitarbeiter, der die technischen Implikationen ableiten kann, sowie dem Plattformmanager, der im eingeschwungenen Betrieb modulübergreifende Basiskonfigurationen vornimmt sowie die Schnittstellen betreut, zusammen. Das strukturierte Testen und die Aufnahme von Anpassungen sind von dem Projektteam eng zu begleiten.

Die folgenden Aktivitäten finden in der ersten Iteration statt:

- Vorstellung des Moduls und dessen Standardprozesse,
- Abgleich der vom Fachbereich gewünschten HR-Soll-Prozesse mit den Konfigurationsmöglichkeiten in der HR-Cloud,

- Aufzeigen von Lösungsalternativen in der Prozesskonfiguration und/oder Anpassung des Soll-Prozesses,
- Dokumentation des abzubildenden Soll-Prozesses in der HR-Cloud und optionaler Schnittstellenanpassungen,
- Vorstellung der Dokumentation und Einholen der Zustimmung beim Datenschutz, Betriebsrat, IT-Security und IT-Architektur,
- Konfiguration im HR-Cloud-Entwicklungssystem und ggf. die Anpassung von Schnittstellen,
- Vorstellung der Konfigurationsergebnisse durch den Implementierungspartner,
- Testen der Konfiguration durch den Fachbereich und Rückmeldung von Änderungswünschen.

Die zweite Iteration setzt sich aus folgenden Aktivitäten zusammen:

- Dokumentation des angepassten HR-Cloud-Prozesses und der optionalen Schnittstellenanpassungen basierend auf den Änderungswünschen der Iteration 1,
- Bei grundlegender Änderung des Prozesses und/oder der Schnittstellen erneute Vorstellung beim Datenschutz, Betriebsrat, IT-Security und der IT-Architektur,
- Konfiguration der Änderungen in der HR-Cloud,
- Vorstellung der angepassten Konfiguration durch den Implementierungspartner,
- Testen der Konfiguration durch den Fachbereich und Aufnahme von weiteren Änderungswünschen.

Nach Abschluss der Iteration 2 sind ca. 80–90% des Prozesses im Modul konfiguriert. In der finalen dritten Iteration finden daher nur noch kleinere, oftmals optische Anpassungen statt. Die Aktivitäten sind identisch zu Iteration 2 und werden durch die folgenden ergänzt:

- Finale Konfiguration der HR-Cloud-Prozesse in Joint Teams, bestehend aus Implementierungspartner und Modulverantwortlichem,
- Übernahme des final konfigurierten Moduls in die produktive HR-Cloud,
- Ggf. Migration von existierenden Daten und Abschaltung von Altsystemen,
- Übergabe der Dokumentation in den Betrieb.

Ein hoher Migrationsaufwand bei der Übernahme von Altdaten kann vermieden werden, wenn im Projekt entschieden wird, dass parallel zur Einführung des neuen Prozesses auch mit einer neuen Datenbasis in der HR-Cloud gestartet wird (z. B. keine Übernahme von Zielvereinbarungen aus Altsystemen).

Auch darf in den Fachbereich kommuniziert werden, dass in der finalen Phase weiterhin Änderungsanforderungen aufgenommen werden können. Die Umsetzung wird aber nicht mehr durch den Implementierungspartner erbracht, sondern vom Modulmanager im Regelbetrieb übernommen. Die Begleitung der Konfiguration der letzten Änderungen durch die späteren Modulverantwortlichen in Joint Teams ist zu empfehlen, sodass ein direkter Transfer des Know-hows in die Organisation stattfinden kann.

Projektphase: Betriebsübergang

Für einen reibungslosen Betriebsübergang ist zu entscheiden, wann der optimale Zeitpunkt für die Einführung eines Moduls ist. Alle Module sind alleine lauffähig, können aber erst im Verbund ihre übergreifenden Prozesssynergien entfalten. Empfohlen werden die Auswahl eines weniger komplexen Moduls und/oder die Einschränkung auf einen vorher definierten Kreis von Key-Usern, um Erfahrung mit der neuen Technologie und den neuen Prozessen zu sammeln.

Ab jetzt übernimmt der Modulverantwortliche das Demand Management für sein Modul und bietet somit den Fachbereichen einen hohen Grad von Autarkie gegenüber der IT an. Der Wissenstransfer zum Modulverantwortlichen hat bereits mit der letzten Iteration begonnen und kann nun durch separate Modulschulungen vertieft werden. Spätestens jetzt ist auch das Betriebskonzept zu finalisieren, das alle den Betrieb der HR-Cloud betreffenden Aktivitäten beschreibt und regelt. Des Weiteren wird zur Komplexitätsreduktion empfohlen, innerhalb des HR-Bereiches einen für den Prozess verantwortlichen Mitarbeiter zu benennen, der wiederum als einzige Schnittstelle zum Modulmanager fungiert. Auch der Plattformmanager übernimmt nun federführend, nach Abstimmung mit den Modulmanagern, Anpassungen an der Basiskonfiguration der HR-Cloud.

Die Schulung der Endanwender ist ein ebenso kritischer Erfolgsfaktor, da die Mitarbeiter an vielen HR-Prozessen nun proaktiv partizipieren können und dadurch eine Reduktion der administrativen HR-Aufgaben antizipiert wird. Da die Supportverträge mit den HR-Cloud-Herstellern typischerweise viele Wartungsaufgaben (z. B. Upgrades) inkludieren und nur die Schnittstellen weiterhin in der Verantwortung des lokalen IT-Betriebs liegen, wird ebenfalls der Administrationsaufwand des IT-Betriebs reduziert. Durch die Abschaltung von HR-Altsystemen werden zudem weitere Ressourcen frei.

Der Betriebsübergang nimmt in etwa 20-30% der gesamten Projektlaufzeit ein. Während dieses Zeitraums kann der Implementierungspartner weiterhin bei Fragen kontaktiert werden. Ziel soll es aber sein, sukzessive unabhängiger von dem Implementierungspartner zu werden und die Standardsupportprozesse der Softwarehersteller führend in Anspruch zu nehmen.

Projektphase: Betrieb der HR-Cloud

Nach Abschluss des Betriebsübergangs liegt die Verantwortung für den Betrieb der HR-Cloud nun auf Kundenseite, konkret bei dem Plattformmanager und den Modulmanagern. In dem ursprünglichen Artikel war die Projektphase des Betriebs nicht inkludiert, was aber nun, aufgrund von weiteren gesammelten Erfahrungen, hiermit revidiert wird. Ein an DevOps, also eine Mischung aus Entwicklung/Konfiguration und Betrieb (Debois 2011), angelehnter Ansatz in Kombination mit dem nach ITIL® (APM Group Ltd 2012) standardisierten Service-Konzept, bilden die Grundlage eines stabilen HR-Cloud-Betriebs.

Im Rahmen dieses Betriebs ergeben sich die folgenden Handlungsfelder:

Change Requests/Änderungsanforderungen

In der Regel gibt es einen Rückstand an Änderungswünschen, die in den vorherigen Projektphasen gesammelt, aber nicht umgesetzt werden konnten. Zudem unterliegen einige Fachprozesse (z.B. die Mitarbeiterbeurteilung) ständiger Veränderung, wenn sich beispielsweise Geschäftsvorgaben ändern sollte. Eine Aufwandsschätzung, eine zeitliche Planung sowie die Prüfung von modularen Abhängigkeiten sollten vor Umsetzung erfolgen. Gerade bei übergreifenden Änderungen an der Plattformbasis (z.B. bei der Anpassung von Personalstammdaten) sind die Implikationen auf die jeweiligen Fachmodule unbedingt vorab zu bewerten.

Upgrade/Updates

Die Anbieter der Cloud-Plattformen bieten zyklisch Updates, Fehlerbehebungen sowie (z.T. optionale) funktionale Erweiterungen an (Harris and Spencer 2016). Die detaillierten Beschreibungen dazu werden mit einer gewissen Vorlaufzeit von den Herstellern veröffentlicht und ggf. auf Testinstanzen eingespielt, sodass der Endkunde bereits einen ersten Blick darauf werfen kann. Die Modul- und Plattformmanager müssen diese in Zusammenarbeit mit der Fachabteilung evaluieren und die ggf. eintretenden Seiteneffekte auf Plattform und Fachmodule bewerten. Es hat sich für die Akzeptanz der HR-Cloud als förderlich erwiesen, die Entscheidungshoheit über die funktionalen Erweiterungen in die Hände des Fachbereichs zu legen.

Gerade die Umsetzung von funktionalen Erweiterungen kann so aufwändig sein, dass diese wiederrum kleinere HR-Transformationsprojekte erfordern (z.B. wenn die Digitalisierung eines weiteren HR-Subprozesses als neue Funktionalität angeboten wird).

Support

Die Unterstützung der Endanwender durch einen Helpdesk als ersten Ansprechpartner (1st Level) verbessert die Akzeptanz des Systems im Allgemeinen und reduziert den Aufwand bei den

nachgelagerten Modul- und Plattformmanagern (2nd Level). Es wird empfohlen, für jedes fachliche Modul vorab einen Katalog mit den häufigsten Fragen und Antworten vorzubereiten, die im Rahmen des Projekts gesammelt wurden. Hier trägt der DevOps-Gedanke zum Erfolg bei, da diejenigen, die das Projekts umgesetzt haben, nun auch direkt den Betrieb mit ihrem umfangreichen Wissen unterstützen können.

Diskussion und Ausblick

Dieser Beitrag zeigt, dass eine professionell durchgeführte HR-Cloud-Transformation die Grundlage für die Akzeptanz einer HR-Cloud-Lösung in einem Unternehmen ist. Die Anwendung des herausgearbeiteten Vorgehensmodells, sowie die Vermeidung der beschriebenen Fallstricke tragen zum Projekterfolg bei. Auch zeigt sich, dass der Einsatz von Cloud-Technologie nicht nur betriebswirtschaftliche Vorteile bietet, sondern vielmehr die Möglichkeit eröffnet, prozessual neue Wege zu beschreiten. Vor allem der vergleichsweise geringe Aufwand der initialen Einrichtung, da u. a. die komplette IT-Infrastruktur in der Cloud vorhanden ist, führen zu einer Fokussierung auf die Fachlichkeit und lassen den Kostenaspekt in den Hintergrund rücken. Zudem ermöglicht die Cloud-Technologie den Zugriff auf Daten und Anwendung in Echtzeit, von überall mit jedem Endgerät über das Internet (Anderson and Rainie 2010; Park and Ryoo 2013), was dem Endanwender weitere Flexibilität erlaubt und somit die Akzeptanz der Lösung erhöht. Auch der Einsatz mobiler Technologien im HR-Kontext (Mülder 2016) und das Angebot von erweiterten HR-Self-Services stellt potentielle Prozessoptimierungen in Aussicht. Softwarehersteller offerieren neben SaaS ebenso cloudbasierte „Platform as a Service"-Lösungen (Wu et al. 2012; Mendix 2017), die neben Schnittstellen zu anderen Cloud-Services (u. a. von Drittanbietern) auch die aufwandsarme Migration von Legacy on-premise Systemen, als zusätzlichen Investitionsschutz, anbieten. Zusätzlich werden plattformübergreifende Analysen angeboten. Ein „Andocken" der HR-Cloud sowie anderer HR-Systeme ist somit eine nächste potentielle Ausbaustufe. Der Begriff „EaaS", der für „Expert as a Service" (Jafari Navimipour et al. 2015a) steht, wird ebenso im Kontext der Cloud-Prozessdigitalisierung erwähnt. Diese Sonderform von SaaS wird als Basis für die digitale Transformation von weiteren Fachprozessen in eine Cloud-Umgebung dienen. Fest steht, dass diese Entwicklungen erst durch Technologien wie dem Cloud Computing ermöglicht werden.

Im Kontext der HR-Cloud-Technologie ergeben sich verschiedenste neue Forschungsmöglichkeiten. Eine Frage, die im Kontext von Projekten immer wieder auftaucht, ist die einer objektiven Erfolgsmessung. Die Untersuchung von digitalen HR-Transformationen im Hinblick auf die antizipierten Effizienz- und Effektivitätssteigerungen, sind wiederkehrende Themen in der aktuellen Forschung. So stellen Stone u. a. (2015) fest, dass e-HRM-Systeme einer Reihe von Restriktionen unterliegen und dass

es bisher nur wenige Publikationen darüber gibt, ob e-HRM zur Steigerung der Effizienz oder Effektivität beiträgt. Ergänzend weisen Marler und Fisher (2013) darauf hin, dass es nur wenige Untersuchungen dazu gibt, die den Einfluss von e-HRM auf die HR im Allgemeinen betrachten. Ein von Maatman (2006) ausgearbeitetes und angewandtes Framework kann als Grundlage zur weiteren Forschung dienen, um die Effektivität von e-HRM auf Basis von Cloud-Technologie zu messen.

HR-Cloud-Lösungen bieten eine übergreifende Abbildung von HR-Prozessen an. Beim Ausführen werden Prozessdaten (z.B. die Mitarbeiterbeurteilung, Dauer des Logins, Laufzeit einer Vakanz etc.) gesammelt und gespeichert. Im Gegensatz zu HR-Einzellösungen, die singuläre HR-Prozesse abbilden, enthalten diese Daten nun prozessübergreifende Informationen. Ein auf diesen prozessübergreifenden Daten aufbauendes Forschungsthema könnte die Identifikation von neuen HR-Kennzahlen (z.B. „Welches sind die Rekrutierungskanäle, aus denen die Mitarbeiter mit den besten Beurteilungen stammen?") sein. Die Anwendung dieser Kennzahlen im Rahmen eines kontinuierlichen Verbesserungsprozesses (ISO 2015) zur Optimierung der in der HR-Cloud abgebildeten Prozesse, was wiederrum Auswirkungen auf die Effizienz und Effektivität hat, kann ebenso ein Forschungsgebiet sein. Das von Davis entwickelte und angewandte Technologieakzeptanzmodell (Davis 1986, 1989) ist ein Modell, das anhand des wahrgenommen Nutzens und der empfundenen Benutzerfreundlichkeit die Akzeptanz einer Technologie evaluiert. Voermans und Veldhoven (2007) wenden dieses in einem Unternehmen der Elektronikindustrie an, das eine on-premise Lösung im Einsatz hat. Eine Anwendung des Technologieakzeptanzmodells auf HR-Cloud-Lösungen ist ein mögliches Forschungsfeld.

Schalk u. a. (2013) untersuchen die Einflussfaktoren zur Entscheidung über die Einführung eines e-HRM und schlussfolgern, dass die Kostensenkung ein dominanter Treiber ist. In Anbetracht eines sich verändernden Arbeitsmarktes und dem Auftauchen von neuen Technologien, wäre zu prüfen, ob sich die Einflussfaktoren geändert und/oder in der Priorität verschoben haben.

Zusammenfassend lässt sich feststellen, dass das Forschungsfeld „e-HRM" derzeit schon verschiedenste Fragestellungen offeriert und dass die ständige Weiterentwicklung von Cloud Computing perspektivisch neue Forschungsfelder eröffnen wird.

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3.3. Article 3: "eHR Cloud transformation. Implementation approach and success factors"

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3.3. Article 3: "eHR Cloud transformation. Implementation approach and success factors"

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Abstract

The article covers process models for HR IT projects and in particular for HR transformation projects. Based on the authors' experience an applied process model for HR transformation projects in a cloud-based environment is derived. The article identifies findings applicable to the fields of organisation, business and IT as well as decisions and critical success factors in the specific context of cloud-based HR solutions. The paper covers process models for HR IT projects and in particular for HR transformation projects. Based on the authors' experience an applied process model for HR transformation projects in a cloud-based environment is derived. The article identifies findings applicable to the fields of organisation, business and IT as well as decisions and critical success factors in the specific context of cloud-based HR solutions.

Introduction and objectives

The research on electronic human resources management (e-HRM) covers two distinct and widely separated fields of academia and practical management: information technologies (IT) and human resources management (HRM). This article will aim at analysing both of them from a holistic and a practice point of view, contributing to the research gap. Therefore, it will analyse fields such as IT and HRM, and how much more effort is needed to bring and integrate them together. There are three focal fields in HR digitalisation: digital employees, work content and digital employee management (Strohmeier and Parry 2014). "Digital employees" refers to the upcoming generations with a high affinity to IT entering the labour market (Prensky 2001). The "work content" defines how to work in a digital working environment while the "digital employee management" refers to applications that "support and network the HR profession". This article focuses on the latter and especially on how to transform HR processes into the digital world with the help of cloud technology. This article is organised in the following way. The article opens with an overview of the evolution of e-HRM including the varying definitions of the terms itself. Subsequent, the impact on the academic research is depicted as well as the implications on the industry using e-HRM solutions. Challenges that arise when transforming HR into the digital world are discussed next. Based on this, a brief overview of project management approaches is depicted and a process model that matches the peculiar requirements of HR transformation projects into a cloud environment is derived. Next, a case study based on experiences from several transformation projects follows. The article finishes by discussing the implications of this article for researchers and practitioners.

State of art

IT supporting HR

Following we discuss the steady evolution of IT supporting the HR digitalisation and the definition of the term electronic HRM. This is followed by a brief overview on the research in the academic and the impact of e-HRM on the industry, closing with challenges that are faced by HR transformation projects.

Evolution and definition of electronic human resources management

Already in 1940 with the advent of computers, personnel record keeping and payroll are one of the first cases of "mechanical" HR. During the next 20 years, some skill inventory and screen testing applications are developed by the aerospace and defence industry (DeSanctis 1986). In 1960 employee data is automated, followed by payroll and benefit administration (Martinsons 1997). Tetz (1974) claims that by the late 1960s one must base effective HR decision on a wider range of personnel information. This requirement is met in the '70s when more than half of the largest US banks and insurance companies already use computer systems for HR and during that decade, companies with a

few thousand employees implement new HR systems (DeSanctis 1986). With the acceptance of the competitive advantages of computers in the 1980s (McFarlane 1984), interest for digital HR rises, resulting in about 40% of companies having a system and according management for it in place.

HRIS (Human Resource Information Systems) is the new term arising, which Kavanagh et al. (1990) define as an integrated computer system that enables an organisation to store, edit, analyse and distribute human resources data.

Another synonym for digital HR shows up in the '90s. With the advent of the "e-" trend (e.g. e-commerce) in the business world, "e-HR", electronic HR follows. e-HR develops in three phases, from simple HR information publishing to HR transaction automation and finally the most elaborate stage of HR transformation (Lengnick-Hall and Moritz 2003).

Zafar (2013) postulates that the difference between HRIS and e-HR is the end user. While HRIS focuses on the HR department, e-HR addresses all employees. Broderick and Boudreau (1992) add to that definition, that during the early '90s HRIS has "mostly been used to improve HR decisions with better information" enabled by digitalising the employee records, payroll and compensation information.

Lepak and Snell (1998) proposed an alternative definition with the term "virtual HR" as "the network-based structure built on partnerships and typically mediated by information technologies to help the organisation acquire, develop, and deploy intellectual capital". They differentiated the following subclasses of outcomes of virtual HR: operational (e.g. reduction of costs), relational (e.g. giving access to HR information or enablement to execute HR processes as a self-service) and transformational (e.g. the transformation of HR to become a strategic business partner).

In the early 2000s, with the advent of the Internet, the web-enabled, web-based, intranet-based HRIS (Raiden et al. 2001; Bondarouk and Ruël 2009), which enables the employee to actively participate in the HR processes over the web, show up. This classification indicates that the HR-centred focus is blurred as HRIS addresses all employees instead of the HR department.

A widely accepted definition of electronic human resource management (e-HRM) is elaborated by Strohmeier (2007) as the "application of information technology for both networking and supporting at least two individual or collective actors in their shared performing of HR activities".

With the ongoing development of (Internet) technology in the last decade, the implementation and application of e-HRM increases (Strohmeier 2007). Thus, the advent of new cloud technologies (Lin and Chen 2012) and the offer of e-HRM cloud solutions (Jafari Navimipour et al. 2015b; Zapotocny 2015) will increase the amount of implementation projects (Harris and Spencer 2016). IT based HRM

have been classified as well as innovation management tools (Hidalgo and Albors 2008; Albors-Garrigos et al. 2018).

To summarise, digital HR has evolved over a long time span, still, the definition is vague. Bondarouk and Ruël (2009) note that e-HRM is "an umbrella term covering all possible integration mechanisms and contents between HRM and Information Technologies aiming at creating value within and across organisations for targeted employees and management". Subsequent they solicit to redefine e-HRM as a standardized definition is still missing.

Academic research in e-HRM

Strohmeier (2007) states that academic interest in the field of e-HR evolved during the mid-'90s. He points out that only 20% of the investigations base on theoretical frameworks and that the research is quite diverse, owed to the wide-ranging topic. He further notes that research rather focuses on the HR department than on all employees. Additionally, he criticises the limited research on how technology can support HR to answer strategic questions. Consequently, several fields of research to sharpen the e-HRM picture are proposed.

Still in 2004 Stanton and Coovert urge to "identify key research questions at the intersection of HR and IT, produce viable theoretical perspectives to frame those research questions, collect meaningful data across multiple organisational settings, and translate their findings into useful advice for practitioners".

Current research focuses on several aspects of e-HRM. Hereafter, exemplary topics and articles in the field of e-HRM research are discussed following.

HR Processes

Several articles examine single HR processes such as the performance review (Florkowski and Olivas-Luján 2006; Nura and Osman 2013), e-Learning (Colchester et al. 2017), talent management (Nura and Osman 2013; Martin 2015) or e-Recruiting (Lee 2007; Furtmueller et al. 2011; B. Holm 2014; Kumar and Lalitha 2016). Interfaces to other management systems such as knowledge-based systems are also discussed (Martinsons 1997).

Technology & Integration

Furthermore, research on new (mobile) access channels for e-HRM (Mülder 2016), on how e-HRM integrates with existing social networks (Pilarski et al. 2016) and on how new cloud technologies can support process digitalisation (Jafari Navimipour et al. 2015b; Zapotocny 2015; Hahn 2016) is conducted.

Legal aspects and security

Legal and security aspects for e-HRM, especially in the cloud context are examined (Zafar 2013; Lehnert and Dopfer-Hirth 2016).

Impact, outcomes and value of e-HRM

The impact of e-HRM is one of the prominent topics for researchers (Ensher et al. 2002; Lengnick-Hall and Moritz 2003; Hussain et al. 2007; Ruël et al. 2007; Parry and Tyson 2011; Maier et al. 2013; Strohmeier and Parry 2014; Stone et al. 2015; Bellou 2016) as well as the perception and the acceptance in the organisation (Fisher and Howell 2004; Voermans and Veldhoven 2007). Other studies focus on the relationship between e-HRM and its contribution to strategy (Marler and Fisher 2013), again others on e-HRM adoption (Strohmeier and Kabst 2009) or on the practical and theoretical implementation of e-HRM (Florkowski and Olivas-Luján 2006; Ngai and Wat 2006; Hooi 2006; Olivas-Lujan et al. 2007; Bondarouk 2011; Varma and Gopal 2011). Furthermore, the value of e-HRM is one of the research fields (Wirtky et al. 2016) and the question which strategic decisions lead to the implementation of e-HRM (Schalk et al. 2013). Finally, HRM has been related with innovation performance (Laursen 2003; Albors-Garrigos et al. 2018).

To summarise, the interest in research on digital HR has started late in comparison to the application of e-HRM solutions in the industry. The impact of e-HRM is a focal topic while there is a widespread range of research opportunities.

e-HRM applied in the industry

The digitalization of HR processes has been of secondary significance in comparison to other primary processes for most companies. On the one hand, there are business-related reasons such as the subordinated role of HR within the organisation (Brockbank 1997) and the challenge to verify the direct contribution of HR processes to the company's success (Klein 2012). On the other hand, there were HR process design boundaries due to the limited computing performance and the availability of adequate technological e-HRM solutions (Olivas-Lujan et al. 2007; Zapotocny 2015). These limitations are essentially resulting from the on-premise e-HRM solutions available on the market, which digitalise HR subprocesses (e.g. recruiting or learning) inside of process silos, but do not yet offer a holistic and above all, interrelated HR process world. Figure 1 gives an overview of the HR process world, which consists of the talent management, the workforce planning and the operative HR process clusters. The dashed lines indicate potential process interfaces (e.g. one can set the goal to attend a certain learning session or the performance review has an impact on the succession planning).
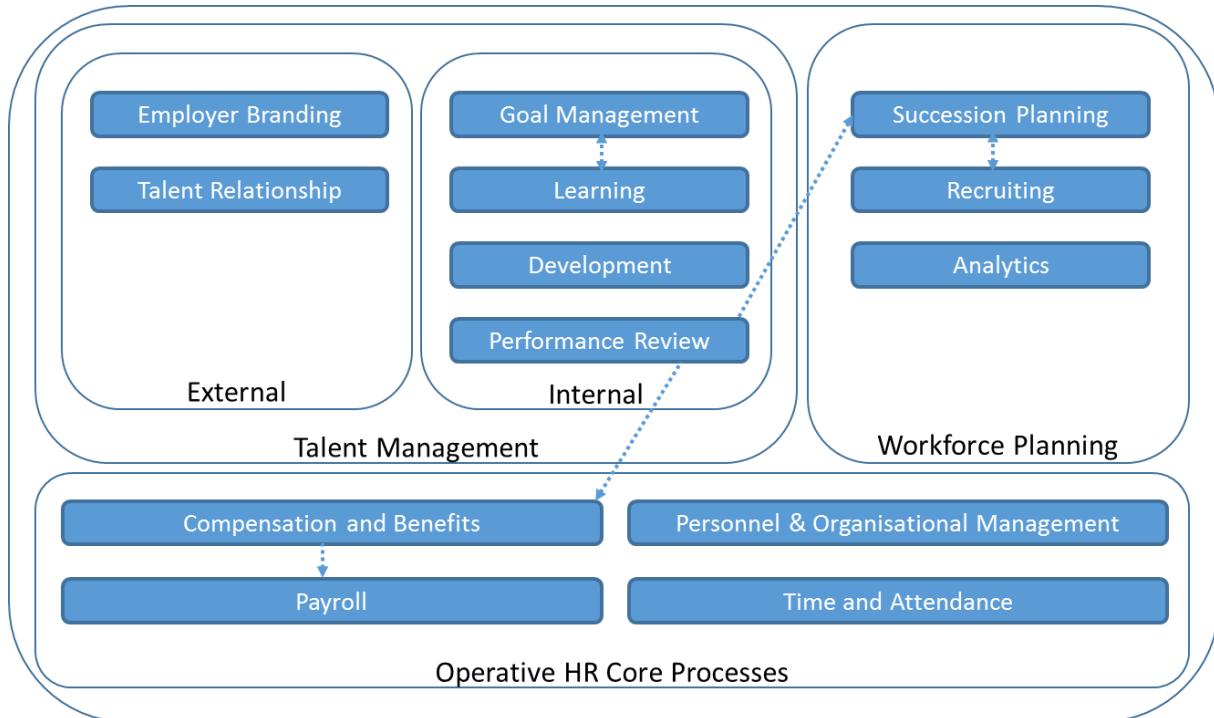
Figure 1: HR process world

The technological change from an on-premise world to a cloud-based Software as a Service (SaaS) environment offers the possibility to tackle the challenges of a holistic digitalisation of HR processes (Jafari Navimipour et al. 2015). For example, workforce planners have a business need to offer career paths to establish succession planning. Thus, the necessary roles (containing a description, skills and competencies) for a vacant position are matched with the individual characteristics of an employee in each offered career path. The drivers of complexity are the manifold combinations of roles as well as the number of positions and employees. Only now is the necessary computing performance within cloud-based HR SaaS Solutions (from now on referred to as HR Cloud) available (Zapotocny 2015).

Cloud-based technologies allows organisation to "develop more valuable relationships with their workforces, clearly defining their expectations and the employee value proposition in a tailored employee experience" (Harris and Spencer 2016) contributing to the possibility for HR to position itself as a strategic business partner (Lepak and Snell 1998; Bell et al. 2006) in the long run.

In addition to the general SaaS benefits such as performance improvements (Lin and Chen 2012), the HR Cloud offers further advantages over existing on-premise solutions by offering a holistic process digitalisation approach. For example, the integrated and interrelated modules, as well as the underlying common database, offer a new form of process synergies. From a technological point of view, one must also consider the advanced lifecycle of on-premise HR solutions. Having a look at the plans of software vendors, there is a clear trend, that HR Cloud solutions are in focus for functional

improvements, even though maintenance for on-premise solutions is offered, at some point support for them will become obsolete (Harris and Spencer 2016).

New internal forums (e.g. SAP SuccessFactors customer community) that offer customers the opportunity to propose and prioritize enhancements for their HR Cloud solution are examples for that trend. In the middle of the 2000s, Gueutal and Stone (2005) state „Today technology has finally begun to deliver on the promises of the 1990s".

Based on these new technologies, various companies (e.g. SAP, ADP, Kronos, Oracle, or Workday) offer HR Cloud solutions, which aim at increasing the HR business value. Contributions to this objective are the improvement of HR efficiency, the standardization of processes, the upgrading of services, the increase of strategic orientation (Ruël et al. 2004; Strohmeier 2009) and finally the cost reduction (Marler 2009; Schalk et al. 2013). In addition, the new way of HR Cloud licensing delivers an improved cost transparency by offering billing models (e.g. based on user count, used modules, transactions) which enable subsequent cost allocation to the business units.

HR transformation projects become more and more attractive for companies to leverage all those potentials described above. Major exogenous factors that are currently contributing to the number of HR Cloud transformation projects, are the demographic development and the transformation to a knowledge-based economy (Eisner 2005; Roehling et al. 2005) as well as the consequent fight for talent. Thus, e-HRM projects must be both, effective, by adequately filling vacancies, and efficient, by making optimal use of the scarce internal and external resources (Laumer et al. 2010) as recruiting, retaining and developing those talents inside the organisation is the biggest challenge ahead for the HR departments (Stone and Deadrick 2015). The human factor is always critical (Martinsons and Chong 1999).

Sierra-Cedar 2016-2017 HR Systems Survey White Paper (Harris and Spencer 2016), based on interviews with 1,528 organisations, states the following evidence, which confirms the tendencies of companies to digitalise HR processes and move to HR Cloud solutions. Since 2014 most large and medium companies assume, that expenditures on HR technology will increase, with budgets for large companies to level in 2017. Moreover, looking at the purchased on-premise versus HR Cloud solutions, one can spot a clear tendency in favour of the latter with 72% of organisations that purchased a talent management suite in a cloud environment. Also, users prefer HR Cloud solutions, which is confirmed by an improved user-experience-score from 2.49/5 (on-premise) to 3.46/5. Additionally, small and medium size companies that adopted HR technology, see an increased revenue in combination with a higher business outcome resulting in a 75% likelihood of HR being accepted as a strategic partner. Last, 24% of the companies plan to transform their current core HRM into a cloud-based solution. Other

recent surveys (KPMG and Bitkom 2017) confirm that 65% of German companies already use cloud services and the majority of the people interviewed feel, that their data is safe in the cloud.

Challenges for HR transformation projects

Projects that transform and digitalise HR processes into an HR Cloud environment face new challenges. Besides the effort of documenting the current and defining the target processes, technical boundaries within the HR Cloud, limit the free process configuration. Due to that, one can only migrate customer specific customisations within certain boundaries and the limited configurable process variants force companies to adjust and standardise the target processes. The latter has been discussed for some time within the ERP environment (Luo and Strong 2004) and led to a paradigm shift, since the process workflows need to adapt to the software solution and not vice versa. This also results in a technologically enforced process compliance because of former workarounds (e.g. shadow systems) which, for example, allowed a direct release of a vacant position, will no longer be available.

Another complicating factor is, that the processes within the HR Cloud, along with the processed personal data, are subject to due diligence by public authorities (e.g. German Federal Data Protection Act-BDSG §28 or the German Works Constitutions Act-BetrVG §80) as well as the worker participation based thereon, restricting the HR process' design and the way personal data is handled. Lehnert and Dopfer-Hirth (2016) give a brief overview over the actions needed to comply with those laws in the on-premise HRM world, which can be applied to the HR Cloud as well. Kovach et al. (2002) also emphasize the importance of securing and limiting the access to personal data within the IT system. Those legal challenges are addressed by Strohmeier and Kabst (2009) who argue that a national data protection is a hurdle for personnel data transmission over the internet. However, the European Data Protection Directive "harmonises data protection principles and to a certain extent enables an internal market for personal data" (Robinson et al. 2009). In the United States, data protection is less restrictive than in the EU, although several laws are in place (e.g., Federal Information Security Management Act of 2002 (Public Low 107-347 2007) or the USA Patriotic Act (One Hundred Seventh Congress of the United States of America 2001)). Due to the different legislations, when choosing an HR Cloud solution, one must be aware of the implications on the stored personnel data. It is getting even more complicated when a company has subsidiaries which fall under different legislation but choose to use one HR Cloud solution (Zafar 2013). Consequently, one must consider legal constraints of each country as the HR Cloud services are not necessarily offered within the company's legal domain. In spite of these challenges, Townsend and Bennett (2003) conclude that companies with developed and implemented privacy policies will be able to attract and retain workforce. Furthermore, Harris and Spencer (2016) find, that companies with an HR Cloud are 21% more likely to be confident in their data privacy processes than non-cloud companies.
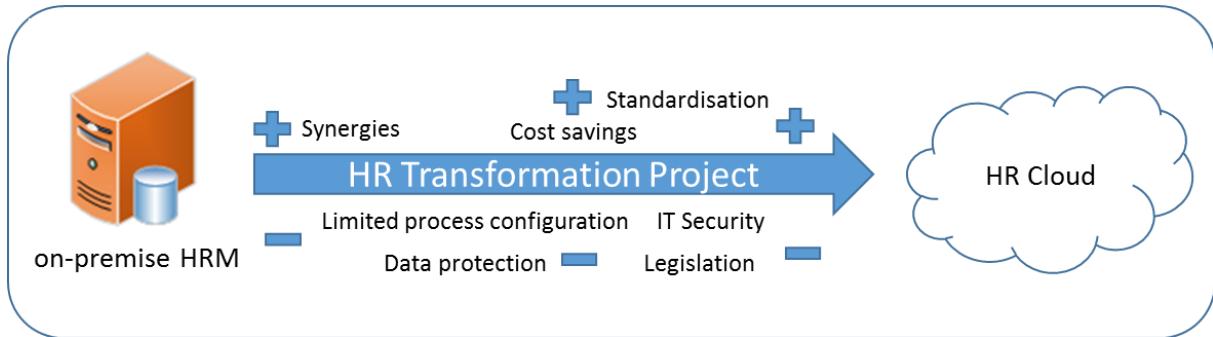
Figure 2: Opportunities and challenges of HR transformation projects

To summarise, the implementation of an HR Cloud solution offers opportunities and challenges (refer to figure 2) to break new processual grounds. From an IT point of view, HR Cloud solution vendors already deal with the security (Successfactors 2012; Sepstrup 2015) and legislative issues, resulting in major investments in IT security and region specific data hubs (Successfactors 2016). From a business point of view, the automation of HR processes enable HR professionals to shift the focus to strategic activities (Cabrera and Bonache 1999). Thus, the HR Cloud enables the HR department not only to manage employee data within the lifecycle "from hire to retire" but also to establish a proactive and strategic human capital management (Martinsons and Chong 1999).

Process models for IT projects in the HR context

Professional IT project management embedded in the organisation is the prerequisite for positive project outcome. The following project management process models reflect the diversity of IT projects. The selection of the fitting model depends on the project type, where a classical and an agile approach (Wagner 2011) could be applied. Company specific customizations of these models are possible.

Classical, agile and hybrid models

Examples of classical approaches are the waterfall model and the V-Modell XT. Typical features of these models are clearly defined, linear process phases, from requirement analysis to go-live and the expected results for each phase. The V-Modell XT is the standard process model for IT projects within the German public sector and focuses on the specific activities per project phase and on the project roles. In 2015, approximately 10% of the German gross domestic product was reported as public procurement volume, which explains the high level of utilization of that model (BMWi 2016; Destatis 2016).

Classical models emphasize the formally defined specifications, the detailed documentation and the contractual delivery of services as well as the strict tracking of the project plan. This results in a high administrative effort to meet all formal requirements and a clear preplanning of the expected project

outcomes. As this method has, especially regarding small and short-term IT projects, some disadvantages, more and more companies focus on agile project models (Vlietland et al. 2016).

Agile methods aim to generate a visible value and to react quickly to new requirements (Boehm and Turner 2004). Instead of providing all planned project outcomes, prioritisation takes place in a need-oriented manner during the project, allowing to respond to new requirements on short notice. This model not only lets the customer be affected by the project but enables him to actively participate by evaluating the project results, based on prototypes and to decide over the next steps. In contrast to classical models, the documentation of the results is rudimentarily and downstream, since its focus is on quick adaption of new requirements within a defined timeframe.

Hybrid models are a combination of classical and agile methods and leverage, depending on the project type, potentials from both (Habermann 2012).

Specific characteristics of HR IT projects

HR IT departments, depending on the type of project, use both, classical and agile project models. A hurdle to take when using an agile approach is the project budgeting that one usually needs to complete before large-scale HR IT projects start. Moreover, as HR is a support process for the value-adding primary activities of a company, usually the project budget is limited. Consequently, mixed projects models are applied, resulting in project phases planned such as in classical models and individual phases within, managed agile. The project documentation is also of importance due to the processed HR data, which contradicts agile models.

Process model for HR Cloud transformation projects

HR Cloud transformation projects are a specific form of HR IT projects and represent a new challenge since the HR Cloud technology limits the degree of freedom of the implementation. One can configure predefined processes, but an entirely free process design is not possible. Full conversion of predefined target processes is not possible, and they rather serve as a template for the customisable processes in the HR Cloud. Figure 3 illustrates a process model for HR Cloud transformation projects, including elements from classical, iterative and agile models.
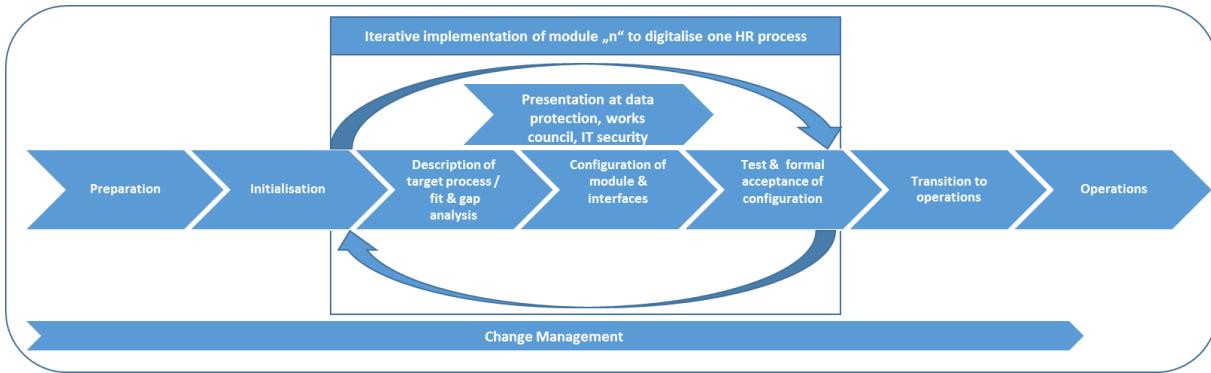
Figure 3: Process model for HR Cloud transformation projects

The five project phases (preparation, initialisation, implementation, transition to operation, operations) are characteristics of a classical approach. A project-accompanying change management supports during each step.

A particularity shows up during the implementation phase, which includes a control circuit during which, prototypes, that represent partial results of the process configuration are presented. This prototyping makes evaluation and adjustment possible on short notice. Agile elements are also included by limiting the number and periods of iterations based on experience from other projects.

This approach is applied during all phases of the implementation for each HR target process (refer to figure 1) while the outcome of the processes, the user groups, and the potential interfaces differ.

The application of e-HRM in small and medium enterprises (SMES)

Does the size of the enterprise influence the use of eHRM? Very few academic studies have analysed the subject in developed countries. While, Bondarouk et al. (2009), posed that the use of e-tools in medium sized organisations was perceived as useful, but difficult to implement and small organisations perceived that utilising HRIS facilitated their HRM, Carvalho and Machado (2016) found in an exploratory study in Portugal, that e-HRM was more commonly used among administrative communication and recruitment processes. Industry sources (Harris and Spencer 2016) claim that 24% of SMEs have operative HR systems while 23% had some under development. We can conclude that there is certain research gap from the academy point of view on a holistic view of the e HRM problem and, especially, in the substructure and cloud networking of the HRM. Thus, we should focus on the digital transformation of HR processes with the support of cloud technology.

Research methodology

There are three different methodologies for empirical research: qualitative, quantitative and mixed-method approach, whereby the latter is a combination of the first two methods. All of them are applied to reconstruct social situations or processes (Creswell 2013; Neuman 2014).

In contrast to a quantitative approach which tests existing theories or hypothesis, this study is conducted using a qualitative approach. We have based our methodology on the review of seven case studies. This research method is recommended when "analysing a contemporary phenomenon within a real-life context" (Yin 2008). Moreover, the variety of the firms and the singularity of the research justify the method (Creswell 2013). This field study was carried out from 2012 to 2018. The reason for the choice of this qualitative approach lies in the relatively new topic and the resulting limited access to a large group of firms. Additionally, quantitative methods are not suitable for collecting specific expert knowledge. Both Gummesson (2006) as well as Gläser and Laudel (2010) point out that the new global digital environment favours the use of qualitative research methods. The case studies selected justify the followed method since they have been implemented in large companies with experience in IT projects and working in a variety of sectors, industry, and services. The authors interviewed twenty managers of these companies in various stages of their project development to analyse the project developments and their outcome.

Case study for an exemplary HR Cloud transformation project

The experiences described below results from several HR Cloud implementation projects in Germany during 2012-17. Table 1 below resume their main characteristics.

Project ID	Industry	# Employees	HR Cloud Solution	Implementation Period	% of suite functionality used
[PID 1]	IT-Services	75,000 - 149,999	SAP SuccessFactors	2012 - ongoing	100%
[PID 2]	Retail	8,000 - 14,999	SAP SuccessFactors	2015 - 2016	85%
[PID 3]	Transportation	75,000 - 149,999	SAP SuccessFactors	2014 - 2015	20%
[PID 4]	Banking	15,000 - 74,999	SAP SuccessFactors	2018 - 2019 (planned)	100 % (planned)
[PID 5]	Energy Supply	8,000 - 14,999	Workday, Umantis	2018 - 2019 (planned)	20 % (planned)
[PID 6]	Retail	> 150,000	SAP SuccessFactors	2016 - 2017	85%
[PID 7]	Consumer Goods	15,000 - 74,999	SAP SuccessFactors	2017 - 2020 (planned)	40% (planned)

Table 1: Summary of case studies revised

Project scope

The project scope contains the digitalisation of all processes including talent management, workforce planning, and HR core processes. The individual HR processes will migrate within modules (e.g. module "recruiting") inside the HR Cloud, which can be configured separately and offer optional interfaces in between them. For example, the module "goal management" can link to the module "e-Learning" if an employee has the goal to participate in a learning activity. The project strives for these kinds of synergies. The chosen cloud solution is based within the EU legislative space, resulting in all personnel data to be stored on servers within the EU. As one participant stated, "*the selection of the project scope was a crucial step in developing the project*".

Project phase: Preparation

Even during the preparatory work, the general commitment of the senior management for the HR Cloud needs to be clearly stated. One must understand, support and communicate the HR Cloud paradigm, which does not allow a completely free design of processes, as well as the external storage of personal data. Various managers stated that "*the preparation and communication phase of the project was important for the final success*".

Fisher and Howell (2004) emphasize to clearly define the values and mission that the project wants to support as otherwise, one risks unintended consequences. Thus, one must define the HR Cloud transformation objectives clearly. In addition to the anticipated process optimization by digitalisation and cross-module synergies, one often anticipates cost savings. The calculation of these potential savings as well as the other benefits, both of which are presented in a business case, depend on various factors. Lengnick-Hall and Moritz (2003) emphasize the importance of a convincing case based on "available, accessible and tangible measures", as the investments in e-HRM can be an expensive venture. In contrast to that, Harris and Spencer (2016) urge companies, implementing HR Cloud solutions to rethink these projects and convert them to constant change management processes without a fixed timeline. As a participant argued "*operating an HR Cloud solution is constant change management, though the implementation costs and timeframe can be evaluated upfront*".

Influencing factors for the cost calculation can be the current degree of digitalisation and the number of HR solutions as well as their position in the application lifecycle. Another relevant factor for the cost calculation is the flexibility of the licensing model because when using an HR Cloud solution, one usually does not buy licenses but procures them over a limited period and needs to renegotiate after the expiration of the contract. The reduction of IT operating cost is one of the underlying assumptions when using SaaS. In contrast to that, the decrease of HR headcount is a delicate topic as the new HR Cloud affects the HR staff that must contribute during the project with their HR process knowledge. Academic literature has already pointed out these factors. The concept of "moderate voluntarism" defined by Strohmeier (2009) describes that dilemma. Furthermore, Roberts (1999) postulates that "we do need to be creative in looking at other benefits, especially with new technologies" when calculating an return on investment for HR systems. Therefore, involving the HR department to deliver intangible indicators (e.g. "better workforce") can help to justify investments - even if the new strategic alignment of HR with the help of IT is the lonely reason.

To select the right HR Cloud solution, one should carry out a fit & gap analysis to match the current HR processes or the target processes with the offered configuration possibilities of each product during vendor presentations. As various managers stated "*fitting the project and HR processes*" was a determinant factor in the project development.

Since a direct migration of the processes is not possible, the following list serves as a base for decision-making:

- Quantity and quality of the processes included,
- Maturity of the HR Cloud product in general,
- Integration into the existing IT infrastructure,
- Total cost of ownership of the solution.

The HR department needs to participate actively during the tender to not perceive the HR Cloud solution as a lonely decision by the IT department. The future project team therefore consists of people from both worlds: IT and HR. IT culture plays then a key role as it was also outlined by most participants.

In addition to the software solution, one must find an implementation partner who configures the processes within the HR Cloud. In addition to the costs, the project experience plays an important role. The internal IT often cannot provide the initial configuration as the expert knowledge for each HR Cloud solution is very complex and short-lived. One should contractually agree on a knowledge transfer (e.g. through joint teams or training) with the implementation partner to enable operations to tackle upcoming configuration adjustments after the project finished. Surveys confirm that 78% of the supporting implementation partners help with the configuration (Harris and Spencer 2016) and accentuate that the internal capacity needed is higher when transforming HR into a cloud compared to on-premise environments. One could argue, that this is also necessary to enable the customer to become independend from external providers. The mix teasm assembly proved to be a necessary task.

Even before the start of the implementation, one must inform and involve the works council, data protection, IT architecture and IT security and to follow up on them during the subsequent phases of the project. Due to the personnel data processed, regular appointments with the works council are recommended during the entire duration of the project; meetings with the other units will be scheduled when needed (e.g., when a new interface is introduced and has an implication on the IT architecture).

Project phase: Initialisation

The initialization phase includes the definition of the formal project as well as the initial technical setup of the HR Cloud environment. During this definitions of the formal project, there is a focus on two topics: the stakeholders and the project charter.

During the previous preparation, as an IT project manifestd *"the first business units were already involved in the communication"*. Then it was time to identify more stakeholders and multipliers, which are not actively participating in the project but will be affected by it. It then is recommended to name

key users from non-HR departments that will be updated and participate in the progressing project (e.g. during the user acceptance tests). The project-accompanying change management, which supports the systematic and organisational change is another success-critical action to improve the collaboration and communication with the stakeholders. In this direction, as Harris and Spencer (2016) found out that only 43% of large and 46% of medium size companies support vital projects with change management initiatives although the successful introduction of the HR Cloud is less dependent on the technological implementation then it is on professional change management. The initial technical setup and the operations of the HR Cloud is less complex compared to on-premise projects because the degree of freedom when designing processes tempts to implement complex on-premise systems. In contrast, the configuration limitation of the HR Cloud implicitly leads to a reduction of the complexity.

To work efficiently during the workshops in the following implementation phase, it is necessary that the relevant, informed decision makers participate. Experience shows, that when faced with IT projects, business units tend to act more in the role of affected rather than of proactive and contributing participants. Increasing the involvement of the business unit can be achieved not only by the demanded commitment of the higher management during the preparation phase but also by the participation of the HR managers during the implementation workshops. The early naming of responsible module managers has proven its worth. Those module managers are responsible for one or multiple modules and will be in charge of adjustments during operations. A high affinity to HR and IT is the prerequisite for that position. Already in 1986 DeSanctis defines the ideal HR IT manager as the person, who has competencies in both, data processing and HR application and concludes along with Hall and Torrington (1986) that it will be challening to find this person in the HR business unit due to the lack of affinity to IT. This challenge is still ongoing, although 30 years have passed.

The project charter is essential as it contains the scoping of the project. Two fundamental decisions need to be made when defining the scope: how to integrate the HR Cloud in the existing IT infrastructure and in which order to implement the modules.

The selection of an appropriate integration scenario depends on whether and which HR processes are already digitalised and which of them are to be consolidated within the HR Cloud. There are three possible scenarios (Harris and Spencer 2016). A "side-by-side" or "hybrid" scenario implies, that a leading on-premise HRM is still on site while a reduced HR master data set is synchronized inside the HR Cloud. If a company is not using an on-premise HRM or decides to migrate all HR processes in the HR Cloud a "green field" or "rip & replace" approach can be applied. Especially German companies prefer the side-by-side scenario due to complex German payroll processes which are currently not available at the same quality that is offered by on-premise solutions. Furthermore, HR departments

demand the highly customized on-premise HRM for their daily work (e.g. reporting or bonus scenarios). A "parellel" or "patchwork" scenario is defined by having HR processes that run parallel on multiple HR Cloud and on-premise system (e.g. subsidiaries have another cloud-based solution for the performance appraisal while mother company uses an on-premise system). Referring to the abovementioned Sierra-Chedar study, companies transforming their HR technology, used a rip&replace approach (28%), followed by the patchwork scenario (21%). Of those companies that still plan to change their HR technology, 35% favour the hybrid approach. Additionally, almost half of the large companies prefer the hybrid approach, moving only the talent management or workforce mangement processes to the cloud while keeping the operative HRM processes on-premise.

Another decision, directly resulting from the chosen integration scenario is the number and type of new interfaces. If one selects a side-by-side scenario , a secure interface between on-premise HRM and the HR Cloud needs to be set up. If all processes will be migrated into the HR Cloud, this interface is obsolete, and only the one-time migration of data is necessary. The module interfaces (e.g. to transfer degree of goal achievement to the compensation and benefits module) multiply with the number of implemented modules and the process synergies in between them. Interfaces to other HR applications outside the cloud (e.g. using an external payroll) need to be taken into consideration as well. When doing a cost-benefit analysis, if in the future all HR Processes will be digitalised inside the HR Cloud, it is recommended to reduce interface implementation effort.

Likewise, the type and number of interfaces have an influence on the order of the module implementation. The mayority of informants confirmed that there are several more influencing factors. It might be necessary to replace an HR legacy system due to its advanced position in the application lifecycle. Also, when leveraging process synergies, module dependencies need to be considered. For example, succession planning depends on identified talents within the organisation and both processes are digitalised in separate modules. Talent management works independently but executing succession planning without an existing talent pool is questionable. One more influencing factor is the timeline when a certain HR process is executed. Typically the bonus payment is done once in the year and the amount is a direct result of the performance appraisal. Having these dates, one can recalculate the latest implementation start for the these modules. The experience from projects showed that a successive order of implementation is preferable to a parallel approach, even if synergies between modules exist. Concluding, the decision to implement a certain module depends on a technical and process complexity. Already at an early stage of the project, the implementation of a less complex module is advised to gain experience with the new project model.

Considering all these factors is important as all of them have an impact on the final project timeline. In this sense, Harris and Spencer (2016) see a connection between the size of a company and the

amount of time needed for HR Cloud transformation projects. While small companies require about 7 month to implement the operative personnel administation and two modules, large companies already need up to 13 month for the same scope and that has been the results of the examined cases.

Project phase: Implementation

After the infrastructure and the first interfaces have been setup, the implementation of the modules is executed in the order defined during in previous phase.

The implementation phase consists of a certain number of iterations that vary in regard to the implemented module. Usually, three iterations are required. Each iteration comprises a series of workshops, which vary in length depending on the complexity of the module. The iterative approach has the advantage that one can match the new process requirements with a running standard process (fit & gap analysis). In addition, one can present practical results within a short timeframe. The long idle time until a business unit can see the first results of the implementation, known from classical approaches, reduces. The following iterations base on the previous results and tests, leading to a consistently improved degree of module completion.

Another positive aspect as some project manager confirmed, is the improved estimation of the project duration. Implementation times for each module base on experiences from comparable projects. The limitation to three iterations additionally sets a clear guidance. Theoretically, more repetitions are possible, but the marginal benefit diminishes after three iterations.

From the side of academia, Fisher and Howell (2004) recommend HR and IT professional to work closely during the design and implementation phase to improve user acceptance. This was confirmed by the research. Participants of the workshops are the responsible process owners, the module managers, the implementation partner and at least one employee from the IT department who can derive the technical implications. Concluding, the project team needs to support the structured testing as well as the tracking of change requests.

The first iteration contains the following activities:

- Presentation of the modules and its standard process,
- Matching the defined HR target process with the configuration possibilities of the HR Cloud,
- Identify alternatives to adapt and implement the target process,
- Documentation of the target process inside the HR Cloud and of optional interfaces,
- Presentation of the documentation and obtaining consent from data security, works council, IT security and IT architecture,
- Configuration of the target processes within the HR Cloud test system and optional interfaces,

- Presentation of the configuration by the implementation partner,
- Testing of the configuration by the business unit and collecting change requests.

The second iteration consists of the following activities:

- Documentation of the adjusted HR Cloud process and the optional interface adjustments based on the change requests from iteration 1,
- If the process has fundamentally changed or new interfaces are needed, a new presentation at the data security, works council, IT security and IT architecture will be necessary,
- Configuration of the changes inside the HR Cloud,
- Presentation of the adjusted configuration by the implementation partner,
- Testing of the configuration by the business unit and collecting change requests.

After finalising the second iteration, the module already depicts 80-90% of the target process. In the third and final iteration, usually only tiny, often graphical adjustments take place. The activities in the last iteration are identical with the previous ones and complemented by the following actions:

- Final configuration of the target process in joint teams, consisting of implementation partner and module manager,
- Migration of the configuration from the HR Cloud test system to the productive instance,
- If necessary, migration of existing data and shut down of legacy systems,
- Transfer of the documentation to IT operations.

Taking the decision to start with a clean database (e.g. not migrating old target agreements from legacy systems) when introducing the new HR Cloud processes, avoids expensive migration of legacy data.

One can communicate to the business units that they will still able to address change requests after the final iteration. However, not the implementation partner but the internal module manager handles these new requirements. To enable knowledge transfer from the implementation partner to the module manager, both parties should participate in joint teams during the last iteration as it is contractually agreed on. We found that this was usual practise among the surveyed firms.

Project phase: Transition to operations

To enable a smooth transition to an operation, the optimal timing of the module introduction is essential. All modules run independently from another but can unfold their full process synergies only

together. A recommendation is, to choose a less complex module and restrict the defined circle of the key user to gain experience with the new technology as well as the new processes.

From now on, the module manager is responsible for the demand management and this enables the business unit to be more autonomous from the IT department. The knowledge transfer to the module manager already began with the last iteration in the previous phase and the knowledge can now be widened by attending separate module trainings. No later than now, one must finalise the operations manual containing all necessary activities for HR Cloud operations. One is advised to also name one person inside of the HR department who takes the responsibility for the process. This person is the one interface to the module manager to reduce complexity.

The training of the employees is also a success-critical factor as they can participate proactively in more digitalised HR processes which in return results in a reduction of administrative HR tasks. Since the support contract of the cloud vendors typically includes maintenance tasks (e.g. updates &upgrades), and only the interfaces continue to be the responsibility of the local IT operations, IT administration tasks will reduce as well. Additionally, resources are set free due to a shutdown of legacy systems.

Our findings show that, usually, it takes about 20-30% of the overall project time to finish the transition. During that time the implementation partner can be contacted for questions that are related to the configuration of the system but those inquiries should decrease and be addressed to the software vendor.

Project phase: Operations

After having finished the transition to operations, operating the HR Cloud is typically handled onsite. In the previous article, operations were out of scope, but due to experience gained after several transitions, one could argue that accompanying the operation phase should be a part of the project. Successful IT experiences such as DevOps stresses this approach. This DevOps (Debois 2011) strategy enables the operations to learn from the experiences made by the project team and to ensure a smooth transition. ITIL (APM Group Ltd 2012) proposes templates for a standardised service management which can also be applied to an HR Cloud solution and should be the base for the whole operations in which the following fields of action can emerge:

Change Requests

Usually there is a backlog of change requests that were collected during the previous project phases that could not be implemented and furthermore some modules (e.g. performance) need regular adjustments due to new business policies. One should evaluate the effort to implement those changes and put them on a timeframe. Each of these changes can have side effects due to the interfaces between the modules, especially if those changes are made directly on the core platform (e.g. changing

the way a certain personnel data is displayed). According to a majority of respondents "*change procedures were a major source of problems*".

Upgrade / Updates

The vendors usually provide 2-3 major updates, correcting errors, and upgrades, containing new features for the HR Cloud environment each year (Harris and Spencer 2016). The impact of these updates/upgrades are described and published by the vendor. Module managers have to verify each of them and analyse if and how the implemented modules are affected. As some of the upgrades are optional, operations need to present them to the responsible HR process managers to decide whether to implement them or not. It is advised, that one tests all affected processes before applying them to the productive system.

All three, change requests, upgrades and updates requires less configuration effort than the initial module setup but can be considered as smaller HR transformation projects.

Support

Enabling a helpdesk to support the end user at first level helps to improve the acceptance of the system and to minimise the questions ending up with the module managers or the project team. One is recommended to hand over a list of common questions and answers for each module which have been collected during the project phase. Again, support tools and systems were a strong facilitator for the whole implementation and operational success.

Discussion and conclusions

This article shows, that a professionally executed HR Cloud transformation project lays the foundation for the acceptance of an HR Cloud solution. Applying the derived process model of this article as well as avoiding the described pitfalls, helps to reach that goal and ultimately supports the overall project success. The contributing aspects of this research result from its strong operational experience with mature IT culture firms.

The evolution of e HR spans from the 1960s and with the advent of internet impacted on e-HR in the early 2000s as well as the growth towards e cloud was initiated in 2012 and academically registered in 2015. But, still, there is a lack of academic research in the field of HR Cloud approach. However, industry associations have an ampler scope of studies covering e-HR evolution. State of the art shows preoccupation from the academic world in the fields of processes, technology and integration, legal aspects and the impact value of e HR although the question of KPIs has not yet been discussed. However, measuring the project success after implementation objectively is one of the challenges arising, especially in regard to the impact on efficiencies, as well as how the effectiveness that is presumably improved by the HR Cloud. This aspect is typical of all innovative management practices.

HR Cloud solutions, bearing cross-domain processes, not only offer new processual ways to work but simultaneously to collect data for each process.

About the e HRM project planning our research has confirmed the academic recommendations of Fisher and Howell (2004), Lengnick-Hall and Moritz (2003) as well as the industry guides (Harris and Spencer 2016) regarding mission communication, risk analysis, etc.

Regarding Project development, our research confirms as well the industry recommendation (Harris and Spencer 2016) about mixed teamwork and the application of proved philosophy such as DevOps (Debois 2011) that facilitate migration between development and operations based in intra team collaboration.

We have confirmed some of the published research recommendations. As Stone et al. (2015) state, the maturity of solutions for e-HRM varies and few publications examine whether the aim of e-HRM is either increase efficiency or effectiveness. Furthermore, and sustaining the research gap, Marler and Fisher (2013) indicate, that few studies are examining the impact of e-HRM on HR. A possible solution lies in the framework, elaborated and applied by Maatman (2006), as a base for further research to measure the effectiveness of e-HRM in the cloud.

Concluding, we can summarize the main contributions of this study as follows:

(a) Proposal of a project procedure model. The literature review shows a significant focus on the effects of digital HR transformation. However, the concrete implementation is often ignored, and only the results are assessed retrospectively. This article bridges between analog and digital HR worlds and paves the way for a successful transformation through the derived project procedure model;

(b) It shows experience from real projects as well as stakeholder notions. From experience gained in numerous transformation projects, we can conclude what could be an optimal project organisation. The stakeholders and their respective influence are analysed and offer an improved possibility of project management. The role of stakeholders contributes in particular, as various articles have suggested (Achterkamp and Vos 2008) and

(c) Cloud Architecture. The article contributes to the IT view of cloud architectures, because this depends on various (functional) parameters and the final stage of expansion must optimally reflect the organisational HR requirements.

Limitations and future research

Being a new area of research there are a number of fields that merit our future interest. Identifying and applying new Key Performance Indicators (KPIs) within a continual improvement process (ISO

2015) to incrementally improve the HR processes within the HR Cloud can be another field of research. (e.g. "what are the recruiting channels where our top performers are sourced?"). This is the goal of our next research phase. Concluding, improved processes relates to the efficiency and effectiveness of the e-HRM solution itself. Another contribution of our research is the confirmation of the goodness of the technology acceptance mode developed and applied by Davis (Davis 1986, 1989) as a framework to measure acceptance of technology by evaluating the perceived usefulness as well as the perceived ease of use. Other researchers such as Voermans and Veldhoven (2007) applied this framework to the e-HRM usage within a corporate context. Applying this acceptance model to HR Cloud solutions to verify the acceptance and usefulness, is an additional future field of research.

Schalk et al. (2013) study the influencing factors for decisions to implement e-HRM and conclude that decreasing cost is the dominant driver. With the changed market environment and the new technology, it can be worthwhile to verify if new drivers appeared or if the order of the drivers has changed.

Finally, our study has concentrated in large firms. Therefore, still the question related to eHRM and firm size still seems to be unresolved as academic literature claims (Carvalho and Machado 2016).

To summarise, further research based on cloud-based e-HRM solutions includes the impact, the acceptance and usefulness, as well as the initial reasons for implementation.

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3.4. Article 4: "Adoption and success of e-HRM in a cloud computing environment"

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Abstract

This qualitative study examines the digitisation of personnel processes in a cloud-based environment. The influencing factors for the transformation from conventional Human Resource Management to electronic management are examined with a special focus on the success factors from a strategic level down to the operational level. Additionally, an in-depth analysis of the currently existing and new HR metrics which emerge during the transformation takes place. The study is based on interviews with HR experts with extensive experience in transforming and working with the new technology. As a result, it can be stated that active participation of the HR department is relevant for the success of the digital transformation HRM project. Based on the current HR metrics, it can be concluded that these metrics have not been applied extensively so far and are used less for controlling and optimizing HR processes, although it is anticipated that new metrics would increase the acceptance of the new technology and thus the success of the overall HR transformation. This study contributes to the research in the field of HR software adoption, especially of cloud-based solutions, and provides the academic and business world with the requirements of such transformations.

Keywords:

Electronic Human resources Management, Human Capital Management, Knowledge Management, e-cloud solutions, Talent management

Introduction

The research on electronic human resources management (e-HRM) covers two separate fields of academia and management in practice whose boundaries, regrettably, are not clearly defined: Information technologies (IT) and human resources management (HRM).

The National Institute of Standards and technology (Mell and Grance 2011) defines cloud computing as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction".

Thus, the aim of the article is twofold. First, to identify success factors that contribute to the HR digitization in a cloud environment, from the perspective of the business department. Second, to recognise key performance indicators which would enable the measurability of success. Both objectives have been examined separately.

This research follows a qualitative approach and is based on a case study methodology. The researchers have considered five on-going cases of e-HRM implementation and have interviewed

seven managers working for the firms involved. This article focuses on the internal drivers and success factors of e-HRM transformation and, on the other hand, regarding the metrics area, carries out an inventory of the currently measured HR key performance indicators (from now on KPI) and their applications. Finally, new relevant metrics are identified that are made possible by digitizing multiple HR processes in a single cloud-based e-HRM solution. The common database enables new approaches to the definition of KPIs (e.g. combining performance with recruitment KPIs).

This study is organized in the following way: first, it discusses the practical and theoretical context of e-HRM. Once the research gaps have been identified, the research hypotheses are shown and debated. Then, the research methodology is presented and justified. Next, the case studies and interviews are examined concluding with the research conclusions. Finally, academic, and management implications are discussed.

Theoretical context

The digital transformation of HR

The digital transformation of companies is progressing, and the digitization of HR processes is a part of it (Bondarouk and Ruël 2009; Stone and Deadrick 2015) impacting the way HR are developed (Stone and Dulebohn 2013). The Sierra-Cedar 2017-2018 HR Systems Survey (Harris and Spencer 2018) shows that the planned adoption rates for workforce management or talent management have risen to more than 80%. It also demonstrates a clear tendency for workforce and talent management systems to be transformed into a cloud-based Software as a Service solution (from now on HR Cloud), where over 50% of the HR technology environment is already implemented. Harris and Spencer (2018) state that the mapping of HR core and talent management processes in HR Cloud solutions has increased by 4% to 63% and by 5% to 79% respectively since 2017 until now. On the other hand, on-premise implementations of HR core processes have fallen by 11% to 33% and talent management by 5% to 19% during the same period. This report also concludes that an average user experience score of 3.51 points, which is 0.61 points higher than comparable on-premise solutions, also speaks in favor of an HR Cloud environment, and companies that have a comparatively high cloud adoption rate tend to see their requirements met there. These HR Cloud conversion projects take a long time and tie up many external and internal resources (Harris and Spencer 2018). Consequently, this raises the question of how to measure success after implementation and which influencing factors exist during the digital transformation of HR processes in cloud-based solutions.

Impact of technology on HR and outcome

How is technology influencing the HR field? Cloud technology, as well as its use to re-engineer processes in the human resources management, that is to say: the HR process landscape, is still relatively new (Lin and Chen 2012; Jafari Navimipour et al. 2015b). Stone et al. (2015) note that "technology has had a dramatic impact on the field of HR, and as technology evolves it is likely to move the field in some very new directions in the future". He also notes that there are still many unanswered questions as to whether the primary goals of HR will be achieved. Other authors suggest that the research is still in its "infancy" (Stone and Dulebohn 2013). Also, Boselie and Paauwe (2005) find that the quality of HR work makes a direct contribution to the financial competitiveness of a company and thus directly contributes to the long-term viability of an organization. Boselie and Paauwe (2005) also indicated that e-HRM would not make a significant value contribution to corporate performance. Bondarouk and Ruël (2013) examine the impact of e-HRM on strategic HR issues such as the transformation of HR into a strategic partner and conclude that e-HRM contributes here.

However, what is the influence of the technological evolution pointed out by Bondarouk et al. (2017)? Marler and Fisher (2013) conclude that there are "no studies [which] directly examined the relationship between e-HRM adoption and any kind of organizational performance measures such as competitive advantage, organizational performance, reduced costs, or improved HR outcomes such as increased human capital, reduced turnover or increased organizational commitment or job satisfaction." This statement generally refers to the digitization of HR processes, rather than the transformation into an HR Cloud environment. There seems to be a disparity between the rapid adoption of e-HRM in practice (Harris and Spencer 2018) and its coverage in scientific studies. Garbarino-Alberti (2013) points out, however, some of the benefits for small and medium enterprises (SMEs). Nevertheless, in spite of the absence of published research covering a holistic approach, there are studies that focus on the use of e-HRM for selected HR sub-processes in different industries and target groups (Troshani et al. 2011; Dhamija 2012; Nura and Osman 2013; Nagendra and Deshpande 2014). Other studies examine the implications of implementing e-HRM in general (Varma and Gopal 2011; Grant and Newell 2013; Theriou and Chatzoglou 2014; Obeidat 2016) as well as on the limitation of these solutions (Stone et al. 2015). Other authors have suggested a direct link between e-HRM adoption and the quality of human resources management (Nura and Osman 2012).

Innovation adoption

As in the case of the majority of innovations, adoption is a crucial aspect to be considered (Rogers 2010). To begin with, models have been utilized for the support and facilitation of innovative technology adoption. For the specific question of software adoption, common models such as the

Technology Acceptance Model (Davis 1986, 1989) are used. This model evaluates the attitudes toward using an approach through its perceived usefulness as well as perceived ease of use and has already been successfully applied in the e-HRM context (Voermans and Veldhoven 2007). However, this adoption tends to be based on daily operational use of the system, which means that the strategic influencing factors and implications are less emphasized. Other models such as the Technology Organization Environment Framework (Tornatzky et al. 1990), which measures the company's impact on the adoption and implementation of innovations, are also used in e-HRM context (Alam et al. 2016).

But should the opinions of staff be considered in software adoption and do they have a specific role? In this direction, another less technical approach to evaluating the adoption of e-HRM is the TOP (Technology, Organisation, and People) framework (Bondarouk et al. 2017b). In applying this framework, it was found that technology and organization are prerequisites, but ultimately people make the difference in adopting e-HRM. Maier et al. (2013) developed a research model that investigates the impact of e-HRM implementations in organizations on employee satisfaction and employee turnover. The basis for their model was the Technology Acceptance Model, which was extended by work-related consequences (e.g. turnover).

But still, a technical focus has its advocates. Some authors recommend that technology and organization should be considered separately when adopting e-HRM successfully, and the mutual dependencies should be examined more clearly (Dery et al. 2013). Other approaches such as the St. Gallen Management Model (Rüegg-Stürm and Grand 2016), which is already used in the ERP environment to evaluate influencing factors (Schoeneberg 2011), have not yet been applied in the e-HRM field. We could conclude according to Bondarouk et al. (2017) that "we still lack a comprehensive understanding of the factors affecting the adoption and consequences of e-HRM." In this respect, another researcher, Strohmeier (2007), stresses there is a lack of a "systematic categorization and consideration of relevant technologies."

Metrics

Management performance cannot be considered without metrics (Van Looy and Shafagatova 2016). We must define first the difference between HR metrics and analytics. Lawler et al. (2004) distinguish between "HR Analytics" and "HR metrics". HR metrics are measures of key HRM outcomes, classified as efficiency, effectiveness or impact. In contrast, HR Analytics do not measure but rather represent statistical techniques and experimental approaches that can be used to show the result of HR activities. Despite this distinction between HR metrics and HR Analytics, there still is definitional ambiguity in the literature.

In the context of HR metrics, Dulebohn and Johnson (2013) point out that while a broad range of measurable numeric HR figures or ratios has been developed, the actual application of these HR figures to provide added value for HR has so far been neglected. Furthermore, the research in this area proves to be unclear. Marler and Boudreau (2017) go one step further by concluding that despite the evidence linking the adoption of HR Analytics to organizational performance, the instances where HR Analytics have been adopted as well as academic research are rather limited. Baesens et al. (2016) underpin this by arguing that the practical application of HR analytics has not had too much success despite the investments in that field. Furthermore, they point out that these metrics are not applied only for statistical purposes but also to provide more profound insights into the business.

This aspect has opened the discussion on the mentioned concept of HR analytics. Ostermann et al. (2009) suggest a targeted benchmarking of e-HRM systems with other business information systems or functions based on metrics to support the decision to buy a new e-HRM, providing a significant incentive for implementation, design or maintenance activities to ensure better HR and overall business performance, ultimately. Van den Heuvel and Bondarouk (2017) argue that HR analytics has matured both in the field of business as well as research. They also conclude that it has hitherto tended to have an experimental status in companies, but that it will also have a predictive function in the long term until 2025, driven by technological progress, in addition to a robust analysis. These authors also state that "fragmented and outdated IT landscapes characterize current system support for HR analytics." With the advent of new HR Cloud solutions, which cover a wide range of HR processes due to a disjointed landscape, a considerably broader, but above all a cross-domain database (Ziebell et al. 2016) is being offered, for which previous stand-alone solutions could only provide rudimentary support. If HR analytics is such a trendy topic (Rasmussen and Ulrich 2015), and there is technical availability of data, why is there relatively little research and only limited practical application if that means better organisational performance and the repositioning of HR as a strategic partner (Lawler et al. 2004; Fecheyr-Lippens et al. 2015; Russell and Bennett 2015)?

Proposal of hypotheses

The previous review uncovers various research gaps, primarily regarding the adoption of HR Cloud solutions and the HR metrics discussion.

Current studies focus on individual personnel processes, such as recruitment (Maier et al. 2013; Laumer et al. 2014), and analyze the subsequent changes. However, the literature has not yet examined the adoption of e-HRM systems that cover the whole spectrum of HR processes in one solution and the resulting impact on the stakeholders.

This latter aspect, the effect of e-HRM on stakeholders was dealt with in an exploratory study carried out by Bondarouk and Ruël (2013) studying the impact of e-HRM in a government office with positive results on the opinion of most stakeholders.

Other authors such as Laumer et al. (2010) carried out a Delphi study within German managers to test their opinion on the e-HRM impact: focussed on positive results on staff retention, internal and external employer branding, filling vacancies and best use of scarce resources, etc. In the same direction, Laumer et al. (2014) examined the combined effects of e-HRM adoption and the application of "business process management" on secondary service processes. These authors suggested that the standardization and digitization of HR secondary processes required a deeper understanding of business process management and business process modeling. The implied process standardization in turn is a paradigm of the HR Cloud through its limited configuration possibilities (Ziebell et al. 2018).

But are there studies based on real cases and not solely on opinions? Eckhardt et al. (2014) point out that there are only a few research contributions on e-HRM digital transformation and its impact on individuals, on business processes as well as on digitation technology. Therefore, few studies focus on the effects of e-HRM transformation of the recruiting process driven by external factors. There is a research gap here, as the internal drivers are briefly outlined. Furthermore, this survey was based on only one firm. Laumer et al. (2010) also focus on external factors and neglect internal ones. Bondarouk and Ruël (2013) also invite further studies to be conducted of organizations to examine the strategic contribution of e-HRM. This strategic contribution also includes the conversion of the HR department into a strategic business unit which is examined in this research. The actual key performance indicators can be used in a benchmark exercise (Ostermann et al. 2009), but the new proposed KPIs also offer the opportunity to shed more light on relevant but previously unobserved aspects. Both, actual and derived KPIs contribute directly to the lack of studies identified by Paauwe (2009), which can link HR practices to both past outcomes and subsequent performance.

Thus, the scientific contribution of this study is relevant, as well as its management implications. The consideration of the influencing factors such as employees, organizational culture, the firm environment, customers and other stakeholders, technology, etc. can make a valuable contribution to successful HR process digitization in a cloud environment.

In conclusion, this study is the first one to deal with process digitization in cloud-based solutions. This technical innovation has limitations (e.g. limited freedom in process definition), but also offers opportunities to rethink HR in general. This applies not only to process design but also to its evaluation. The focus of this paper is on these advantages and disadvantages as well as the experience people

have with the transformation of the HR processes into cloud-based solutions. These matters are examined here for the first time and close a further research gap.

The following research questions have therefore been determined based on the literature review:

Question 1: Which factors from an HR perspective contribute to a successful HR Cloud transformation? The following themes should also be considered: HR digitization strategies, drivers, and obstacles; prioritizing HR processes by stakeholders, etc.

Question 2: Do companies use HR key performance indicators for HR process control/optimization and does the new HR Cloud technology contribute to this by providing new KPIs? HR KPIs are currently measured; new KPIs can be provided by the HR management in a cloud-based environment in the future; these new metrics impact the acceptance of an HR Cloud solution.

To answer these questions, three hypotheses based on the current state of research have been formulated.

There is a broad research in the field of general technology adaptation (Davis 1986; Thong 1999; Oliveira and Martins 2010; Lin and Chen 2012; Venkatesh et al. 2016) and also in the special field of e-HRM adoption (Florkowski and Olivas-Luján 2006; Teo et al. 2007; Strohmeier and Kabst 2009; Alam et al. 2016; Bondarouk et al. 2017b).

Findings are that the adoption of e-HRM depends on a wide variety of influencing factors. Two of the relevant topics here include the active participation and attitudes of employees (Rogers 1995; Reichers et al. 1997; BarNir et al. 2003; Fisher and Howell 2004; Voermans and Veldhoven 2007; Teo et al. 2007; Amalou-Döpke and Süß 2014; Bondarouk and Brewster 2016) as well as a highly professional (i.e. in time and budget) implementation (Tansley and Newell 2007; Bondarouk 2011; Khan et al. 2017; Harris and Spencer 2018).

The bandwidth of the HR processes to be digitized is also addressed in various articles, although there is disagreement about how many processes are ultimately to be implemented in solutions. Some authors advocate a broad approach (Angrave et al. 2016; Ziebell et al. 2018), others suggest a constraint to a few processes (Gueutal and Stone 2005; Parry 2011). The impact of the overall digital HR transformation is also explored by various articles (Parry 2011; Grant and Newell 2013; Obeidat 2016), which explore positive aspects such as the increase in HR service quality (Devaraj et al. 2007; Laumer et al. 2014; Bondarouk et al. 2017a), process efficiency (Dhamija 2012; Kumar and Lalitha 2016) or cost reduction outcomes (Lepak and Snell 1998; Ruël et al. 2007; Marler 2009). The analysis of these three factors dominates the studies.

From these aspects, the first hypothesis is derived.

Hypothesis 1: The success of an HR Cloud transformation depends on active participation in the fundamental digitization decision and the comprehensive, problem-free, time-acceptable digitization of a large part of the HR processes in an HR Cloud environment. It will have a positive influence on how people work in the HR department.

Research regarding metrics is diverse. The literature states that e-HRM enables companies to measure several KPIs which are increasing steadily (Beatty et al. 2003; Carlson and Kavanagh 2008; Strohmeier and Piazza 2013; Angrave et al. 2016) although it is not entirely clear which impact these measurements have, how to apply them (Wei et al. 2015; Bassi and McMurrer 2016) and what to use them for (Lawler et al. 2004; Gardner et al. 2011; Dulebohn and Johnson 2013; Amalou-Döpke and Süß 2014; Ulrich and Dulebohn 2015; Rasmussen and Ulrich 2015; Baesens et al. 2016; King 2016; Patre 2016; Levenson 2018; McIver et al. 2018).

On the other hand, Amalou-Döpke and Süß (2014) argue that HR measurement improves the quality of HR work in general as KPIs enable HR to justify its effort while being able to control which is the proper effect. More concluding, Russell and Bennett (2015) state that better data leads to better overall performance. Based on these research results, the following second hypothesis is derived.

Hypothesis 2: There are many HR metrics that are already used today to control and optimize HR processes.

The last hypothesis is composed of partial aspects of the two above hypotheses, with a special emphasis on the technological aspect of cloud technology. Cloud technology, its perception and adoption is researched widely (Low et al. 2011; Lin and Chen 2012; Park and Ryoo 2013) while there are few articles dealing with e-HRM based on such solutions (Jafari Navimipour et al. 2015b; Stone et al. 2015; Zapotocny 2015; Ziebell et al. 2018). Angrave et al. (2016) argue that several HR processes are consolidated in cloud-based solutions which offer a broader set of data and the general trend to transform into such solutions is confirmed by Harris and Spencer (2018). The new technology thus potentially offers new possibilities for measurement and evaluation, which in turn has a positive impact on HR work. Conversely, does this contribute to the acceptance of new cloud solutions? This assumption is reflected in the third hypothesis.

Hypothesis 3: The HR Cloud enables the derivation of new HR figures, which is accompanied by a higher acceptance of the new HR Cloud technology.

The validation of the hypotheses would serve to identify the strategic and operational factors that contribute to a successful HR Cloud transformation from the perspective of the HR department. From the management perspective it serves to derive practicse to increase acceptance during and after the successful completion of the project. To what extent does the new technology influence the working

method? The aim of the inventory of the currently measured HR indicators is to give an insight into the practical work of HR in companies and thereby show how sparsely spread the actual measurement of HR work through KPIs is. Thus, an objective evaluation of the valuable contribution of HR or a benchmarking becomes much more difficult. Another goal is to derive new KPIs which, based on the current measured critical figures in combination with success factors, should be an indicator of what appropriate measures can be, both for an HR Cloud transformation and for successful HR work in the future.

In summary, the practical digitization of HR processes in an HR Cloud environment will continue to increase and the research gap results from the fact that the influencing factors of the transformation into this new technological environment and its impact have not been investigated in-depth. The same statement applies to the new analytical possibilities offered by the technology and how this can be used to improve HR.

Research methodology

Methodology selection

This study was conducted using a qualitative or theory-generating approach. The methodology used for data collection is expert interviews, and the subsequent evaluations are of qualitative content. Both data collection and assessment are carried out using the procedure model for qualitative research using expert interviews and qualitative content analysis by Gläser and Laudel (2010).

The reason to conduct expert interviews lies in the relatively new topic and the resulting limited access to a large group of experts (Gummesson 2006).

The survey methodology describes which experts were interviewed for which reasons. Also, the process of compiling the questionnaire and the interview guideline will be explained as well as the concrete implementation of the interviews.

An expert interview to collect data is a proven means of answering the research hypotheses (Gläser and Laudel 2010). These expert interviews are used to record the interpretations, views, and attitudes of the interviewees, which in turn provide insights that would not be available merely through observation or document study (Mayring 2016). An expert describes the interview partner's specific role as a source of specialist knowledge and practices (Gläser and Laudel 2010).

The following criteria, in order of priority, form the basis for the selection of the experts:

1. The expert is employed by a company that already has an HR Cloud solution in place or where the HR Cloud implementation project is already in an advanced stage.

2. The expert is familiar with HR metrics and is ideally involved in the definition of HR KPIs.

3. The expert works in the HR department, not in IT (optional).

4. The expert works in a management position (optional).

Criteria 1 and 2 ensure that both, the cloud technology and the KPI know-how are available. Criterion 3 guarantees that the respondent does not have an overly technical view of the HR Cloud but can instead make a beneficial assessment from the HR point of view. The last criterion serves to obtain the broadest possible knowledge about the operational and strategic use of the HR Cloud solution.

Based on these criteria, 32 possible Germany-based interview partners from 16 individual companies from eight different industries were identified, three of which took part in a pre-test and seven of which were again included in the primary survey, which corresponds to an overall response rate of more than 30%. All seven interviewed experts have succeeded in meeting criteria 1 and 2. Criterion 3 matches 85% of respondents. The last rule, namely to have a management position, is fulfilled by 43% of the respondents. The other 47%, however, have a holistic view of the topic, as they were able to gain extensive insights into the issue, for example as part of the HR transformation project.

The following table gives an overview of the seven interviewed experts from five different companies. This includes the anonymized position title, which on the one hand enables comparability of the interviewees and on the other hand does not reveal the identities of the experts. The first column "ID" serves for the allocation of the individual statements in the analysis.

ID	Title/Position	# Employees	Industry	HR Cloud Solution	Form of interview
[IP1]	HR Project/Process Expert	75,000 - 149,999	IT-Services	SAP SuccessFactors	Face-to-Face
[IP2]	HR Head of Process	8,000 - 14,999	Retail	SAP SuccessFactors	Face-to-Face
[IP3]	HR Project/Process Expert	8,000 - 14,999	Retail	SAP SuccessFactors	Face-to-Face
[IP4]	HR General Management	8,000 - 14,999	Retail	SAP SuccessFactors	Face-to-Face
[IP5]	HR Head of Process	75,000 - 149,999	Transportation	SAP SuccessFactors	Telephone
[IP6]	HR General Management	15,000 - 74,999	Banking	SAP SuccessFactors	Telephone
[IP7]	HR Project/Process Expert	8,000 - 14,999	Energy Supply	Workday, Umantis	Telephone

Table 1: Overview of the interviewed experts

The preference for the SAP Success Factors solution is high. More than 85% of the companies surveyed employ more than 10,000 people and are therefore considered to be "large firms," which in turn rely on permanent HR Cloud solutions (e.g. Workday, Success Factors, Oracle Cloud) available on the market (Harris and Spencer 2018). All companies are based in Germany, which is traditionally a strong market for SAP solutions, and finally, the authors have a well-developed network of SAP implementations based on their practical expertise.

Questionnaire and interview guideline

Variables

Variables are stored as additional information when coding the interviews. In this way, it is possible to compare and segment certain findings. The following variables have been defined:

- Company size (#employees):
    - small (8,000-14,999)
    - medium (15,000-74,999)
    - large (75,000-149,999)
- Management position: yes or no
- Industry:
    - Banking
    - Energy Supply
    - IT Services
    - Retail
    - Transportation

These three variables were adopted because it was expected that the answers to the questions might be different regarding company size, position in the hierarchy and industry. Also, the information provided by all experts was rated equally.

Two documents, a questionnaire and an interview guideline were prepared and used for data collection. In developing the survey and the interview guideline, particular attention was paid to compliance with ethical standards regarding research process transparency and the handling of personal data (Gläser and Laudel 2010).

Interview guidelines

The interview guidelines and their references were the following:

Question	Reference
Would you consider the cloud transformation project a success?	(Bondarouk and Ruël 2009; Bondarouk et al. 2009b; Masum et al. 2015; Alam et al. 2016)
Which was the digitation strategy followed by your firm?	(Grant and Newell 2013; Francis et al. 2014; Bondarouk et al. 2017b; Harris and Spencer 2018)

Which did you consider were the main drivers of the digitation process in your case?	(Dery et al. 2013; Francis et al. 2014)
Did your firm prioritize any process in your project?	(Dhamija 2012; Dulebohn and Johnson 2013; B. Holm 2014)
What were the main challenges and obstacles in your project?	(Bondarouk and Ruël 2009; Heikkilä et al. 2014; Stone et al. 2015; Baesens et al. 2016)
What were the man tools used and the main HR processes in the digitisation project?	(Harris and Spencer 2018; Ziebell et al. 2018)
Did you utilize any given criteria or solution for your project such as SAP SuccessFactors or other HR Cloud solutions?	(Davis 1989; Strohmeier 2007; Schoeneberg 2011; Dery et al. 2013; Ziebell et al. 2016)
What were the main changes carried out during the project implementation?	(Harris and Spencer 2018; Ziebell et al. 2018)
Were the actual KPIs utilized to control and optimize the HR processes?	(Dulebohn and Johnson 2013; Fecheyr-Lippens et al. 2015; Marler and Boudreau 2017)
From which sources did you obtain the KPIs? Which are the most relevant KPIs?	(Ziebell et al. 2018)
Do you expect them to have an impact in the future?	(Lawler et al. 2004; Chhinzer and Ghatehatehorde 2009; Lin 2011; Lin and Chen 2012; Maier et al. 2013; B. Holm 2014)

Table 2: Interview guideline references

The purpose of the questionnaire was to explain the research topic to the interviewee, to verify that he or she met the expert criteria and to obtain data on the current HR KPIs in advance.

Data collection to answer the research question was carried out through semi-structured expert interviews based on the above interview guideline (Bogner et al. 2014). The structure of the interview guidelines was developed from the pre-defined question categories and the derived hypotheses. In general, when designing the questions, attention was paid to creating a suggestion for the interviewee to tell a story (Gläser and Laudel 2010). For example, the questionnaire asked in advance what the expert sees as their personal added value and valuable contribution to their current position. This question is referred to again in the guidelines when asked how they would like to measure this. All interviews were transcribed, omitting the non-verbal elements (e.g. gestures or clearing the throat) and time stamped so that it was possible to trace who said what and at what time. These transcriptions served as a basis for the following evaluation.

Evaluation methodology

A structured content analysis was used to analyse the transcribed interviews. A combination of the approaches of Schreier (2012) as well as Gläser and Laudel (2010) was applied. The evaluation was computer-assisted.

Coding allows categorization and enables the search for patterns that facilitate analysis (Saldaña 2015). The given structure of the interview guidelines was helpful in determining the main categories, and the subcategories contained in them could be derived from the findings as well. In addition to the definition of the groups, extraction rules were defined which specified the allocation of the statements to the individual categories (Krippendorff 2012; Bogner et al. 2014).

The questionnaires containing personal data and further details about the company were included as additional figures to the analysis and served as supplementary information for interpretation.
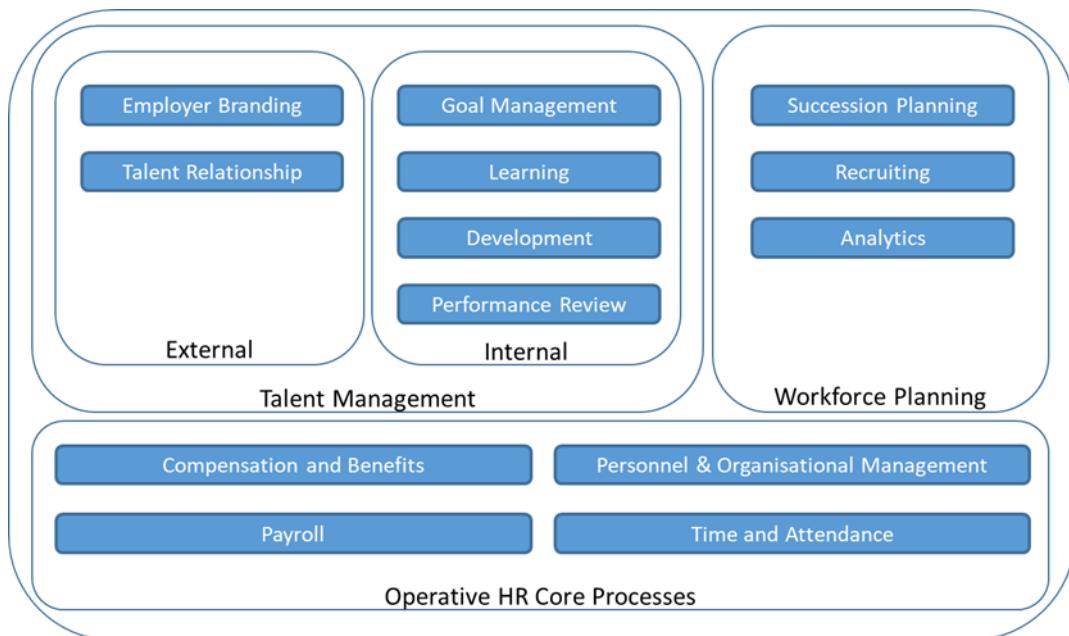
Figure 1: HR process cluster (Ziebell et al. 2018)

The actual metrics were evaluated separately. Among other things, these were assigned to the individual HR processes clusters (see figure 1 adapted and translated by permission from Springer Vieweg, Cloud Computing – Die Infrastruktur der Digitalisierung, (Vom traditionellen Personalmanagement hin zu e-HRM in der Cloud Implementierungsansätze einer digitalen Transformation) (Ziebell et al. 2018) @2018) and their absolute frequencies, separated by the company, was analysed.

Results

The combined results of the expert interviews, the questionnaire responses, and the actual KPIs are discussed in the following sections. A total of seven transcribed interviews, seven questionnaires and four spreadsheets with the actual HR metrics were evaluated.

The success of the cloud transformation

Hypothesis 1: The success of an HR Cloud transformation depends on active participation in the fundamental digitization decision and the comprehensive, problem-free, time-acceptable digitization of a large part of the HR processes in an HR Cloud environment. It will have a positive influence on how people work in the HR department.

The following main categories were used to answer the hypothesis, for the evaluation:

- Digitisation strategy
- The driver of digitization in the organization
- Prioritisation in the implementation process
- Stumbling blocks and obstacles during implementation
- HR process cluster and place of digitization
- Criteria for solution selection and implementation period
- Change and evaluation of the working method

Digitisation strategy

After the analysis of the digitization strategy pursued by the companies, the following four sub-codes emerged: "fundamentally digitizing," "increasing efficiency," "standardization & harmonization" and "data quality."

Both the "increase in efficiency" and the "standardization & harmonization" have been most frequently cited as strategic reasons for the digitization of HR processes, while the approach adopted here is that primarily processes in the company are to be digitized and the improvement of data quality has only been mentioned once in each respective case.

> *"This means to create more consulting, more conception, more value-added and to outsource the processes, which in the end are only transactional, not to other functions but to outsource them to technology."* [IP2]

> *"So, the strategy is to use standardized, a standard solution, a standard IT solution to map the HR processes in it[...]"* [IP5]

On a strategic level, none of the interviewees denied the influence of digitization on increasing efficiency

The driver of digitization in the organization

This category indicates which organizational unit or individual has driven the topic of HR digitization. Only one of the respondents stated that the primary driver of HR digitization was the IT department. In all other cases, it was driven by the HR department, by the HR director, CHRO, a dedicated change officer at board level or the board itself.

> *"[…] HR itself, so I consider myself as a driver."* [IP4]

Nevertheless, the reasons for the selection are also affected by strict IT policies, which also influence the subsequent implementation project.

> *"Well, there was just this standard software, so we wanted to have a horizontally integrated software, not "best of breed"[…]"* [IP4]

Prioritisation in the implementation process

In addition to the strategic component, operational selections for prioritizing the processes to be digitized were also examined. This resulted in the following three sub-categories of prioritization: "logical dependencies of processes & holistic approach," "efficiency increase & process harmonization" and "hierarchy promoter or unknown."

The most frequently cited aspect of operational prioritization is increasing efficiency and process harmonization, which is consistent with the statements on the digitization strategy. Individual HR processes (e. g. recruitment), which are end-of-lifecycle or depict a process not working at its best, are discussed to be digitized anew. Also, complex processes or those with a high impact are mentioned as the goal of digitization. The logical interdependencies between the processes also influences their prioritization. The clear focus on higher quality HR work is also mentioned several times.

> *"Thus, more consulting activities in the HR function, less operational, administrative, manual activities in the process."* [IP2]

Technical requirements for prioritization were only mentioned regarding the logical dependencies of the processes among themselves resulting from it.

> *"[…] if you don't have employees, you don't need to track performance. So, there is an inherent logic in the software."* [IP4]

Two experts noted that prioritization is also being affected by corporate policy or hierarchy.

Stumbling blocks and obstacles during implementation

The analysis of the project implementation challenges resulted in the following sub-codes: "cultural change," "technical restrictions," "resources and know-how," "works council and co-determination," "functional conception," "internal organization and governance" and "costs."

The most frequent statements could be assigned to the following three categories (classified by occurrence): "cultural change", "technical limitations" as well as "resources and know-how".

The subject of change is addressed several times by all experts; there was only one exception.

> *"[…] stumbling blocks are concrete[…] employees' passion for such topics."* [IP4]

> *"So, there are those who have been working with certain systems for a long time and are not necessarily affine to change them now."* [IP4]

> *"[…] many things are changing, the appetite for change is extremely overstretched, the employees from all target groups and levels have […] not much time for even more topics, but it is also enough for them."* [IP7]

> *"Then the topic of change in the company […] should not be underestimated."* [IP5]

The technical limitations were also mentioned, with one exception, by all respondents.

> *"[…] we wanted to continue this logic of course, and we noticed relatively quickly that even what we had planned and written in technical terms could not be realized at all in many respects. This means systemic restriction for us, which of course always leads to disappointment and for me, being a constraint is a disappointment because it doesn't work as expected and that is a dissonance which has to be processed first."* [IP2]

> *"this fundamental decision [...] we have to act with standard software and not 'best of breed,' we have been handcuffed somehow from the beginning."* [IP4]

Only one expert, in whose company the implementation is currently running, explicitly denies these technical restrictions.

> *"Technique [...] I don't see it as an obstacle in case the question comes up."* [IP6]

The topic of resources and know-how is also addressed by all experts with one exception.

> *"Stumbling blocks are main resources, i.e., the amount and qualification of resources"* [IP4]

The subject of "works council and co-determination" is exclusively mentioned by the three experts from the medium and large companies.

"[...] perhaps one last obstacle, how do I manage to work with our employee representative bodies […]" [IP6]

When it comes to the functional conception of the HR processes, the thing mentioned most of all were the difficulties arising from the technical restrictions are mentioned. Occasionally, the unclear internal organization was referred to and one expert pointed out that the topic of cost allocation was discussed once again during implementation.

HR process cluster and place of digitization

The main category "HR process cluster and place of digitization" is divided into the sub-code cloud, on-premise and other solutions which also reflect the systematic mapping of the HR processes. These other solutions are proprietary stand-alone solutions or process mapping on a spreadsheet. In the sub-codes, a further distinction is made between the individual HR business processes. Based on the analysis, the following table provides an overview of the implementation status of the HR processes in the companies based on more than 300 KPIs. The processes that have already been digitized are highlighted in green; the ones marked in yellow are in the planning stage.

Company	HR Cloud			on-premise			other solutions		
	Talent Management	Workforce Planning	Operative HR Core Processes	Talent Management	Workforce Planning	Operative HR Core Processes	Talent Management	Workforce Planning	Operative HR Core Processes
C1	Development Performance & Goals	Succession Recruiting	Personnel Administration Organisational Management (international)		Recruiting	Personnel Administration & Organisational Management Payroll Document management Travel Expenses Time & Attendance			Time & Attendance (in-house development)
C2	Performance & Goals Development Learning	Recruiting Succession	Document management Onboarding Compensation			Personnel Administration Organisational Management Payroll	Development (Excel)		Time & Attendance (Adobe Workflow)
C3	Performance & Goals Learning Learning	Recruiting	Personnel Administration Time & Attendance Travel Expenses Personnel Administration Organisational Management						
C4	Performance & Goals Learning	Succession	Personnel Administration Organisational Management			Personnel Administration Organisational Management			
C5	Performance & Goals Learning	Workforce Analytics Recruiting	Payroll On-/Offboarding Compensation Document management			Personnel Administration Organisational Management			

Figure 2: HR Process implementation status

It shows that HR processes have already been digitized in the HR Cloud and future digitization will also take place there. No planned on-premise HR digitization projects have been mentioned. It is also noticeable that in the talent management cluster, especially the performance and goal management processes are the focus of attention, while in the workforce planning cluster, the recruiting process is

emphasized. Analytics was only mentioned once as being digitized. It was also pointed out that many Excel-based solutions still exist in parallel.

> *"In the course of our project, we are of course also in the process of recording which systems are in use where. There's still a lot of it in Excel"* [IP7]

Overall, the HR Cloud has given an impetus for migrating and adapting existing HR processes and digitizing new ones.

Criteria for solution selection and implementation period

Of the companies surveyed, three are already using an SAP SuccessFactors HR Cloud and another company is currently implementing this solution. Only one company is currently using another HR Cloud solution (Lumesse ETWeb), that will be replaced by the Workday HR Cloud, which is already in an advanced implementation stage.

Most respondents stated that several HR Cloud solutions were looked at in advance, but that two categories were the relevant selection criteria. First, the "functionality and coverage of corporate needs," and second, the "specifications from non-HR areas." The first included the general scope of the HR Cloud as well as the integrative coverage of the respective processes.

> *"In essence, there aren't many solutions that meet the requirements"* [IP2]

One expert also mentioned economic reasons and the flexibility of switching to other solutions. The specifications from non-HR areas related to the IT architecture and data protection requirements and were mentioned by two experts.

It can be summarized that the focus of the selection criteria, despite some restrictive specifications from other areas, was on the functional coverage of the HR processes and that the HR department could participate actively in the selection.

The stated implementation period for the HR Cloud solutions varied among companies. While three companies reported that one year had been set aside for the simple implementation, the preparation time ranged between four months and six years. An expert stated that the application itself took only four months, but negotiations with the works council took over a year.

> *"And then the roll-out began for employee groups that are relevant to codetermination, and then the negotiation of co-determination simply dragged on for a relatively long period. So, over another year, until we had the co-determination on board."* [IP5]

One expert reported that the implementation project has been ongoing for the last six years.

Change and evaluation of the working method

The change in working methods can be divided into two categories: on the one hand, the difference in the efficiency and quality of HR and on the other side, the way how the HR Cloud, including the constraints and possibilities offered, is managed. Only two experts stated that they had not noticed any change at all, one of them said that it was not his working method that had changed but that of the entire HR department. One of them could not see any change because he has always worked in the HR Cloud.

In the context of increasing efficiency, reference was made several times to reducing transactional, operational activities and refocusing on value-enhancing activities.

> *"So, the real non-value-adding activities have been reduced to a small amount."* [IP2]

The quality of the data was also mentioned, which was used to measure and optimize HR processes and, above all, to improve the internal HR consulting quality. Regarding the last, skepticism is expressed as to the extent to which the data currently available there offer an additional benefit.

> *"I think we now have the data available in a different way, but it's not that I feel we have a new insight."* [IP4]

Regarding the handling of the HR Cloud solution, attention is drawn to the forced process standardization and the associated communication within the organization. It is also expected that regular releases and exchange with other users of the same solution will lead to process improvements and more innovation.

> *"We are curious to see what else is coming, we know about the release updates and see it as an opportunity [...]"* [IP3]

Explicit reference is also made to the new cooperation with the IT department, which will be involved earlier when adjustments are to be made. Those who are already actively using an HR Cloud solution generally view the change in their working methods positively, while pointing out that they want to see even more positive changes in the future.

Actual KPI used to control and optimize HR processes

Hypothesis 2: There are many HR metrics that are already used today to control and optimise HR processes.

In assessing this hypothesis, there was an analysis of the filled in spreadsheet templates along with the actual KPIs, as well as consideration of the following main categories derived from the interviews:

- Overview and types of actual KPIs

- Sources of actual KPIs

- Distribution, use, and influence of actual KPIs

Overview and types of the actual KPIs

Of the five companies, only four handed over the currently measured KPIs in the spreadsheet template and one named the KPIs during the interview. A total of 336 different KPIs were handed over from all three HR process clusters, 85% of which were provided by a single company, followed by 10% from a second company and 5% cumulated from the other companies.

The following figure provides an overview of the number of KPIs for each HR process, grouped by company.
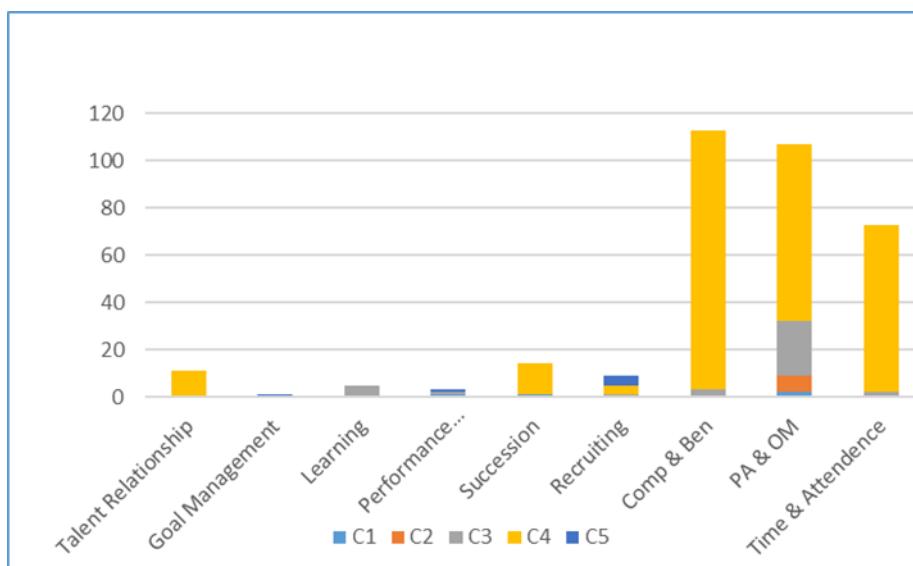
Figure 3: Overview of the quantity of HR key figures per HR process

Most key figures are measured in the HR processes "Compensation & Benefits" (Comp & Ben), "Personnel Administration & Organisational Management" (PA & OM) and "Time & Attendance."

By breaking down the key figures into the three HR process clusters, the following picture emerges.
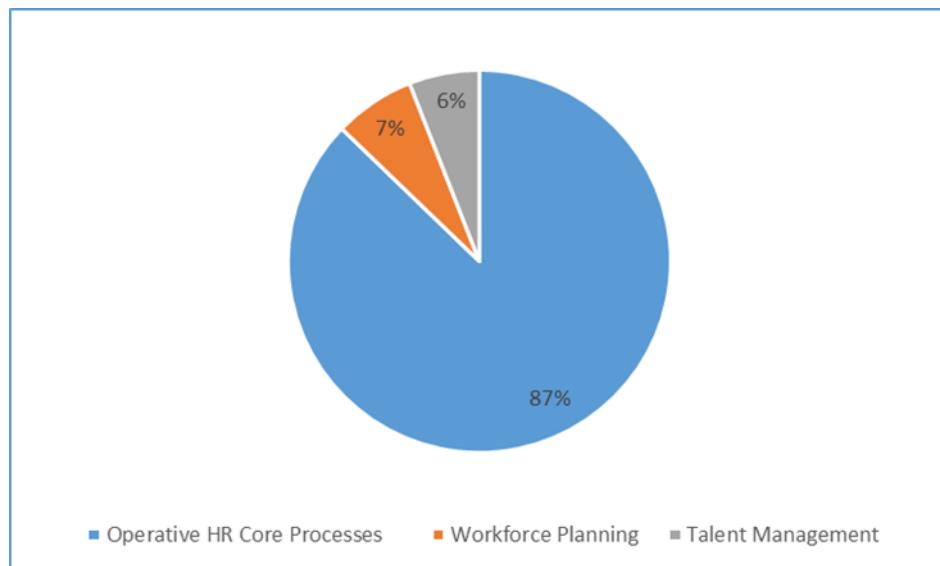
Figure 4: Breakdown of KPIs into process clusters

It shows that most of the KPIs come from the area of operative HR core processes. On closer inspection, the following distribution of the key data within this area is shown.
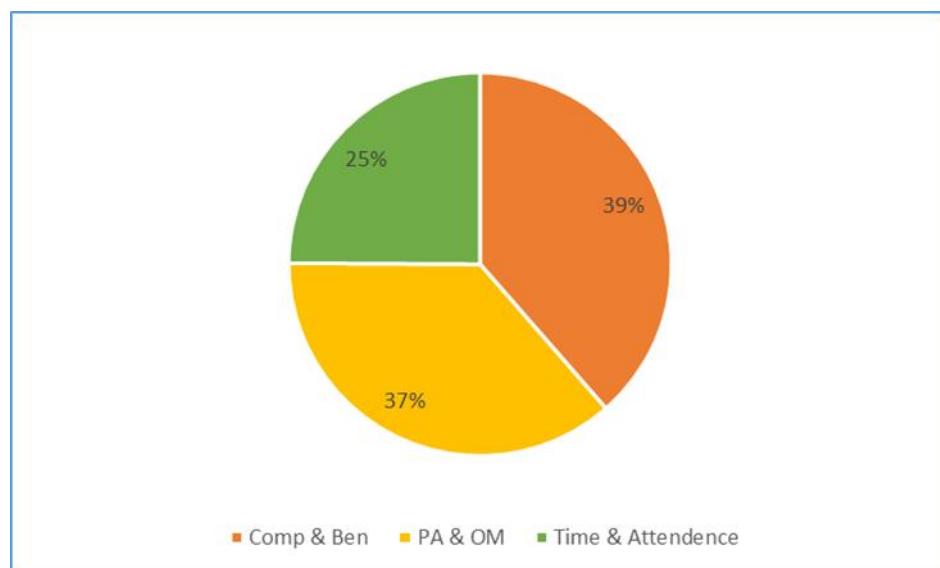

Figure 5: Breakdown of operative HR KPIs

Most of the key figures are currently measured in the companies surveyed in the process area of "Compensation and Benefits."

Half of the respondents stated that they receive technical KPIs such as user numbers and response times in addition to the business KPIs. However, these are usually requested and supplied on demand.

Also, four companies are already measuring cross-domain KPIs. However, these are collected with great effort and are mostly correlated manually.

"Then, however, days of illness should also be recorded, absences in general, which again comes more from the whole topic of time management, and the topic of time management is based on a wide variety of systems. So, the master data we may still have globally in a system, but the time management, which is almost in every country in a different system. And that makes it very time-consuming." [IP7]

Sources of actual KPIs

The sources of the actual KPIs are roughly divided into three areas: respectively the HR Cloud, other systems, a department or a mix of the three are the origins of the metrics.

"We take them out of the system ourselves, or else ask relevant stakeholders. So, to give such an example, if we now want to consider the rate of dismissal or new appointments at the management level, then we currently ask the subsidiaries." [IP5]

All respondents stated that they had to access at least two different sources to obtain their metrics, so far there is no single system that meets this requirement as of today.

Distribution, use, and influence of actual KPIs

The experts stated that the KPIs currently being collected are distributed at the same level, for example to inquiring about business units or the upper management level, for example, to economic committees. Three experts stated that the key figures are further processed in reports (e. g. annual reports, diversity reports).

Four of the five companies indicated that key figures are used to control HR processes or to improve HR processes.

"What is my relationship from recruiter to support, to Active Source, that's an implication. Another implication is business partner management, i.e. in the topic of low performance, high-performance management potential candidates, and we conclude our development programs that we set up and then control our own, our training." [IP2]

However, this control only takes place in some processes and not across the entire process landscape.

When asked about the impact on work quality, the picture was split.

"Limited, so it's flanking numbers, these numbers don't control me, I don't use them for control because they come too unreliable." [IP4]

"It should influence my very personal quality of work because [...] I am nowadays responsible for our Shared Service Centre [...] and in this role the whole thing lives of course from quality and efficiency" [IP6].

Four experts stated that the influence of key performance indicators was noticeable, three denied they had influence or weighted it as low.

New KPIs enable the acceptance of new technologies

Hypothesis 3: The HR Cloud enables the derivation of new HR figures, which is accompanied by a higher acceptance of the new HR Cloud technology.

The following categories resulting from the interview were considered for the analysis:

- Conceptual consideration of KPIs in the project scope
- Assessment and use of cross-domain domain KPIs
- Successful work, its measurement, and display by derived KPIs
- Influence on acceptance of the cloud solution

Conceptual consideration of KPIs in the project scope

Three companies indicated that key figures were considered in the implementation project. Interviewees from this group stated that the metrics were a key selection criterion for the HR Cloud solution and provided an added value.

"To put it this way, as an icing on the cake, this evaluation mechanism comes at the top, where we say, so now we have to collect or process HR data on a broad scale, and from this, we want to extract KPIs that speak as much as possible for the company." [IP4]

Two of the respondents stated that the topic of KPIs is in the status of ideas or should only be implemented in the future, with one pointing out that the KPIs already delivered by the on-premise system would be enough at present.

Assessment and use of cross-domain KPIs

All respondents rate the use of cross-domain KPIs as positive or even mandatory.

"[...] that's why I think it is imperative to link KPIs." [IP2]

Two basic benefits of these KPIs have been identified. The increase in the transparency of dependent processes, with one expert, explicitly pointing out that this also clearly demonstrates and justifies the complexity of HR work in general and its valuable contribution in the company:

"Mainly to represent the value added of HR, because we do these processes to achieve something, and if we could report on these overall processes or maybe even, what do you call cross-domain related reports, we could also portray the complexity of our work differently."[IP4]

The further processing of these data for enhanced optimization (i.e. through the application of artificial intelligence) is also mentioned as a vision for the future.

The second benefit is improved control and optimization of HR processes. All companies see potential here, starting with the fact that the elaborate creation of KPIs is no longer necessary, up to the adaptation of complex process chains. The respondents also expect an improvement in the overall database collected, as the linking of key figures across several processes also reveals weak points in the data (e.g. the number of vacancies filled cannot be greater than the number of people recruited internally and externally).

Successful work, its measurement, and display by derived KPIs

All experts stated that customer satisfaction is the essential criterion for measuring success in their work. This specific degree of satisfaction varies depending on the individual position of the expert, e.g. adoption of the HR Cloud is relevant for the project experts while the quality of the HR services provided is essential to HR General Management.

As a result, some of the derived KPIs are used to measure customer satisfaction. Three experts want to measure employees' mood images and how they can change because of individual influences. Key figures in the context of talent management are also addressed either in combination with workforce planning or mixed with the efficient core processes.

Examples of this are the following desired process ratios, some of which are combined:

- Filling vacancies from recruitment combined with performance and potential values
- Performance assessments and succession planning in combination with development figures
- Potential applicants for job families and the use of talent pools to fill vacancies
- Movements of an employee within the organization
- Fill levels of talent pools in combination with performance and potential values
- Job evaluations in combination with performance and possible values
- Comprehensive competence evaluations to fit into positions
- Assessment methods in conjunction with performance values
- Learning outcomes and their influence on potential assessment compensation in combination with performance and likely assessments Positions in combination with compensation

One expert also referred to other technical KPIs that measure, for example, the length of time a person spends in HR processes, with a focus on the end user's use of the system.

Regarding the way in which the KPIs are presented, there is agreement that either a web-based solution or an own (mobile) application is required. Extended possibilities of evaluation, such as time filtering and selection of individual business processes (e.g. display of the recruitment KPIs of the last 3 months) as well as simulations (e.g. that involve questions such as: "are vacancies filled faster if a new recruiting channel is selected?") are requested.

Influence of new KPIs to the acceptance of the cloud

All experts admit that the new key figures would generally have a positive impact. Emphasis is placed on the increased acceptance and confidence of the end customer. The improved possibility of consultation is also mentioned here.

> *"[…] from my point of view, being able to deal with their teams much more autonomously or self-sufficiently and being able to say that I have a situation here, what do I do with them now? I think that would strengthen both the cloud and the HR function […]"* [IP4]

The availability of the data alone is seen by an expert as positive.

> *"Yes, I am experiencing the experience on a small scale, which would have an immense acceptance, because I notice more and more when people know what they are filling the tool with data for, and when something happens to the data, it increases acceptance to an extreme degree."* [IP5]

Only a slightly negative vote indicates that key figures are generally positive, but other preparatory work is necessary.

> *"I think it would be a so-called 'nice to have' […] I believe that our acceptance is something that has to be picked up elsewhere - not with the key figures."* [IP7]

Discussion and conclusion

Conclusions are derived from the analysis of the three hypotheses and their contribution to research are discussed. Finally, an outlook on potential further research opportunities will be given. The derivations resulting from the analysis of the respective categories and subcategories are described hereafter.

The success of the cloud transformation

Hypothesis 1: The success of an HR Cloud transformation depends on active participation in the fundamental digitization decision and the comprehensive, problem-free, time-acceptable digitization of a large part of the HR processes in an HR Cloud environment. It will have a positive influence on how people work in the HR department.

Considering all factors influencing the hypothesis, the following can be stated:

- The topic of standardization and efficiency improvement is reflected and positively accepted from the strategic level, through the selection criteria of an HR Cloud solution down to the operative level.

- The HR department itself is the main driver of digitization, with a clear focus on process improvement and harmonization. It can be assumed that the HR department itself will largely prioritize process digitisation, especially to increase process efficiency and to shift focus to the more strategic aspects of HR. It is interesting to note that it is assumed that the automation of operative HR tasks leads directly to a more strategic focus, which contradicts the findings of Marler (2009).

- Cultural change and technical restrictions are the potential stumbling blocks, with HR being responsible for the first one. Medium-sized and large companies explicitly cite negotiations with the works council as a further challenge which leads to the assumption that co-determination gains influence as the size of the company increases.

- The cost aspect has only been mentioned once, although this is the main driver for selecting a talent management solution, according to the study by Harris and Spencer (2018).

- Many HR processes have already been migrated to the HR Cloud, and further process migrations are pending. Prioritisation is managed by HR.

- The HR Cloud transformation is accompanied by a positive change in the working methods, especially the increase in efficiency of HR processes and the new approach to the solution itself.

In conclusion, it seems as if HR itself is the most significant success factor for a successful HR Cloud transformation and, above all, accompanying change management has a meaningful influence. Heikkilä et al. (2014) state that top management is often not involved in the decisions to introduce e-HRM and that external consultants replace the scarce internal resources (e.g. IT experts, HR process owners) and that they are also responsible for the implementation. The findings of this study are that the problems of limited resources have been addressed several times, but an explicit assumption of responsibility must be seen at both the operational and strategic management level. Concerning the

influence of the technology on the introduction of enterprise software, some studies present it either as high (Alam et al. 2016) or as non-decisive (Teo et al. 2007). The experts stated in the study that the HR Cloud has technical limitations (e.g. the lack of the possibility of a completely free process design or the perceived loss of control over the data through remote storage in the cloud), which can be attributed to a lack of experience with the new technology.

The Sierra-Cedar 2017-2018 HR Systems Survey (Harris and Spencer 2018) finds that 70% of companies that have a high level of cloud adoption approach the adoption of the cloud in HR management consistently, so awareness seems to be there. Close cooperation with the IT department for a deeper understanding of the solution also seems to be helpful. As far as decision factors are concerned, the findings are similar to those of Schalk et al. (2013), which have identified the increase in efficiency and repositioning of HR in the company using three case studies.

Actual KPI is used to control and optimize HR processes

Hypothesis 2: There are many HR metrics that are already used today to control and optimise HR processes.

Looking at the delivered key figures and the interviews, an ambiguous picture emerges when analysing the hypothesis:

- Although many key data have been collected in quantitative terms, they are not widely distributed across all HR process clusters. The number of core operating figures, such as compensation, is predominant.
- The compilation of these key figures takes time and effort, and the use of process control and optimization is limited. The derivation of concrete options for action takes place, but only once was it explicitly pointed out that the HR process has been improved by using key figures.
- The key figures are used to control operations, but not over the entire process landscape, but in individual HR processes.
- While half of the respondents see HR metrics as influencing the quality of work, the other half denies this or consider it to be of low impact. Here the divided picture shows up again.

HR KPIs are documented in the companies surveyed. However, this is by no means the case in all already digitized HR processes, but only in selected individual processes. Besides, the range of crucial figures recorded in these processes is limited with a strong focus on operative HR core processes (refer to figure 3). Even if these key figures are already used for controlling and optimizing, this only affects one part of the HR process map. The fact that only half of the respondents also see a connection between the key figures and the quality of work shows the overall significance of the topic. These findings are in line with the Sierra-Cedar Report (Harris and Spencer 2018), which states that just under

40% of companies conduct any form of analytics at all. Also, the figures collected there are mainly used in the context of compliance as well as risk mitigation and as a (cost) benchmark. The latter is indicative of the long-standing paradigm that the only purpose of HR is to improve a financial outcome (Bondarouk and Brewster 2016). This paradigm explains why many more KPIs were reported in the operative HR core and compensation cluster than in the talent management area.6.3. New KPIs enable the acceptance of new technologies

Hypothesis 3: The HR Cloud enables the derivation of new HR figures, which is accompanied by a higher acceptance of the new HR Cloud technology.

The last hypothesis can be contrasted by looking at the following points:

- Most of the companies investigated in this study have thought of KPIs during the HR Cloud transformation project (confirming Harris and Spencer (2018)).
- All respondents see cross-domain KPIs positively and see the possibilities of process optimization at the same time.
- Customer satisfaction is the driver for all experts, and the measurement of customer satisfaction is aimed for.
- The combination of KPIs from all HR process clusters enables a large quantity of derived KPIs that make the entire HR process chain measurable. This transparency also contributes to customer satisfaction.
- All experts see a positive correlation between the new KPIs and the acceptance of the cloud solution.

From these points, it can be concluded that the experts are aware that new KPIs can be generated from the HR Cloud and this directly contributes to customer satisfaction. These key figures only need to be developed conceptually and then implemented. It is remarkable, however, that the relationship between actual KPIs and the quality of work seems not to be as clear to the experts as it is to potential new KPIs.

Contribution to research, limitations and future research

By identifying success factors for HR Cloud transformations, a detailed review of the actual KPIs and the analysis of potential new vital figures, this study contributes to both research and practice.

The identification of the influencing factors offers the possibility to take them into account in the context of practice transformation and to mitigate the resulting risks. This contribution to the research is achieved by examining the adoption of e-HRM software in a cloud-based environment. There is no limitation to a specific HR process; there is a holistic assessment of the HR Cloud solution from an HR

point of view. The focus on the new HR Cloud technology will also become relevant for research and practice, as software manufacturers increasingly rely on cloud solutions (Wagner 2018) for mapping HR processes. The on-going substitution of legacy on-premise systems for HR Cloud solutions will lead to a further increase in HR Cloud transformation projects in the medium term.

This study also contributes to the field of HR analytics, both in research and in practical terms. On the one hand, an explicit reference is made to HR figures and their impact on the business, but on the other hand, their use is limited in practice. In this case, the study provides ideas on how key figures can be thought of differently and how critical figures generated by the new technology can be used profitably.

The limitations of this study resulted from the number of available HR experts, all of whom came from Germany and mostly use SAP Success Factors as an HR Cloud solution. Although the experts interviewed have a broad perspective on HR digitization in their companies due to their exposed position, this view is still limited and biased due to the pre-selection with a focus on HR experts in management positions. A multi-stakeholder approach can provide further insights (Bondarouk et al. 2009b; Bondarouk and Brewster 2016) as well as focussing on other employees working with e-HRM (Francis et al. 2014). The experience gained in day-to-day work is also limited, as the implementation projects have only been completed recently. The database of the currently recorded key figures is also limited to the interviewed companies. Here, more key figures were expected than delivered and the analysis was therefore limited. In principle, the temporal component is also a further limiting factor, since the faster development of HR Cloud solutions compared to on-premise systems influences the results of this study.

Future research in the field of software adoption may be based on the categories derived from this study. These could be used in a quantitative study, in which a wide range of end users of an HR Cloud are surveyed. These end users can be segmented according to different aspects, such as geography, business unit or cloud solution. A prerequisite is the increased maturity and adoption of HR Cloud solutions in companies.

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3.5. Article 5: "e-HRM in a cloud environment: Implementation and its adoption – A Systematic Literature Review –"

Title:	e-HRM in a cloud environment: Implementation and its adoption – A Systematic Literature Review –
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Abstract

The digitization of HR processes in companies continues to increase, and at the same time, the underlying technical basis is also developing at a rapid pace. Electronic human resources (e-HRM) solutions are used to map a variety of HR processes. However, the introduction of such systems has various consequences, which are not only technical but also imply organizational and functional changes within the organization. Additionally, the cloud environment contributes to enhance e-HRM capabilities and introduces new factors in its adoption.

A systematic review of the available literature on the different dimensions of electronic resources management was conducted to assess the current state of research in this field. This includes topics such as the evolution of e-HRM, its practical application, use of technology, implementation as well as HR analytics. By identifying and reviewing articles under e-HRM, IT technology and HR journals, it was possible to identify relevant controversial themes and gaps as well as limitations.

Introduction and objective

The subject of this systematic literature review is the digital transformation of human resources (HR) processes into new cloud-based environments. Armstrong (2014) defines human resource management (HRM) as the comprehensive approach to the recruitment, development, and management of individuals based on a variety of philosophies and theories, with a key aspect of HRM being on and contribution to the efficiency of an organization. The operationalization of HRM takes place through HR processes (Browne 2000) that reflect the range of processes from "hire to retire" (Dessler 2013). The digital transformation of HRM HR processes using electronic HRM solutions (Bondarouk and Ruël 2009), is increasing rapidly (Harris and Spencer 2018). Electronic HRM (e-HRM) is defined as the use of information technology to network and support at least two individual or several actors in the execution of HR activities (Strohmeier 2007) and its role as well as capabilities have evolved steadily over the last 60 years, from the simple provisioning of information (DeSanctis 1986) to process automation (Martinsons 1997) to the transformation of HR (Lengnick-Hall and Moritz 2003). The impact of e-HRM adoption goes hand in hand with the expectation of positive effects such as cost reduction, process quality improvement and also the repositioning of HR as a more strategic partner (Lengnick-Hall and Moritz 2003). The technological evolution of e-HRM systems has not only improved process digitisation (McFarlane 1984; Lin and Chen 2012) and thus influenced the way HR departments work (Snell 1995; Stone and Dulebohn 2013), it has also raised new questions with regard to data security of personal data (Zafar 2013; Lehnert and Dopfer-Hirth 2016) or other legal concerns (Wong and Thite 2009; Zafar 2013). One of the newest trends is cloud-based e-HRM solutions (from now on HR Cloud). Cloud computing is "a model for enabling ubiquitous, convenient, on-demand

network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction'' (Mell and Grance 2011). This new technology offers the possibility of comprehensive digitization of all HR processes within one single system, resulting in new ways of process integration as well as improved analytic capabilities for the HR department while at the same time reducing the implementation and maintenance efforts for the IT department (Harris and Spencer 2018; Ziebell et al. 2018). One question that arises with this new technology and the resulting process mapping is whether a new project management methodology (PMM) (Wagner 2011) approach should also be chosen during the digital transformation and how to measure project success (Ziebell et al. 2018).

Although e-HRM is a comparatively young field of research (Strohmeier 2007; Johnson et al. 2016), there have been a few articles since 2006 representing comprehensive literature research. Ngai and Wat (2006) focus on the perceived benefits as well as barriers to implementation and conclude that a large part of the research is based on conceptual studies. Strohmeier (2007) examines the literature and finds that the research field of e-HRM is very broad and that the research methodology is empirical rather than theoretical. Bondarouk and Ruël (2009) focus on the e-HRM definition and show how future research will be. This includes consideration of the multidisciplinary approach, as both HRM and IT are affected, as well as the repeated indication that theory-building research has been neglected so far. Strohmeier (2009) reviews the literature regarding the consequences of e-HRM and concludes that deeper research into that topic is needed. Marler and Fisher (2013) examine the relationship between e-HRM and strategic HRM and suggest more empirical research. Another approach is that of Geffen et al. (2013), who examine e-HRM literature in the context of multinational companies and conclude that the majority of research covers post-implementation questions such as e-HRM outcome and adoption. Also, they call for research in the e-HRM field to be oriented towards "larger" disciplines such as research in the IT area. Ruël and Bondarouk (2014) address in their review that although the number of researchers covering the e-HRM field increases, there is still a lack of theoretical background. Johnson et al. (2016) review the evolution of academic research as well as the practical application of e-HRM. They conclude that although research is progressing in the e-HRM field, the "interesting" questions such as how to effectively deploy e-HRM in an organization are not covered fully yet. They urge researches from both distinct disciplines, HR and IT, to work together to answer these questions. Wirtky et al. (2016) examine the literature regarding the question of what effect the digital HRM transformation should theoretically have; what effect it currently has and conclude that even more potential could be tapped. The latest review is conducted by Bondarouk et al. (2017b) who call for more research into adoption, which according to their findings depends less on generic than on human factors, and in the field of the consequences of e-HRM. Also, like some of the previous literature

research, they demand more theory before new empirical research can take place and to consider a multi-level analysis approach by starting to analyse the factors influencing adoption and effectiveness of e-HRM on the individual level up to the whole organisation.

This literature review aims to give an overview of the evolution and definition of e-HRM in general and of the HR processes digitized in it. Furthermore, the implementation of e-HRM, as well as the accompanying barriers and resulting benefits, are researched, with an emphasis on the adoption of these solutions. The literature on the associated legal and security issues is additionally revised. Finally, the topic of HR analytics which is enabled by new e-HRM technologies and impacts HR work significantly (van den Heuvel and Bondarouk 2017) is analyzed. The review concludes with the identification of research gaps within these diverse e-HRM topics with the aim to provide an impulse for further research. The objective of this review is to shed light on other aspects of e-HRM in addition to the area of evolution and adoption which are already extensively covered in other literature researches. These new aspects include digitized multi-functional HR processes, legal and IT security aspects as well as HR analytics. This systematic literature research is the first to comprehensively examine aspects of the digitization of HR processes in cloud-based e-HRM solutions as well as the resulting legal implications and new requirements for IT security.

Research methodology

"A systematic literature review is a means of evaluating and interpreting all available research relevant to a particular research question, topic area, or phenomenon of interest. Systematic reviews aim to present a fair evaluation of a research topic by using a trustworthy, rigorous, and auditable methodology" (Kitchenham and Charters 2007). Hart (1999) adds to that definition, maintaining that a systematic literature search provides an overview of what is already available in a certain field of interest, states what is currently being researched and identifies research gaps, which are then contrasted by own findings. Kitchenham and Charters (2007) divide the process of systematic literature research into three phases: planning, conducting and reporting the review, whereby the first two phases are iterative.

Planning the review

The qualitative research checklist (Critical Appraisal Skills Program 2013) was chosen as the basis for the selection of qualitatively relevant literature. Among other things, this checklist questions whether the studies indicate the research objectives, whether the right research methodology is chosen, whether the data collection fits the research question and whether the research itself is a valuable contribution to the scientific community. The focus is set on primary and secondary studies in

reputable, peer-reviewed journals to meet these requirements, as it is assumed that the peer review ensures compliance with the quality criteria listed above and thus also secures the reputation of the journal through its positioning within the scientific rankings such as the Thomson Reuters JCR 5-year impact factor and the Scimago Journal & Country Rank. The aim of narrowing the range of publications under review to ensure their internal as well as external validity. Also, prominent publishers (Emeraldinsight, ELSEVIER, IEEEexplore and Taylor & Francis), which include the publication from the different e-HRM dimensions, were also used for literature research. Conference proceedings, as well as books, were included. Literature was accessed via the Web of Science and Google Scholar.

The timeframe used for the search interval differed according to the specific topic. Articles published over 40 years ago were used, e.g. Tetz (1974) to provide a comprehensive picture of the historical development of e-HRM and its predecessors, with the increasing practical adoption of e-HRM from the late 1990s onward (Stanton and Coovert 2004; Strohmeier 2007; Johnson et al. 2016; Bondarouk et al. 2017b), during this time period research in this field increases as well resulting in more articles published. Newer topics, such as the use of cloud computing in the e-HRM context, are relatively new research areas and therefore there are no publications that date back more than five years. In general, however, articles published between 1974 and 2018 were considered.

During the literature review, a review protocol was created, which contained the search queries, the sources as well as the inclusion and exclusion criteria. For example, articles relating exclusively to HR management without reference to a digitalized environment were excluded from the study.

Conducting the review

Following the defined strategy in the planning phase, several search criteria were defined. A full text search was carried out with the help of search terms that not only contained general terms such as e-HRM, Human Resources Information System, HR Cloud, and HR Transformation, but also more extensive and combined search keywords such as talent management, recruiting, E-Learning, HR Process Transformation, (e-HRM-)IT adoption or special aspects such as legal implications and IT security. The latter, to avoid a too selective approach (Rodgers and Hunter 1994), narrowing down the search and the results too much. The definition of the search terms was developed in the course of multiple discussions by e-HRM experts.

Table 1 gives an overview of the general search terms used in the systematic review.

General terms
Digital HRM
e-HR
e-HR(M) (electronic human resources Management)
e-HRM
HRIS
HRIT
human resource information system
virtual HR
virtual HRM
HR cloud

Table 1: General search terms

The following table shows examples of search terms used in the context of HR analytics. These were combined both alone and in combination with the general search terms. For each of the individual subject areas (e.g. adoption, legal) search terms were defined and concatenated with the general search terms.

HR Analytics
business analytics
domain driven data mining
expertise analytics
HR analytics
HR data mining
key performance indicators
KPI
multi-criteria decision analysis
people analytics
talent metrics
workforce analytics

Table 2: HR Analytics search terms

The systematic approach, which uses search terms and defined quality requirements to make limitations in advance, can lead to relevant literature being left out (Boell and Cecez-Kecmanovic 2015), but it still guarantees the replicability and quantification of research (Webster and Watson 2002; Torraco 2005).

Reporting the review

The procedure for reporting the results was that the general search terms were used first and the duplicates (e.g. if the article is listed several times with different keywords) were removed from the results. Then categories were formed based on which the specific search terms (e.g. HR Analytics) were

derived. The procedure was then repeated. The articles that did not fit into the e-HRM topic area were then removed.

The following table summarises the results of the systematic literature review.

Area of research		# of papers
e-HRM in general	Evolution and definition	60
	Digital HR processes	46
Implementation and outcomes	Implementation and project management methodology	60
	Adoption, barriers and impact	121
	Legal and security issues	33
	HR Analytics	60
	e-HRM in a cloud-based environment	19
	Total unique documents reviewed	**365**

Table 3: Overview of review scope

A total of 365 unique documents were found to be relevant. These were categorized according to the following criteria:

- **e-HRM in general:** these are articles that deal with the evolution and definition of e-HRM as well as the HR processes that are currently digitized.

- **Implementation and outcomes:** research that deals with the implementation of e-HRM, how the technology is adopted as well as its impact are reviewed here. A special focus is put on the project management methodology to conduct the implementation as well as legal and security issues arising from it. The review concludes with a closer look at HR analytics and the impact of cloud technology in e-HRM.

During classification, an article can also be assigned to several subject areas, since different topics have been addressed. Not all the articles found during the review are referenced in the results section below since the same topic was dealt with in several articles but treated qualitatively differently. In these cases, the choice was in favor of the qualitatively more valuable article, but the references were retained.

Results

In the following paragraphs, the results of the literature search, divided according to the individual e-HRM dimensions, are presented. The general e-HRM topics, their implementation as well as the outcomes are reviewed.

e-HRM in general

In the following paragraphs, the results of the literature research on the evolution and the definition of e-HRM as well as the digitized processes.

Evolution and definition of e-HRM

It is argued that e-HRM began with the advent of the first computers in 1940 (Tetz 1974; McFarlane 1984; DeSanctis 1986; Raiden et al. 2001) and has evolved over several decades from information provisioning, to transaction automation (Mathys and LaVan 1982; Lederer 1984; Magnus and Grossman 1985; Weigert et al. 2017), to become the enabler of HR transformation (Kavanagh et al. 1990; Lengnick-Hall and Moritz 2003; Manuti and de Palma 2018; Petry 2018); as a results, it has become increasingly important to implement corporate strategy (Pyburn 1983; Marler and Parry 2016) and since 1995 a subject in academic literature (Strohmeier 2007). Lengnick-Hall and Moritz (2003) divide the evolution of e-HRM into the phases of information publication, process automation, and organizational transformation. Several articles reference the historical development of digitalizing HR processes as part of the literature review (DeSanctis 1986; Lengnick-Hall and Moritz 2003; Maatman 2006; Ruël and Bondarouk 2014; Fındıklı and Bayarçelik 2015; Johnson et al. 2016; Wirtky et al. 2016), but so far none has been found that exclusively covers that topic. Current application and technologic trends of e-HRM are constantly reviewed in the yearly Sierra-Cedar 2017-2018 HR Systems Survey (Harris and Spencer 2018), which gives a comprehensive look at the practical adoption of e-HRM. More than 1300 companies of different sizes and from different sectors provide an insight into how the digitization of HR is progressing. The new trend in e-HRM is cloud-based solutions (Johnson et al. 2016; Harris and Spencer 2018) which are not as widely researched in academia. The concept of the "Expert Cloud" for which an IT architecture is proposed, in which cost savings and efficiency improvements are named is one of the few concepts that establishes a connection between cloud computing and HR (Jafari Navimipour 2015; Jafari Navimipour et al. 2015a, b). In this concept, however, the focus is less on mapping the entire HR process cluster (Ziebell et al. 2018) in a cloud environment and more on an isolated application case in HR. Zapotocny (2015) demonstrates the advantages of a cloud-based Software as a Services (SaaS) solution for e-HRM but focuses above all on the advantages of IT such as the new licensing model or the externalization of maintenance efforts.

Various names are used in the context of e-HRM, for example, HRIS (Human Resources Information Systems) (Kavanagh et al. 1990) or "virtual HR" (Lepak and Snell 1998). Differentiation takes place according to the user of the HR system (Zafar 2013); either the HR department or all the employees of a company. Additionally, operational, relational and transformational characteristics are subject to their respective definitions (Lepak and Snell 1998). Strohmeier (2007) defines e-HRM as "the (planning,

implementation and) application of information technology for both networking and supporting at least two individual or collective actors in their shared performing of HR activities." Concerning the definition of the e-HRM term, Bondarouk and Ruël (2009) aptly state that this is an "umbrella term", which includes the integration between HR and technology to increase the value of the organization for employees. The exact definition and unambiguous definition of the term e-HRM is not clear from the literature, and so Bondarouk and Ruël (2009) demand a standardized definition. One of the newer definitions is given by Marler and Parry (2016) which state that "e-HRM consists of configurations of computer hardware, software and electronic networking resources that enable intended or actual HRM activities (e.g. policies, practices and services) through the coordination and control of individual and group-level data capture and information creation and communication within and across organizational boundaries."

Evolution and definition of e-HRM

In the context of the processes to be digitized, research focusses on several processes out of the HR process world (refer to figure 1, adapted and translated by permission from Springer Vieweg, Cloud Computing – Die Infrastruktur der Digitalisierung, (Vom traditionellen Personalmanagement hin zu e-HRM in der Cloud Implementierungsansätze einer digitalen Transformation) (Ziebell et al. 2018) @2018).
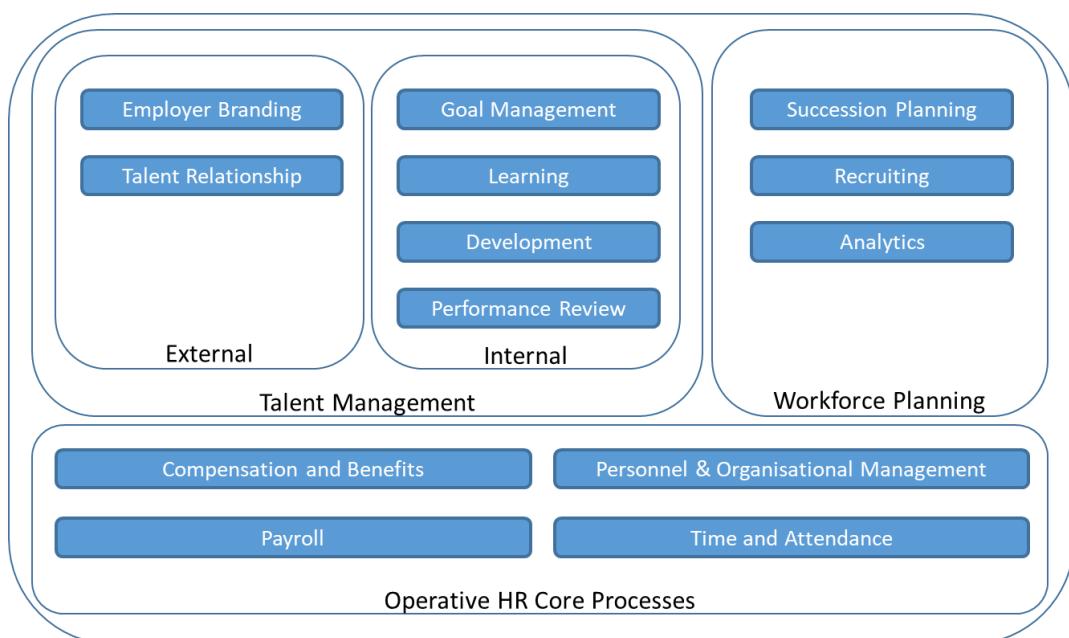
Figure 1: HR Process world (Ziebell et al. 2018)

Generally, the processes that are digitized in e-HRM can be classified into two types, according to their usage: "unsophisticated" and "sophisticated", whereby operative core processes are considered as

being "unsophisticated" while talent management and workforce planning are classified as "sophisticated" (Nagendra and Deshpande 2014).

Talent Management & Workforce Planning

Research in the area of talent management and e-HRM is quite diverse ranging from articles about human capital management, including performance management (Herington et al. 2013; Nura and Osman 2013; Tornack et al. 2014; Pilarski et al. 2016; Bohlouli et al. 2017) or the general value of e-HRM in the talent management context (Wiblen 2016) to specific research about e-Learning (Nichols 2003; Clark et al. 2003; Pocatilu et al. 2010; Stone et al. 2015; Fındıklı and Bayarçelik 2015; Colchester et al. 2017) or employee relationship management (Strohmeier 2013). Some special issues in certain processes are addresses for example how e-Learning can be made more efficient (Nichols 2003; Clark et al. 2003) or if its digitization is expedient (Pocatilu et al. 2010).

Combining different disciplines such as business process management in the context of recruiting and researching its impact is also a variation in that research area (Laumer et al. 2014). Bohlouli et al. (2017), for example, suggest the use of mathematical models to evaluate competencies. Tornack et al. (2014) note that the topic of competence management is already well supported, but succession planning has so far been less digitized. In succession planning, Pilarski et al. (2016) point out that digitization can help both to promote and retain (Nura and Osman 2013) internal talents better and to acquire external talent. Girard et al. (2013) examine the influence of new web technologies on recruitment practice and discover that the topics of employer branding and reputation management have been expanded. Wiblen (2016) draws attention to the extended analysis possibilities of e-HRM and the evidence-based decision-making possibilities in talent management based on it. At the same time, she questions why there have been few studies in the academic world on the role and influence of technology in talent management up to date. In the workforce planning cluster, recruitment is the dominant research topic (Pin et al. 2001; Furtmueller et al. 2011; Dhamija 2012; Girard et al. 2013; Maier et al. 2013; Laumer et al. 2014), followed by several articles about analytics (see **Fehler! V erweisquelle konnte nicht gefunden werden.** for a complete review) and succession planning (Brad Neary 2002; Nagendra and Deshpande 2014). These articles cover different aspects such as how the digitization of these processes contribute to the improvement of process quality and efficiency (Pilarski et al. 2016) or how digitization influenced a process change (B. Holm 2014).

Administrative Core Processes

The research regarding the administrative core processes in e-HRM is rather limited, although the Sierra-Cedar Survey 2017-2018 (Harris and Spencer 2018) states that the practical adoption rate of payroll solutions in companies is 98%. It is assumed that e-HRM solutions can deliver those background

processes (Strohmeier 2007), but the non-administrative application such as talent, workforce or strategic management (Grant and Newell 2013) are focussed in recent research. Dulebohn and Marler (2005) note that companies use e-HRM typically to automate the payroll, design the compensation system and administrate the compensation and benefits. The added value of using a system is the increase in accuracy and reduction in errors regarding the payroll processes (American Payroll Institute 2010). Using this data to get an overview of the pay structure is another benefit (Fay and Nardoni 2009). Dery et al. (2013) research the problems that occur when implementing an e-HRM system focussing on the payroll function. Additionally, administrative core processes, due to their standardized nature offer the chance to be outsourced completely to leverage costs efficiencies (Dickmann and Tyson 2005).

Implementation and outcome

The following subsections deal with the implementation of e-HRM systems, its adoption, addressing the barriers as well as the general impact. Legal and security issues are then addressed. The chapter closes with a literature overview of HR analytics and the impact of cloud technology on e-HRM.

Implementation and project management methodology

Not many studies deal alone with the implementation of e-HRM and those who do so deal with the lessons learned from these projects (Bondarouk 2011; Heikkilä et al. 2014) as well as with the influencing factors (Banerji 2013; Dery et al. 2013; Ngoc Duc et al. 2013; Heikkilä et al. 2014) rather than focus on each implementation step. Heikkilä et al. (2014) research the challenges when they introduce e-HRM in a multinational corporate and identify various barriers and challenges during the implementation process. They point out the special role of the consultant and the possible micropolitical challenges (e.g. power struggles between departments) in implementation. In addition, possible conflicts caused by a lack of IT knowledge or by the organisational balance of power are also addressed.

The following are also analysed: which strategic decisions generally influence the implementation of e-HRM (Schalk et al. 2013), to what extent an implementation is related to individual HR processes (Maier et al. 2013; Eckhardt et al. 2014) or how innovation can be enabled during the implementation process (Tansley et al. 2014). The few studies on the models deal with the question of the extent to which an implementation offers a competitive advantage (Beckers and Bsat 2002) or how the added value and the consequences of e-HRM could be measured (Stone et al. 2006; Stone and Lukaszewski 2009; Strohmeier 2009). While Roberts (1999) tries to develop an approach to calculate the return on investment but finds that much of the value is intangible, Strohmeier (2006) even deals explicitly with the contradictory statements about the advantages realized.

Research on project management methodology (PMM) is wider, including articles about PMM evolution (Garel 2013), classical (Neugebauer 2004; Wagner 2011) and agile (Boehm and Turner 2004; Komus 2013; Torrecilla-Salinas et al. 2016; Vlietland et al. 2016), mixed so-called hybrid approaches (Habermann 2012; Špundak 2014) or adaptions by companies (Schollerer 2016). All these different approaches bring advantages or disadvantages depending on different decision factors (project type, project size, industry, etc.) and thus have a direct influence on project success (Cooke-Davies and Arzymanow 2003; Wells 2012; Komus 2013; Joslin and Müller 2015). The maturity of the PMM in the industry is evaluated (Cooke-Davies and Arzymanow 2003) as well as how efficient certain approaches are (Schoeneberg 2011; Wells 2012; Joslin and Müller 2015). Only a few articles directly connect e-HRM with a certain methodology (Schuessler 2008; Wilson-Evered and Härtel 2009; Mohapatra and Patnaik 2011). Ziebell et al. (2016) conclude that a mix of different approaches, supported by strong change management, is the best way to meet the needs of HR Cloud transformations.

Adoption, barriers, and impact

Adoption

The adoption of IT, also in the context of e-HRM has been examined more widely. In principle, the factors influencing IT adoption are individual, external, organizational and technological while Bondarouk et al. (2017b) differentiate between technological, organisational and social factors influencing adoption.

The individual acceptance of technology, i.e., one's own perception, motivation, and attitude, are examined in various studies (Rogers 1995; Thong 1999; Martinsons and Chong 1999; Voermans and Veldhoven 2007; Delorme and Arcand 2010; Troshani et al. 2011). External factors such as regulations or competitive pressure within an industry, the country where the company is based, the culture as well as legal requirements have an influence on the adoption of IT (Olivas-Lujan et al. 2007; Sophonthummapharn 2009; Panayotopoulou et al. 2010; Oliveira and Martins 2010; Low et al. 2011; Masum et al. 2015). With regards to organisational determinants, company size, the skill and attitude of the workforce, individual roles, individual positions, as well as management commitment are to be named (Hussain et al. 2007; Voermans and Veldhoven 2007; Teo et al. 2007; Bondarouk et al. 2009b; Strohmeier and Kabst 2009; Troshani et al. 2011; Bellou 2016). In the context of technology, the technological readiness of an organization, the quality of the e-HRM implementation and the IT skills of the employees are mentioned (Ruël et al. 2007; Voermans and Veldhoven 2007; Oliveira and Martins 2010; Low et al. 2011; Maier et al. 2013). Another, namely the view of an external applicant on e-HRM give Stone et al. (2013).

Different theoretical approaches for measuring the adoption of e-HRM are used. The Technology Acceptance Model (TAM) (Davis 1986, 1989), which combines the perceived benefits of a system with its simplicity of use, is one of the approaches chosen (Maatman 2006; Voermans and Veldhoven 2007; Erdoğmu and Esen 2011; Nura and Osman 2012; Yusliza and Ramayah 2012). Yusliza and Ramayah (2012) use the TAM in their empirical study with 154 HR professionals and find that the attitude towards e-HRM correlates with the variables examined (e.g. the perceived use/contribution of e-HRM and the perceived ease of use of the system). Nevertheless, they point out that there are many more variables to be investigated and give recommendations for practical implementation and use. They also find that e-HRM is not suitable for every organization. Snicker (2013) applies the model the HR employee self-service at TAP Portugal airlines. A combination of the TAM approach with the Theory of Theory of Acceptance and Use of Technology (Venkatesh et al. 2016) is also used in e-HRM (Virdyananto et al. 2017). Other models such as the Technology Organisation Environment Framework (Tornatzky et al. 1990; Alam et al. 2016), the TOP Framework (Technology, Organisation and People) (Bondarouk et al. 2017a), or derived and combined models (Al-mobaideen et al. 2013; Chakraborty and Mansor 2013; Masum et al. 2015) are also used to evaluate the adoption. Njoku (2018) combines TAM with several other theories to analyse the contribution that e-HRM makes to business performance. Another scientific approach: the "regression analysis" is used by Lin (2011), who finds that e-HRM depends both on IT adoption and on the adoption of a virtual organization, where the entities of an organisation are detached but collaborate with the help of IT. He concludes that both have a positive influence on organizational innovation and derives recommendations for practical implementation.

Other studies focus on different aspects of the practical application and the influence of socio-cultural adoption. Thus, e-HRM application is differentiated according to countries (Ngai and Wat 2006; Hooi 2006; Panayotopoulou et al. 2007; Teo et al. 2007; Olivas-Lujan et al. 2007; Lau and Hooper 2009; Troshani et al. 2011; Nura and Osman 2013; Eckhardt et al. 2014; Masum et al. 2015; Alam et al. 2016; Bondarouk et al. 2016), company size (Hooi 2006; Nagendra and Deshpande 2014), the private (Ruël et al. 2004; Voermans and Veldhoven 2007; Olivas-Lujan et al. 2007; Kumar and Lalitha 2016) and the public sectors (Bondarouk et al. 2009b; Troshani et al. 2011; Alam et al. 2016) but also according to business processes (Varma and Gopal 2011; Eckhardt et al. 2014). A combination of the individual points to be investigated, such as the country, process, and sector or technology, is implicit. For example, Kumar and Lalitha (2016) investigate the recruitment processes in the private banking sector in India while Johnson and Diman (2017) focus on the adoption of cloud technology in small and medium size companies (SMEs).

Barriers & Impact

Studies on the impact of e-HRM, on the other hand, are common and can be divided into operative and strategic outcomes. Operative advantages include process automation to enable the efficiency of HR, cost savings due to headcount reduction as well as service improvement through the better quality and integrity of the provided information (Tansley et al. 2001; Lengnick-Hall and Moritz 2003; Ruel et al. 2004). Enabling the employee and make them a part of the HR process is named as well (Kovach et al. 2002; Beckers and Bsat 2002). Improved decision making from a broader and better database also offers as an advantage (Kovach and Cathcart 1999; Raiden et al. 2001; Raidén and Neale 2005). The practical realization of these advantages is confirmed in various case studies (Stone et al. 2013; Laumer et al. 2014; Thite 2014; Fındıklı and Bayarçelik 2015). Barriers mentioned include lack of funds or insufficient management commitment (Kovach and Cathcart 1999; Bondarouk et al. 2009b; Tomanna et al. 2018), initial project costs and maintenance (Beckers and Bsat 2002), and lack of know-how in both HR and IT (Ngai and Wat 2006; Kumar et al. 2013).

Chapman and Webster (2003), on the other hand, find that the use of technology has limited impact and success. In general, positive arguments such as possible efficiency gains and cost savings (Dhamija 2012; Kumar and Lalitha 2016) predominate, but disadvantages such as the exclusion of certain target groups, e.g. top management (Pin et al. 2001) through process digitization are also named.

The improvement of the strategic orientation and strategic partnership (Lepak and Snell 1998; Davis et al. 2000; Ruël et al. 2004) of the HR department is also mentioned frequently but research on how e-HRM can support this strategic transformation and its assessment, is more recent (Bondarouk and Ruël 2013; Grant and Newell 2013; Thite 2014; Bellou 2016; Marler and Parry 2016). Marler and Parry (2016) research whether technology enables strategic HRM or whether IT is just another instrument for implementing strategy. In their empirical study they find evidence for both, but these vary depending on the context (e.g. the external environment) and they conclude that the influence of external stakeholders must also be considered.

Legal and security challenges

The processing of personal data, which is the normal day-to-day work in the HR environment, requires particularly secure handling. The data protection requirements are typically set by national legislators (One Hundred Seventh Congress of the United States of America 2001; Poullet 2006; Public Low 107-347 2007), who define a legal framework within which the e-HRM systems must be adapted (Strohmeier and Kabst 2009). Hubbard et al. (1998) point out the ethical and legal implications in the context of e-HRM and conclude that the constantly changing legislative and regulatory requirements demand that both HR and e-HRM managers are aware and deal with these requirements, as otherwise

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there is the possibility of legal action. Zafar (2013) discusses the basic requirements for IT security in the e-HRM environment and how it can be improved. Lehnert and Dopfer-Hirth (2016) address the new requirements for e-HRM in the context of the new General Data Protection Regulation (GDPR) and above all how these are to be implemented technically. Other research focusses on the human factor in IT security in the e-HRM context (Eddy et al. 1999; Wong and Thite 2009).

Other articles deal with data security and legal requirements based on the technology used, such as cloud-based environments (Chow et al. 2009; Kandukuri et al. 2009; Kaufman 2009; Pearson and Benameur 2010; Chonka et al. 2011; Subashini and Kavitha 2011; Zissis and Lekkas 2012; Lothar Determann 2012; Chen and Zhao 2012; Rong et al. 2013; Wei et al. 2014; Odun-Ayo et al. 2017), but do not specify a particular (e-HRM) business process.

HR analytics

Assessing performance measurement cannot be conducted without defined metrics (Van Looy and Shafagatova 2016) which Lawler et al. (2004) differentiate between "HR analytics" and "HR metrics." HR metrics typically measure the outcomes of HRM that is to say: its efficiency, effectiveness or the impact of certain actions. HR analytics represent a statistical and experimental approach that can also be used to show the results of HR activities. Nevertheless, there are ambiguous definitions of terms in the literature that use the terms "metrics" and "analytics" interchangeably or combined (Pape 2015; Bassi and McMurrer 2016).

It is assumed in the literature that a combination of key figures from the area of finance (Huselid 1995) and the area of human resources such as employee turnover and absence (Guthrie 2001), employee satisfaction and commitment (Macky and Boxall 2007) can be applied to measure the efficiency of HR management. During the literature research, a focus was placed on the analysis of HR key figures made possible through the implementation of e-HRM and thus contribute to the measurability of efficiency.

Technological progress and the increasing availability of HR data have created the relatively new and aspiring field (Acito and Khatri 2014) of HR analytics, meaning the use of metrics to analyze HR data (Boudreau and Ramstad 2002; van den Heuvel and Bondarouk 2017). Until now, many companies have lacked the skills to implement HR analytics in the organization (Wolfe et al. 2006; Carlson and Kavanagh 2008). Nevertheless, it is questioned to what extent data analysis can offer added value for the organization and it is certain that a clear definition of the questions to be answered in advance is necessary (King 2016). However, answering questions about organizational problems must also lead to management's action, as this is the only way to create a beneficial situation for the organization (Carlson and Kavanagh 2008). Angrave et al. (2016) are critical of the use of HR analytics if the goal is to increase strategic influence at the management level (Lawler et al. 2004) while maintaining the

current practices of HR working methods while McIver et al. (2018) propose a way to realise organisational success when applying analytics. Research has also dealt with concrete applications of analytics in practice (Wei et al. 2015; Bassi and McMurrer 2016; Simón and Ferreiro 2018), its interpretation and impact (Chhinzer and Ghatehatehorde 2009; Khan and Tang 2016; Schiemann et al. 2018). The latest review which has been conducted by Marler and Boudreau (2017), concludes that since the practical adoption of HR analytics is rather limited, research has so far also been less extensive.

e-HRM in cloud-based environments

The literature dealing with the topic of e-HRM in cloud-based solutions is rather limited. Wang et al. (2016) develop a model for the implementation and usage of cloud technology for HRM in SMEs. Pande et al. (2012) review open source e-HRM solutions of which some are cloud-based and point out that this cloud technology offers SMEs the possibility to scale up their applications without having to invest in hardware which makes adoption more likely. Taniser (2016) examines the differences between on-premise and cloud-based e-HRM solutions and discusses different aspect such as the implementation or adoption of these practices and suggest managerial as well as theoretical implications. Other literature researches a specific HRM process, such as the cloud-based HRIS reporting (Hota and Mishra 2012) or skill and knowledge sharing via a cloud-based framework (Jafari Navimipour et al. 2015a, b). Some literature points out the relevance of future cloud-based e-HRM systems in theory (Bhargava 2012; Chakraborty and Mansor 2013) and practical application (Zapotocny 2015; Alamelu et al. 2016; Kansara et al. 2016). Chen (2014) defines a complete architecture to use cloud technology for HR while adoption is researched as well (Johnson and Diman 2017; Seo et al. 2019). Ziebell et al. (2018) propose a process model for successful e-HRM transformation into a cloud-based solution. Finally, Harris and Spencer (2018) conclude a technological shift from on-premise to cloud-based e-HRM solutions.

Conclusions, research gaps, and future research

The most diverse aspects of the e-HRM research field has already been examined, and this is also confirmed in various works which review the literature on this subject (Ngai and Wat 2006; Strohmeier 2007, 2009; Bondarouk and Ruël 2009; Marler and Fisher 2013; Ruël and Bondarouk 2014; Johnson et al. 2016; Wirtky et al. 2016; Marler and Boudreau 2017). However, the most recent literature review from Bondarouk et al. (2017b) as well as older ones (e.g. Ngai and Wat 2006b; Strohmeier 2007) cover publications up until 2010. In our research we include literature up to the year 2018, discussing recent publications that address topics related to new technologies (e.g. technological development of cloud-based e-HRM solutions) and thus contribute to research.

However, current literature deals with the historical development of e-HRM, its adoption and the potential that can be tapped after its introduction. Many of the publications studied are empirical (e.g. case studies), and there is a lack of theory building, and Strohmeier (2007) concludes that "the main and most detrimental inadequacy of current research is its primarily non-theoretical character." Our literature review confirms this assumption, goes along with the findings of the previous literature researches and agrees with Bondarouk et al. (2017b), who advocate more theoretical research before more empirical research can follow.

The influential adoption factors are classified as follows: technology, organization and people. The consequences of e-HRM are divided into three categories: operational, relational and transformational consequences. Bondarouks's work in the current review of e-HRM does this (Bondarouk et al. 2017b) and it is confirmed by our research. Further research could differentiate between e-HRM processes and how they differ in adoption and consequences, in the same way this article differentiates the process clusters in talent management, workforce planning, and administrative core processes. One of the findings resulting from the differentiated consideration of the process clusters is that the talent management cluster is examined more intensively than the administrative core processes; which may be because the administrative core processes are considered commodity, meaning to be perceived as standardised services (Harris and Spencer 2018). So far, HR suites that enable the mapping of entire HR process landscapes and their interaction with one another have not been found in current research.

While Bondarouk et al. (2017b) focus on the adoption and consequences of e-HRM procedure, this literature review contributes to the e-HRM topic by mentioning other aspects as the HR analytics and the cloud-related aspects.

As the practical application of cloud-based solutions is gaining momentum (Harris and Spencer 2018), research oriented towards its use in organizations cannot keep pace. Therefore, one of the contributions this review makes is to investigate the combination of e-HRM and cloud-based solutions while pointing out that further research in that field is necessary. New ways of implementing and adopting e-HRM due to the benefits cloud technology brings along as well as the practical implications for HRM in general need to be further investigated. It was found that so far there is little research in the area of process models for digital HR transformations. Especially cloud-based e-HRM solutions require a different approach, which is similar to ERP implementations with their closely defined process (Luo and Strong 2004; Ziebell et al. 2018). There are further possibilities for research here because the cloud-based e-HRM transformation will continue to advance (Harris and Spencer 2018). Legal aspects involve the requirements for the handling of personal data and the use of technology. This, in turn, involves safety aspects that must be considered. Up until now, the scientific discussion has been conducted based on the technology, i.e., the legal implications of cloud solutions in general

and on-premise HCM solutions. Research in cloud-based e-HRM solutions and the resulting legal and security-related topics is rare.

This also applies to other topics such as HR analytics, which benefit from new technologies. Although the adoption rates of HR analytics are comparatively low, research is not taking the lead here and investigates this topic in depth. It could open additional research fields, for example, those that describe which key figures are relevant, or which key figures can be used to measure the success of HR transformation projects.

Furthermore, it can be confirmed that e-HRM is a multidisciplinary topic in both HR and IT research. This is also reflected in the following table which shows that the publications take place in both HR and IT journals. Only journals with 5 or more publications that were found during the review are included in that list.

e-HRM Journal articles		Category	# articles
1	The International Journal of Human Resource Management	HR	20
2	Human Resource Management Review	HR	18
3	Human Resource Management	HR	14
4	Employee Relations	HR	12
5	Personnel Review	HR	10
6	Journal of Strategic Information Systems	IT	7
	Procedia - Social and Behavioral Sciences	Social Sciences	7
	MIS Quartely	IT	7

Table 4: Journal Rankings

The International Journal of Human Resource Management and Human Resource Management Review are those most prominent journals publishing reviews on e-HRM topics. It is noticeable that most e-HRM articles are published by HR journals, and only two IT journals appear on the list. This confirms the assumption that e-HRM is a scattered, multi-discipline research field (Strohmeier 2007), but that HR discipline is largely in the lead while IT journals have not dealt sufficiently with the subject. However, the research field e-HRM affects even more disciplines than HR and IT. There are overlaps with the disciplines of law and general project management, which are examined in this article.

About the findings, generally, the evolution of e-HRM is ongoing at a fast pace, with a wide practical adoption (Harris and Spencer 2018) which research is trying to catch up with and as several research disciplines are involved, there are still opportunities for further research at the points at which these various desciplines overlap.

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4. Discussion

In this work, three problems were identified from which the hypotheses were derived, which served as the basis for the articles. Each problem is now considered to what extent the articles could contribute to its solution.

Problem 1: It is not known what the optimal process model for transforming HR processes into a cloud-based e-HRM solution looks like.

Addressed in articles: 1, 2, 3, 5

The results of the articles are a derived process model for transforming HR processes into a cloud-based environment that has already been used several times in practice. Considering the classical, iterative and agile methods currently used in project management, a combination is developed that optimally meets the requirements of the HR area but also the technological limitations. The article also points out how potential pitfalls can be avoided.

Problem 2: It is not known which factors contribute to a successful HR Cloud transformation from an HR perspective.

Addressed in articles: 4, 5

The hypothesis that the success of an HR Cloud transformation depends on active participation in the fundamental digitisation decision and the comprehensive, trouble-free and time-compatible digitisation of a large part of HR processes in an HR Cloud environment, and that this has a positive impact on the way employees in the HR department work, was largely confirmed.

The active participation of the HR department in these transformation projects was emphasised, as was the fact that it is not just a purely technical reorganisation of processes in the cloud environment but most of all a cultural change that must be professionally accompanied by change management. The technical limitations of process migration resulting from the standardised processes in the cloud environment were also mentioned. The transformation is accompanied by a positive change in HR working methods, in particular an increase in the efficiency of HR processes.

Problem 3: It is not known whether companies currently use HR KPIs for HR process control/optimisation and whether the new HR Cloud technology can contribute by providing new KPIs.

Addressed in articles: 4, 5

The question about the HR key figures currently used was answered in that they at best represent a subarea of the HR process clusters and only measure selectively there. The application varies from simple reporting, to controlling, to active managing and to optimising HR processes. There are major

differences within companies as to which key figures are measured at all and no company measures across the entire HR process landscape. Furthermore, it is not certain to what extent the current key figures have a positive influence on working methods.

Regarding the new key figures offered by cloud-based solutions, there is a great openness, whereby it is anticipated that they will have a great impact on work quality and will increase the acceptance of the new cloud technology.

5. Conclusion

By deriving a process model for the transformation of HR processes into a cloud environment, by identifying success factors during implementation, by reviewing actual KPIs in detail and by analysing potential new KPIs, this work contributes to research and practice.

The derived process model can be used as a basis for practical application in transformation projects. The application of this model and the avoidance of the described pitfalls contribute to the success of the project. It also shows that the use of cloud technology not only offers economic advantages, but also opens the possibility of breaking new ground in terms of processes. Especially when it comes to process standardisation, potentials can be raised here that would not be possible in the on-premise area.

The identification of the influencing factors offers the possibility of taking them into account resulting in risk reduction during the implementation. The contribution to research is made by studying the adoption of e-HRM software in a cloud-based environment. In contrast to other articles, the entire HR process landscape is considered in this thesis and no limitation to individual processes was made. Since there is little experience with e-HRM solutions based on cloud technology, this thesis also contributes to pointing out the technological influence on and advantages for operational and strategic personnel work. In addition, the collected and derived metrics provide information on what is measured today and what actions are derived from it. The process model, the influencing factors as well as the metrics serve as a basis for further research work.

The process model can be used in further transformation projects and can be investigated and adapted, for example, through case studies. The limitation of this thesis results from the focus on the German market but also from the fact that most of the companies use the same cloud solution. Subsequent research projects can alter these variables and conduct a similar study outside Germany with other cloud solutions. Another possibility for research would be the application of qualitative research methods to a larger number of respondents. While the experts focused on the HR department, it would also be possible to survey employees from other areas. Only the limited use of the new cloud technology and the lack of experience in regular operation set the limits here.

In summary, all results show that the development of (cloud-based) e-HRM in general and its adoption in practice is progressing rapidly. Research has not yet been able to keep pace with this and must catch up quickly. Since this topic involves several research disciplines, there are plenty of opportunities for deeper research at the points where the topics overlap.

This doctoral thesis, or rather the cumulated articles, contributes a small part to the fact that HR transformations into cloud-based solutions were scientifically investigated in greater depth.

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7.   Attachments

The following attachments give a deeper insigt how the research for this thesis was conducted.

Article 4: Cover letter and questionnaire

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Robert-Christian Ziebell
Departamento de Organización de Empresas
Email: ziero@doctor.upv.es

Study: Cross-domain Human Resources Key Performance Indicators

Dear participant,

Thank you very much for your willingness to participate in this study. This study is conducted by me, Robert-Christian Ziebell, PhD student at the polytechnic university of Valencia.

The aim of this study is to identify and derive cross-domain HR Key Performance indicators (KPI), which are now available when using new technologies (e.g. HR Cloud solutions such as SAP SuccessFactors). You are supporting me with your participation to progress with my PhD thesis, which covers the question how companies can optimally carry out the digital transformation of HR.

Your responses will, of course, be kept confidential, will not be used for any other purpose outside this study and will not be shared. If you have any questions, please feel free to contact me any time.

1. Content and process of the study

The following figure shows that the study will be conducted in two steps.

Step 1: Introduction of the topic and questionnaire (Expected time: 15-20 min)

- Introduction of the topic
- Questionnaire
- Hand-over of HR KPIs

- Return Questionnaire
- Return HR KPIs
- Schedule interviews

Step 2: Interview (Expected time: 30 min)

- General HR Digitalization
- Derive cross-domain KPIs

1-2 Weeks
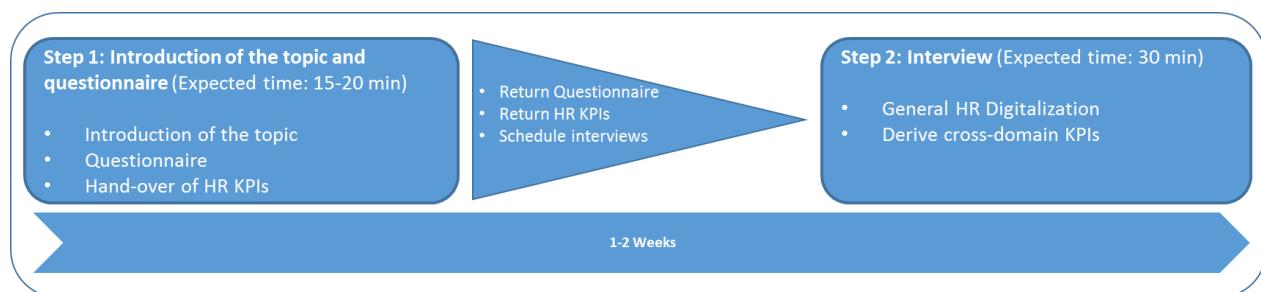
Figure 1: Two-step approach of the study

During **step 1** the research topic will be presented to you and a short questionnaire will be filled out to collect general information about you as well as your work in the company. Concluding, I would like

to ask you to provide me with the HR Key Performance Indicators (KPI) currently used in your company so that I can prepare myself optimally for the second step.

After the return of the questionnaire and the KPI documents, I will individually coordinate an interview appointment with you (on site or by telephone).

During the interview in **step 2**, we will cover two topics. On the one hand, I will ask you about the digitization of HR processes in general; on the other hand, we will try to identify and derive cross-domain KPIs.

I assume that you will need about 15-20 minutes to process the first part and the interviews will take about half an hour of your time.

If you have any further questions, please do not hesitate to contact me.

2. Introduction to the research topic

In the following, I present the research topic and show you what contribution you can make.

Today HR processes (refer to figure 2) are realised on proprietary stand-alone solution, which have no or only few interfaces in between each other. For example, there is a separate solution for e-Recruiting and another for Goal Management. Concluding, these single solutions do not offer a holistic HR process world, which in turn leads to the fact that cross-domain evaluations can only be realized with great effort.
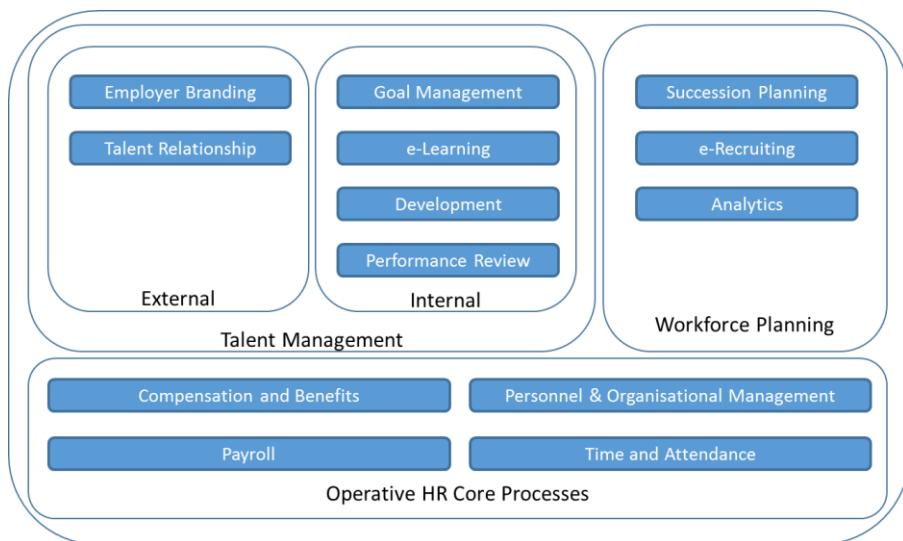
Figure 2: Overview of the HR process world

New technically innovative HR Cloud solutions (e.g. SAP SuccessFactors or Workday) offer a continuous process coverage as they digitize a majority of the HR process world in one suite. Thus, process interfaces (for example, in a target agreement, an e-Learning will be an objective, or the result of a

performance review has a direct influence on the compensation) already exist, and in addition, all process data is centrally available in one system. Figure 3 depicts the difference between the "old world", based on stand-alone solutions and the "new world" in an HR Cloud.
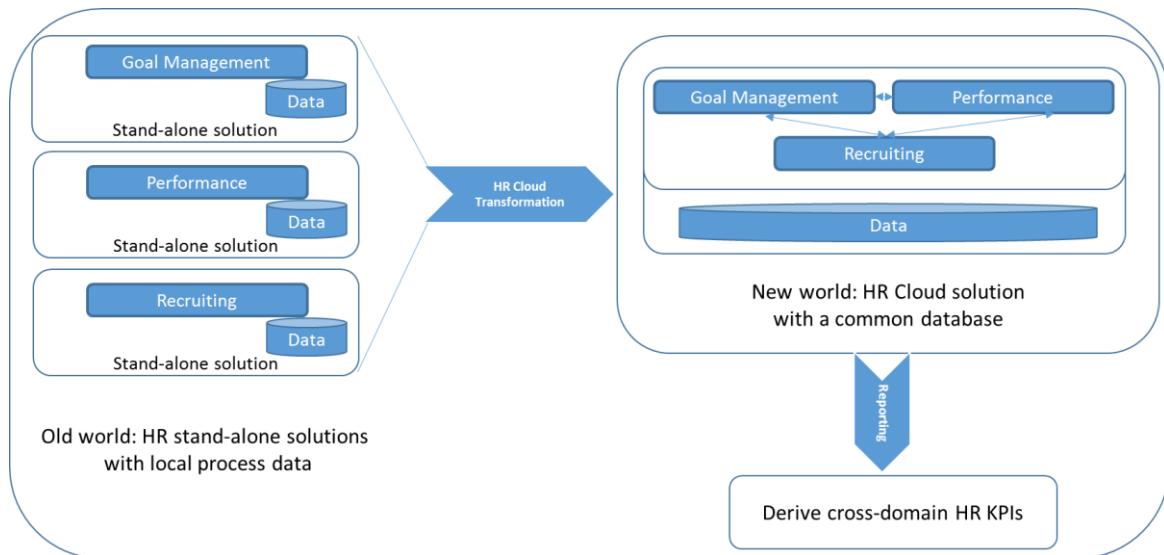

Figure 3: HR Transformation into an HR Cloud solution

Aim of this study

Your company already has an HR Cloud solution in place and some of your HR processes are already running there. Due to the integrative HR process world described above and the common data base, it is possible to derive new cross-domain KPIs. An example of this is the combination of recruiting KPIs with those of performance to answer the question how long it took to recruit (KPI data from recruiting) the high performers of the company (KPI data from performance).

The aim of this study is to develop together with you these new key figures. To get a better understanding of how your company is digitizing the processes in general, I will focus in that topic at the beginning.

Sending over your current HR Key Performance indicators

In order to prepare the interview, I need an overview of the HR KPIs you are currently using in your business unit. Please also let me also know, if you are currently not using any KPIs.

Please be aware: I do not need the concrete values (for example, the actual headcount in one area) from you. What I need from you is the information "how" you would measure the values.

Optimally, I would receive the KPIs in the following format from you:

Name of the KPI	Purpose of the KPI	Calculation	Area used
Time to hire	This KPI measures the time until a vacant position is filled again.	(Time when newly hired employee starts job) - (Time when position was vacant)	Recruiting
Headcount in business unit X	This KPI gives an overview of the internal and external employees in business unit X.	Amount of internal employees + amount of external people in business unit X.	Succession Planning

Table 1: Overview format HR KPIs

In the attachment to this mailing, you will find an Excel sheet (Status Quo - HR KPI.xlsx) which you can use to fill in your information.

Please send the sheet together with the following short questionnaire to the following address:

ziero@doctor.upv.es

I assure you that I will treat this data confidentially and that no direct conclusions will be possible on you or your company. If you have any questions, please do not hesitate to contact me.

Next steps

After sending the questionnaire and your HR KPIs, I will get back to you so that we can follow up with the interview.

I will provide you with the results of the study as soon as it is completed.

3. Questionnaire on personal information

First- and Last Name   _____

Industry of your company   _____

Amount of employees   _____

Which position do you hold in your company and for how long?

Please describe the main tasks in your position!

What is the business purpose of your area and where do you see your personal mission and value contribution?

Which concrete experiences did you already have in relation to "HR KPIs"?

In which function could you collect these experiences?

Contact: Robert-Christian Ziebell (ziero@doctor.upv.es)

All your data will be kept confidential and will not be passed on.

Article 4: Interview Guideline (German)

1. Begrüßung und Formales

2. HR Prozessdigitalisierung im Allgemeinen

   2.1. Welche HR Digitalisierungsstrategie verfolgt ihr Unternehmen?

   2.2. Wer ist der Treiber für das Thema HR Digitalisierung?

   2.3. Nach welchen Kriterien wird entschieden und priorisiert, welche HR Prozesse digitalisiert werden?

   2.4. Was waren die Stolpersteine / Hemmnisse bei der Umsetzung der Digitalisierung?

3. HR Prozesse in der HR Cloud

   3.1. Welche HR Prozesse (Recruiting, Learning, G&P, C&B, Profile, Nachfolgeplanung, Reporting) sind derzeit auf welcher Basis (on-premise, Cloud) bereits digitalisiert?

   3.2. Welche HR Prozesse sollen zukünftig noch digitalisiert werden und wo (lokale Lösung vs. Cloud)?

   3.3. Welche HR Cloud Lösung ist derzeit bei ihnen im Einsatz und wie lange schon?

   3.4. Warum haben sie sich für diese Lösung entschieden?

   3.5. Welchen Zeitraum haben sie für das Implementierungsprojekt angesetzt?

   3.6. Hat sich mit der Einführung der HR Cloud ihre Arbeitsweise geändert und wenn ja, wie?

   3.7. Wie bewerten Sie die Arbeitsweise nach Einführung der Cloud?

Stufe 2: Interviewleitfaden: Prozessübergreifende HR KPIs

4. IST HR KPIs – Bestandsaufnahme

   4.1. Haben sie das Thema HR KPIs im Rahmen der Cloud Migration überhaupt berücksichtigt und wenn ja inwiefern?

   4.2. Wer liefert ihnen diese Kennzahlen? Woher kommen die KPIs?

   4.3. Wofür nutzen sie diese IST HR Kennzahlen?

   4.4. Welche Kennzahlen/Auswertungen werden an welchen Verteiler weitergegeben?

   4.5. Haben diese IST KPIs einen Einfluss auf ihre Arbeitsqualität gehabt und wenn ja, welchen?

   4.6. Erhalten sie auch technische KPIs (Verfügbarkeiten) oder rein fachliche HR KPIs?

   4.7. Erhalten sie auch prozessdomainübergreifende KPIs und/oder korrelieren sie diese Daten später? Wenn ja, welche KPIs sind das?

5. HR SOLL KPI – Definition neuer prozessdomainübergreifender HR KPIs

5.1.   Welche Vorteile sehen sie durch eine durchgängige prozessübergreifende KPIs?

5.2.   Woran machen sie fest, dass sie einem guten Job gemacht haben und wie würden sie das messen? Stellen sie sich vor, sie könnten sich in einer beliebigen Frequenz quantitative Auswertungen über ihre Arbeit zukommen lassen – welche wären das?

5.3.   In welchem Format (alles in der Cloud vs. Download: Excel, Word, PPT, Mail, PDF, Online Report, Dashboard) und Frequenz (wie oft) benötigen sie diese KPIs?

5.4.   Hätten/haben diese neuen prozessübergreifenden KPIs einen Einfluss auf die Akzeptanz der HR Cloud Lösung und wenn ja, welchen?

6.   Danksagung und Beenden des Interviews

Article 4: Interview Guideline (English)

1. Welcome and formalities

2. HR process digitization in general

    2.1. Which HR digitisation strategy does your company pursue?

    2.2. Who is the driver for HR digitisation?

    2.3. Which criteria are used to decide and prioritise which HR processes are to be digitised?

    2.4. What were the stumbling blocks / obstacles in the implementation of digitisation?

3. HR processes in the HR Cloud

    3.1. Which HR processes (recruiting, learning, G&P, C&B, profiles, succession planning, reporting) are currently already digitized and on which basis (on-premise, cloud)?

    3.2. Which HR processes will be digitized in the future and where (on-premise vs. cloud)?

    3.3. Which HR cloud solution is currently in use with them and for how long?

    3.4. Why did you choose this solution?

    3.5. What is the timeframe for the implementation project?

    3.6. Has the introduction of the HR Cloud changed the way they work and if so, how?

    3.7. How do you rate the way you work after the introduction of the cloud?

Stage 2: Interview guide: Cross-domain HR KPIs

4. IST HR KPIs – currently in use

    4.1. Have you even considered the topic of HR KPIs in the context of cloud migration and, if so, to what extent?

    4.2. Who provides them with these KPIs? Where do the KPIs come from?

    4.3. What do they use these IST HR metrics for?

    4.4. Which key figures/evaluations are passed on to which distributor?

    4.5. Have these IST KPIs had an influence on their quality of work and if so, which?

    4.6. Do they also receive technical KPIs (availabilities) or purely technical HR KPIs?

    4.7. Do they also receive cross-process domain KPIs and/or do they correlate these data later? If so, which KPIs are they?

5. HR TARGET KPI - Definition of new cross-domain HR KPIs

    5.1. What advantages do you see from a consistent cross-domain KPI?

    5.2. How do you know that you have done a good job and how would you measure that? Imagine you could get quantitative evaluations of your work at any frequency - what would that be?

5.3 In which format (everything in the cloud vs. download: Excel, Word, PPT, Mail, PDF, Online Report, Dashboard) and frequency (how often) do you need these KPIs?

5.4 Would these new cross-process KPIs have an influence on the acceptance of the HR Cloud solution and if so, which one?

6. Thank you and end of the interview

Article 4: Codebook for qualitative analysis

Codesystem

1 Digitalisierungsstrategie

    1.1 Standardisierung & Harmonisierung

    1.2 Effizienzsteigerung

    1.3 Grundsätzlich Digitalisieren

    1.4 Datenqualität

2 Treiber der Digitalisierung in der Organisation

    2.1 Business Unit: HR / Change Office / Board

    2.2 IT

3 Priorisierung in der Umsetzung

    3.1 Prio: Effizienzssteigerung & Prozessharmonisierung

    3.2 Prio: Machtpromotor oder unbekannt

    3.3 Prio: Logische Abhängigkeiten der Prozesse & holistischer Ansat

4 Stolpersteine / Hemmnisse bei der Umsetzung

    4.1 Kultureller Wandel

    4.2 Technische EInschränkungen

    4.3 Ressourcen und Know-How

    4.4 Betriebsrat und Mitbestimmung

    4.5 Fachliche Konzeption

    4.6 Interne Organisation und Governance

    4.7 Kosten

5 HR Prozesscluster und Ort der Digitalisierung

    5.1 Cloud

        5.1.1 Recruiting optional On- und Offboarding

        5.1.2 Performance & Goal Management

        5.1.3 Succession und Development

        5.1.4 Compensation

        5.1.5 Learning

        5.1.6 PA und OM

Article 5: Search terms

General terms	Evolution & Definition	Digitised Processes
Digital HRM	definition	applicant screening
e-HR	evolution	e-learning
e-HR(M) (electronic human resources Management)	historic development	e-selection
e-HRM	history	performance management
HRIS	literature review	recruiting
HRIT	personnel Management systems	talent management
human resource information system		employer branding
virtual HR		administrative processes
virtual HRM		workforce planning
HR cloud		

legal, data protection & security	project management methodology for digital (HR) transformations	Cloud
data protection	agile	expert cloud
data security	application	HR cloud
information and communication security	capability maturity model (cMMi)	
information security	classic approaches	
it-security	Management by projects	
legal implications	migration	
legislation	project context	
Network security	project evaluation	
policy	project experience	
privacy	project governance	
privacy protection issues	project management	
risk analysis	project management methodologies	
risk assessment	project success analysis framework	
secure computation auditing	risk assessment	
security	SCRUM	
security architecture	software engineering	
security concerns	standard model	
security legislation	transformation	
security model	waterfall model	
security policies	web engineering	
trust		
trust issues		

Technology - Adoption	Technology implementation, benefits and barriers	HR Analytics
acceptance	adoption factors	business analytics
adoption	attitudes	domain driven data mining
case studies	barriers	expertise analytics
cloud computing	benefits	HR analytics
consequences	consequences	HR data mining
outcomes	cost efficiency	key performance indicators
perceived Usefulness	deployment	KPI
software as a service	effectivness	multi-criteria decision analysis
technology acceptance model	employee attitudes	people analytics
Unified theory of acceptance	impact	talent metrics
user acceptance	implementation	workforce analytics
white papers	influcnes	
	influencing determinants	
	influencing factors	
	operational benefits	
	organisation effectivness	
	organisational performance	
	outcomes	
	perceived usefulness	
	service qualitay	
	social influence	
	strategic benefits	
	strategic HRM	
	transformation	