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Implications of the Digitalization on Human-Resource-Controlling

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Abstract: The advancing digital transformation is increasing the cost pressure on companies. People's work performance needs to be re-evaluated. Therefore, efficient Human-Resource-Controlling (HR-Controlling) with increased use of technologies promises companies a sustainable improvement in their financial situation. This paper shows the potential of the recent digital technologies on HR-Controlling, such as Big Data or Advanced Analytics. To demonstrate the impacts of the digital transformation on HR-Controlling, an empirical study with Austrian companies has been done. As a result, the most promising technologies for each stage in the HR-Controlling-loop are shown to increase the efficiency in HR-Controlling.

Keywords: Advanced Analytics; Big Data; Controlling; Digitalization; HR-Controlling-Loop; Human-Resources

1 INTRODUCTION

A trend, which was known for several years, has been intensifying recently: Human-Resource must demonstrate the value added and successes that investments in HR processes lead to [1]. Still, Human-Resource-Controlling is an underrepresented discipline in many companies. Companies underestimate the contribution of personnel controlling to their value creation. The fact that this can cause long-term damage to the company is often not perceived or only noticed when it is too late. On the other hand, companies are facing new challenges [2]. Especially in times of crisis, many HR departments are busy managing the company. Unfortunately, there is a lack of key figures and statistics at the push of a button, as well as scenario-oriented HR forecasting tools. However, to emerge successfully from a crisis, these tools are needed. Even without a crisis, they are immensely important: shortages of skilled workers, international workforce developments, etc. must be well managed [3].

Recent developments in digital technologies support also approaches in the field of controlling. The application of innovative technologies like HR-software systems, Artificial Intelligence, Big Data or In-Memory-Computing promise potentials in data consistency, time and resource savings, which have a direct impact on the planning, steering and monitoring [4]. HR-Controlling moves away from traditional reporting in the direction of forecasts and scenarios. The maximization of key figures is thus replaced by an understanding of interrelationships, which is reflected, among other things, in better and more comprehensible decision-making and in the identification of risks [1].

According to a survey of IDC, 74.1% of the most successful enterprises use a HR-Management-Software-System for their HR agendas [5]. Although the benefits of a software support are known, like data consistency and therefore, time and resource savings, companies are still insecure which specific impact with the use of an innovative digital technology occurs [6].

2 RESEARCH PURPOSE AND METHODOLOGY

This paper emphasis on the impact of digitalization in the field of HR-Controlling. Within the paper the following research questions will be answered:

- How can digital technologies help in HR-Controlling to demonstrate the added value?
- What innovative digital technologies are used in Austrian companies in each step of the HR-Controlling loop?

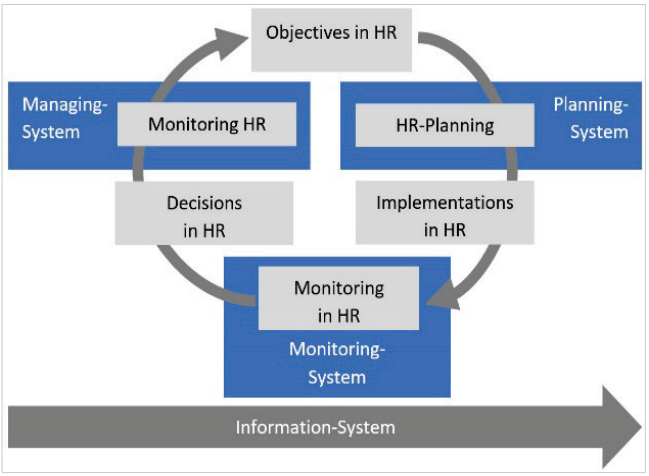

Figure 1 HR-Controlling loop [14, 16]

For this purpose, initially fundamentals of HR-Controlling are outlined, and the main tasks are described. The results of the subsequent impact analysis of digital technologies are then merged with the areas in Human-Resource-Controlling. To get a statement on the relevance of these tools for the company's success, an empirical study in Austria's small and medium sized companies is introduced. Therefore, the online tool "Lime Survey" was chosen as a survey software based on appropriate quantities on other research projects at the University of Applied Sciences Joanneum, Industrial Management. Therefore, 22 questions have been sent to 1,861 Austrian companies, excluding

companies, which have less than nine employees. Whereby 136 companies participated, mostly employees of the HR department. As a result, the most often used digital technologies for each stage in the HR-Controlling-loop are shown.

3 FINANCIAL SUSTAINABILITY THROUGH DIGITAL TECHNOLOGIES IN HR-CONTROLLING

3.1 Human-Resource-Controlling to Display the Value Creation of Labour

In the rapidly changing and increasingly complex realities of today's knowledge-based business world, the awareness of the HR function as a central role in the corporate value creation process is critical to the quality and sustainability of a company's success [7]. Controlling is the sum of all measures that serve to coordinate the management areas of planning, steering, monitoring, and informing in such a way that the company's goals are optimally achieved [8]. Therefore, controlling means the control, regulation and steering of a company. Subsequently controlling takes care of securing the company's existence by increasing the value creation and supporting the management [9, 10]. Interpreted in terms of HR, Human-Resource-Controlling is a sub-function of personnel management that monitors an optimal ratio of personnel-related expenditures to personnel-related earnings, considering current and future economic developments in the company and its environment [11]. This involves both planning, objective assessment, and the recommendation of targeted HR-measures to optimize the performance of personnel and human resources work.

Human-Resource-Controlling will be found in various forms in companies in 2022. It represents an area of personnel management as well as controlling in companies. The way in which it is implemented varies in practice from company to company [12]. In the past, HR controlling had a strongly administrative character and primarily provided information about what had already happened. For example, an attempt was made to achieve cost transparency and to show the employment structures and attendances of employees. Accordingly, personnel costs and remaining vacation days are still the most important key figures [1]. The focus of the historically grown HR-Controlling is basically the consideration of the quantity as well as the quality of the employees' work [13]. Optimizations regarding employees are managed and monitored by HR-Controlling. Controlling thus creates transparency in terms of performance, costs, and results [12].

HR-Controlling can therefore also make use of the controlling loop [14]:

- In HR-Controlling, personnel targets are derived from the corporate objectives and target values are defined for the corresponding goals (planning-system).
- In the next step, the personnel controller measures the current actual values. The comparison of actual values with the planned target values indicates any need for action. In the event of discrepancies between actual and target values, these are analysed by the HR controller (monitoring-system).
- Based on the results of the analysis, corrective actions are implemented by managers, and the HR controller can/should make recommendations regarding corrective actions (managing-system).

HR-Controlling should thus provide a planning reaction and control system, which is supported by all different systems through the personnel information system to increase the quality of information [15].

3.2 Potentials of Digital Technologies in HR-Controlling

Due to the rapid rate of digitization, new possibilities are constantly emerging to plan, monitor and manage Human-Resource-Activities. Digital technologies will fundamentally change the quality of information. According to Peter Drucker, *"If you can't measure it, you can't manage it"*, the importance of gaining and collecting information is evident [17]. To guarantee high-quality analysis, tools must be synchronized, and the data must be accessible at a central location and regularly collected and validated. Software tools like an Enterprise-Resource-system (ERP) combined with a Data Warehouse (DWH) or Big Data, HR-Analytics, and Robotic-Process-Automation (RPA) are widely considered of being high relevance for HR-Controlling, significantly contributing to plan, monitor and manage HR activities.

- Companies usually use ***ERP and DWH systems*** to support, integrate and automate their business processes. An ERP system consists of modules that communicate with each other and share a database. Every application, often referred to as a software module, typically focuses on one business area, for example, finance, controlling, human resources, sales, and logistics [18]. By using an in-memory database inside an ERP, transactional and analytical data can be managed in a system in real time [19]. Although ERP systems are powerful instruments mapping business processes and resources in one consistent system, they are not the preferred approach for an integrated solution in terms of planning, monitoring, and managing HR activities. With the extension of special tools like business intelligence systems (BI), HR-Controlling can achieve a new level of relevance. BI systems focus on corporate planning and reporting and are integrated with ERP systems. BI systems support controlling by using modern information technologies, for example a DWH or Big Data technologies. Data Warehouse Systems provide and integrate aggregated information from multiple sources [20]. DWH enable to perform complex queries and analyses and handle large amounts of data [21]. Concerning HR-Controlling the benefit of these software applications is evident. In addition to historical data, present data and many other data can be used to create analyses, reports, and queries for the HR area [22].
- The concept of ***Big Data*** rests on in-memory platforms aiming at integrating and analysing huge amounts of various data coming from different internal and external sources. In-Memory computing is a new storage technology, where data is no longer stored on hard disks,

but constantly provided in the random-access memory of the information system. Therefore, Big Data allows a constant monitoring of relevant data sources in real-time, leading to an event-triggered analysis and can be utilized to predict and forecast future developments [23]. While the concept of Big Data is still open for discussion [24], Big Data will revolutionize the established ways of making decisions and making sense of the prevailing realities [25]. Regarding the retention of employees for example, Big Data is used to perform probability calculations for the respective employee to perform a match between career opportunities in the company and the development desires of the person [26]. By linking data from different sources, Big Data opens completely new dimensions in strategic HR corporate planning. Internal personnel, financial and production data can be combined with external, macroeconomic data (e.g. changes in labour markets, demographic developments, competitive situation) and analysed more precisely than ever before from a holistic perspective [27].

- ***HR Analytics*** or People Analytics refers to projects that use, actively collect, and evaluate data from employees and workers. HR Analytics is part of the concept of business intelligence and consists of several sub-processes, which are built on one another: Based on *descriptive analytics*, which considers data from the past, like number of employees or fluctuation rate. In this first process step querying and searching analyses are mostly applied. Online-Analytical-Processing (OLAP) software systems, like a DWH, act as a basis and enable the user to quickly access a wide range of information [28]. In the second step *diagnostics* measures the relationship between two variables to understand the driver or explanation for what happened, e.g. job satisfaction vs retention or engagement vs profitability [22]. Building upon this, *predictive* analysis relates data of the past (reporting) with data of the present (monitoring) and recognizes samples, interrelationships, and meanings. With data mining in the background, predictions for the future are possible, for example training programmes predicts sales outcomes or changes in LinkedIn profile predicts absenteeism [28, 22]. HR-Analytics, however, are not solely measures, but rather represent statistical techniques and experimental approaches that can be used to measure the impact of HR activities [29, 30]. Thus, HR Analytics provides HR management with objective decision-making aids.
- The automation of standardized processes with so-called ***Robotic Process Automation*** (RPA) promises to relieve the burden on employees, an acceleration of the processes and therefore creates capacities for value-adding activities. Software robots, analyse extensive data sets, recognize algorithms and with these patterns repetitive standardized processes can be automated. An example for the application of RPA in the HR-controlling area is the providing of all the necessary documents and contracts after the recruitment notice [30, 32]. Going one step further, the combination of RPA with Artificial Intelligence like machine learning, leads to Intelligent Process Automation (IPA). In this case the software learns from human users by identifying and evaluating their behavioural patterns and interprets human activities using historical and current data. In addition, a robot with such abilities can also question decisions and thus gain experience. After an extensive learning phase, robots can also work independently [33].

4 IMPACTS OF DIGITALIZATION ON THE HR-CONTROLLING IN AUSTRIAN COMPANIES

To demonstrate the impacts of the previous presented digital technologies on HR-Controlling, an empirical study with Austrian companies has been done. An online survey was chosen as research methodology. Therefore, 22 questions have been sent to a total of 1,861 Austrian companies, excluding companies which have less than nine employees. Whereby 136 companies participated, mostly employees of the HR department. For this paper, relevant excerpts of the survey, with a special emphasize on the impacts on the three main stages of the controlling loop, are shown.

82,7% of the respondents stated that they had already dealt with HR-Controlling. The awareness for the contribution of HR-Controlling for the financial sustainability is certain, however, it must be considered that 37,5% of the participants have worked in the HR department.

67,9% of the total number see the greatest benefit on the application of digital technologies in the operative HR-Controlling. Considering this result, digitalization has a substantial impact on the efficient conduction of daily business, e.g. key figure systems or HR cost analysis. 13,5% detect benefits in the strategic area of HR-Controlling by using digital technologies. The remaining votes don't see a gaining for the HR-Controlling.

The deployment of digital technologies in the HR-management context results in the following: 70,4% of the participants use an ERP-system with the module in Human Resource for HR-management agendas. 34,6% use HR-Analytics and 25,9% optimise tasks with the application of Big Data. Only 2,5% work with RPA in the HR-area. Whereas ERP-systems have a long history in supporting companies within their resource-planning-process, the new technologies like HR-Analytics, Big Data or RPA are less used in Austrian companies.

4.1 Efficiency in HR-Controlling

Nevertheless, 89,6% of the participants think that with the application of digital technologies an increase in efficiency for the HR-Controlling can be fulfilled. Also, 66,2% believe that the implementation of an effective HR-Controlling is well supported through digital possibilities. More than one third of the participants identified time savings with the use of digitalization in HR-Controlling between 20-30%. Almost 20% think that more than 40% of the time for executing controlling tasks can be saved. Considering the cost savings with the application of digital technologies in HR-Controlling, 58,4% of the participants

indicated that 2-5% are realistic. 26% stated that cost savings more than 6% are possible. 15,6% of the participants only see savings less than 1% or even no cost savings.

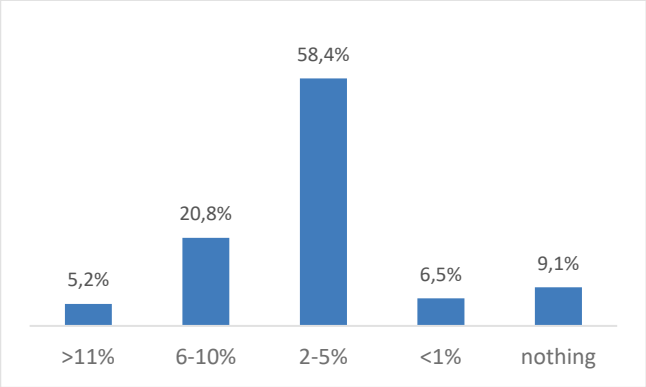

Figure 2 Estimated cost savings in HR-Controlling with digital technologies

4.2 Digitalization in the Planning-System

Based on the HR-Controlling-loop (Fig. 1) companies submitted that the highest relevance of new digital technologies for the planning-system in HR-Controlling plays HR-Analytics. 86,1% of the participants think that this approach is relevant or rather relevant. Therefore, descriptive analytics, diagnostics, or even predictive analysis to foresee future developments are highly important for personnel budgeting or annual staff planning. 80,6% stated that Big Data has a relevance in the planning processes of HR-Controlling. The management of data with the "Four V – Volatility, Volume, Velocity and Visibility" in the planning context promises a high influence. The relevance of RPA or Artificial Intelligence in the planning-system of HR-Controlling is indifferent. 51,4% see that this concept is relevant or rather relevant – the other half hasn't recognized an impact.

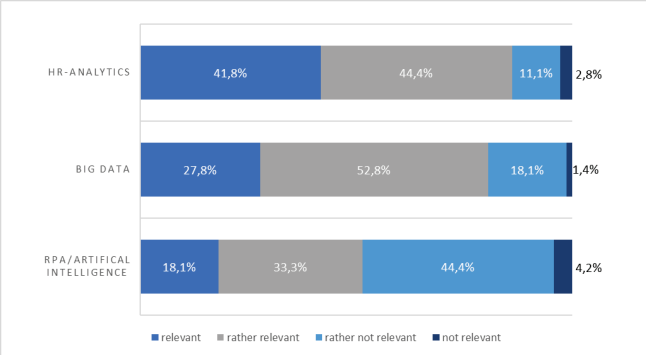

Figure 3 Relevance of new technologies in the planning-system

4.3 Digitalization in the Monitoring-System

The figure below visualises the evaluation of the empirical survey with the relevance of new technologies in the monitoring-system of HR-Controlling. In addition, in this process step HR-Analytics is the most important approach for the participants. 87,5% stated a relevance - deviation analyses or KPIs in HR-Controlling refer to HR-Analytics. According to the diagram, Big Data has a high significance to the monitoring-system. 75% indicated a relevance in this HR-process-step. Artificial Intelligence in the context of RPA is for more than a half of the participants relevant this stage.

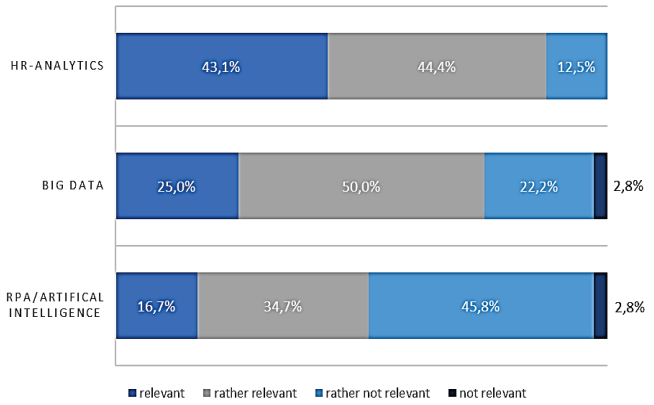

Figure 4 Relevance of new technologies in the monitoring-system

4.4 Digitalization in the Management-System

Fig. 5 shows the assessment of the relevance for new technologies in the management-system of the HR-controlling-loop. HR-Analytics is highly relevant for the participants in this process step (41,7%), followed by Big Data (26,4%). Artificial Intelligence is considered very relevant by 11,1%. According to the surveyed, reporting or staff forecasting, for example, can be optimised with the application of HR-Analytics. The needs of the employees are focused more strongly – the right course can be set, and costs saved.

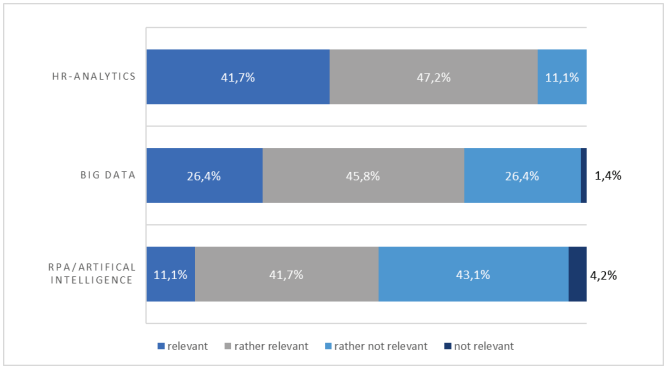

Figure 5 Relevance of new technologies in the management-system

5 CONCLUSION

Especially in times of crisis as well as in a world of constant changes, increasing competition and hence growing cost pressure, enterprises must optimise their processes for their financial sustainability. Working in today's digital age is characterized by the intense use of digital technologies and (as a result) increased flexibility. Thus, HR-Controlling is a comprehensive approach to plan, monitor and manage tasks in Human Resource. Thanks to ongoing process analysis, HR-Controlling identifies and implements improvement

opportunities for the HR department. This ensures consistent optimization and stability of HR processes. Moreover, the standardization of processes with the aim of increasing the automation in HR is focused. In this paper, we showed the benefits of using digital technologies in HR-Controlling. Afterwards we have examined the implications and relevance of modern digital technologies in the specific context of HR-Controlling. For this purpose, we asked companies for their assessment on the relevance of selected technologies on the HR-Controlling-loop.

According to the participants HR-Analytics is the most promising digital technology considering the relevance in the planning-, monitoring- and management system of the HR-Controlling-loop. Nevertheless, only a little more than a third used HR-Analytics to optimise personnel controlling. The most widely used tool is the ERP-system, which plays a central role in the digitalization strategy of companies. Big Data, a concept that integrates and analyses huge amounts of different data, is perceived as relevant in all the three stages by most of the participants, although only about a quarter is using it. RPA, which is a tool, that automatises standardized processes, is considered as particularly relevant in managing HR activities, although only 2,5% of Austrian companies work with this possibility in HR. Furthermore, the connection of RPA and artificial intelligence is very promising, and companies must confront themselves with this new technology. Almost 90% stated that with the application of digital technologies efficiency gains in HR-Controlling could be achieved. However, Austrian companies have recognized the benefits of new technologies for HR-Controlling, but the holistic use of these concepts is still a long way to go for enterprises.

Notice

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6 REFERENCES

[1] Brence, F. (n.d.). *HR-Controlling 2.0*. Deloitte. https://www2.deloitte.com/at/de/seiten/human-capital/artikel/hr-controlling.html (Accessed: 22.02.2022).

[2] Wickel-Kirsch, S. (2018). Anforderungen an Personal-controlling: (Weiter-)Entwicklungen im Personalcontrolling in den letzten 25 Jahren. In: Kochhan, C. & Moutchnik, A. (ed): *Media Management: Ein interdisziplinäres Kompendium* (pp. 28-42). Berlin: Springer. (in German) https://doi.org/10.1007/978-3-658-23297-9_2

[3] Göttman, K. & Plößer, M. *Zahlen, bitte! HR Analytics – Mit belastbaren HR-Daten bessere Entscheidungen fällen.* HR heute. https://www.hr-heute.com/magazin/hr-analytics. (Accessed: 24.02.2022). (in German)

[4] Sage (n.d.). *Personalcontrolling: HR-Kennzahlen und Reports auf Knopfdruck. Einfach, schnell, alles auf einen Blick.* https://www.sagedpw.at/hr-software/personalcontrolling/. (Accessed: 24.02.2022). (in German)

[5] IDC (2019). *The HR-Role in Best-Run Midsize Companies: Using Intelligent Technologies to Manage the Total Workforce.* https://keyush.com/wp-content/uploads/2021/08/HR-RoleinBest.pdf. (Accessed: 24.02.2022).

[6] Al-Ani, A. (2019). Die Human-Resource-Funktion in Zeiten des Digitalen Übergangs. *Controlling*, 5/2019. (in German) https://doi.org/10.15358/0935-0381-2019-5-12

[7] Sure, M. (2009). *Moderne Controlling-Instrumente*. *Bewährte Konzepte für das operative und strategische Controlling*. München: Vahlen. (in German) https://doi.org/10.15358/9783800643738

[8] Wöhe, G., Döring, U., & Brösel, G. (2020). *Einführung in die Allgemeine Betriebswirtschaftslehre.* München: Vahlen. (in German)

[9] Becker, W. & Ulrich, P. (2016). *Handbuch Controlling.* Wiesbaden: Waxmann. (in German) https://doi.org/10.1007/978-3-658-04741-2

[10] Fischer, T., Möller, K., & Schultze, W. (2015). *Controlling: Grundlagen, Instrumente und Entwicklungsperspektiven* (2nd ed.). Stuttgart: Schäffer-Poeschel. (in German)

[11] DGFP E.V. (2013). *Personalcontrolling für die Praxis: Konzept – Kennzahlen – Unternehmensbeispiele* (2nd ed.) Wiesbaden: Bertelsmann. (in German)

[12] Klein, A. (2012). *Controlling-Instrumente für modernes Human Resource Management.* München: Haufe. (in German)

[13] Havranek, C., Freudhofmeier, M., & Schmidt, N. (2010). *Die optimierte Personalabteilung: Wege zur Effizienzsteigerung von Human Resources.* Wien: Linde. (in German)

[14] Niedermayr, R., Waniczek, M., & Wickel-Kirsch, S. (2020). Personalcontrolling – Prozessmodell 2.0. Ein Leitfaden für die Beschreibung und Gestaltung von Prozessen des Personalcontollings (2nd ed.). Wien: Linde. (in German)

[15] Lindner-Lohmann, D., Lohmann, F., & Schirmer, U. (2016). *Personalmanagement* (3rd ed.). Heidelberg: Springer. (in German) https://doi.org/10.1007/978-3-662-48403-6

[16] Heimerl, P. & Tschandl, M. (2014). *Controlling, Finanzierung, Produktion, Marketing.* Wien: Facultas. (in German) https://doi.org/10.36198/9783838543239

[17] Drucker, Peter (1909 – 2005).

[18] Raidl, U. (2016). *What is ERP – and what can it do for your business?* 22.02.2022. https://blogs.sap.com/2016/12/19/what-is-erp-and-what-can-it-do-for-your-business/.

[19] Bischof, C. & Wilfinger, D. (2018). Big Data Analytics im Controlling: Anwendungsbereiche, Vorteile und Umsetzung am Beispiel von SAP HANA. In: Gleich, Ronald; Tschandl, Martin (ed.): *Digitalisierung und Controlling. Technologien, Instrumente, Praxisbeispiele* (pp. 161-174). Freiburg: Haufe.

[20] Batalla, S., Wilfinger, D., & Tschandl, M. (2021). Integrated Planning of Operating Expenditures (OPEX) - A model to apply best practices when running ERP and DWH systems. *Proceedings ICCTA, The 7th International Conference on Computer Technology Applications*, 92-98. https://doi.org/10.1145/3477911.3477926

[21] Von Rechenberg, W. (2019). *OLAP – Online Analytical Processing: Analysen in vielen Dimensionen.* Controlling-Portal. https://www.controllingportal.de/ Fachinfo/Business-Intelligence/OLAP-Online-Analytical-Processing.html. (Accessed: 22.02.2022). (in German)

[22] Diez, F., Bussin, M., & Lee, V. (2020). *Fundamentals of HR Analytics: A Manual on Becoming HR Analytical.* Bingley, Emerald Publishing. https://doi.org/10.1108/9781789739619

[23] Mayer-Schönberger, V. & Cukier, K. (2014). *Big Data – A Revolution That Will Transform How We Live, Work and Think.* Boston, Houghton Mifflin Harcourt.

[24] Davenport, T. H. (2014). How strategists use "big data" to

support internal business decisions, discovery and production. *Strategy & Leadership*, 42(4). https://doi.org/10.1108/SL-05-2014-0034
[25] Iffert, L. (2016). Predictive Analytics richtig einsetzen. *Controlling & Management,* Review Sonderheft 1. (in German) https://doi.org/10.1007/s12176-016-0006-y
[26] Müller, M. (2017). Industrie 4.0: Wie sich die Arbeitswelt künftig wandelt. https://www.personalmanagement.info/hr-know-how/fachartikel/detail/industrie-40-wie-sich-die-arbeitswelt-kuenftig-wandelt/. (Accessed: 22.02.2022). (in German)
[27] Fleischmann, F. (2018). Big Data Analytics: HR gestalten statt verwalten. *Insights Controller Institut.* https://insights.controller-institut.at/big-data-analytics-hr-gestalten-statt-verwalten/?gclid=EAIaIQobChMIl5yP2uaG9gIVArp3Ch3cdAxQEAAYAyAAEgJ7JfD_BwE (Accessed: 24.01.2022).
[28] Wirges, F., Ahlbrecht, M., & Neyer, A.-K. (2020). *HR-Analytics: Was HR-Verantwortliche und Führungskräfte wissen und können müssen.* Wiesbaden, Springer Gabler. (in German) https://doi.org/10.1007/978-3-658-27793-2
[29] Lawler, E., Levenson, A., & Boudreau, J. W. (2004). HR metrics and analytics: use and impact. *Human Resource Planning, 27*(4).
[30] Dahlbom, P., Siikanen, N., Sajasalo, P., & Jarvenpää, M. (2020). Big data and HR analytics in the digital era. *Baltic Journal of Management, 15*(1). https://doi.org/10.1108/BJM-11-2018-0393
[31] Smeets, M., Erhard, R., & Kaussler, T. (2019). *Robotic Process Automation (RPA) in der Finanzwirtschaft: Technologie – Implementierung – Erfolgsfaktoren für Entscheider und Anwender*. Wiesbaden, Springer. (in German) https://doi.org/10.1007/978-3-658-26564-9
[32] Madakam, S., Holmukhe, R. M., & Jaiswal, D. K. (2019). The Future Digital Work Force: Robotic Process Automation (RPA). *JISTEM – Journal of Information Systems and Technology Managements*, 16. https://doi.org/10.4301/s1807-1775201916001
[33] Safar, M. (2022). *RPA and KI: So werden Software-Roboter intelligent - Wie Künstliche Intelligenz das Potenzial von Software-Robotern erweitert.* https://weissenberg-group.de/rpa-und-ki-so-werden-software-roboter-intelligent/. (Accessed: 22.01.2022). (in German)

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