

Secondary Publication



Ulrich, Patrick; Frank, Vanessa; Buettner, Ricardo; Becker, Wolfgang

A Literature Review on the Impact of Modern Technologies on Management Reporting

Date of secondary publication: 23.01.2024

Version of Record (Published Version), Article

Persistent identifier: urn:nbn:de:bvb:473-irb-929645

Primary publication

Ulrich, Patrick; Frank, Vanessa; Buettner, Ricardo; Becker, Wolfgang (2022): „A Literature Review on the Impact of Modern Technologies on Management Reporting“. In: *Procedia computer science*, Vol. 207, pp. 907-915, Amsterdam: Elsevier, doi: 10.1016/j.procs.2022.09.146.

Legal Notice

This work is protected by copyright and/or the indication of a licence. You are free to use this work in any way permitted by the copyright and/or the licence that applies to your usage. For other uses, you must obtain permission from the rights-holder(s).

This document is made available under a Creative Commons license.



The license information is available online:

<https://creativecommons.org/licenses/by-nc-nd/4.0/legalcode>



26th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems (KES 2022)

A Literature Review on the Impact of Modern Technologies on Management Reporting

Patrick ULRICH^{a*}, Vanessa FRANK^b, Ricardo BUETTNER^c, Wolfgang BECKER^d

^aAalen University, Beethovenstr. 1, 73430 Aalen, Germany and University of Bamberg, Feldkirchenstr. 21, 96045 Bamberg, Germany

^bAalen University, Beethovenstr. 1, 73430 Aalen, Germany

^cUniversity of Bayreuth and Fraunhofer FIT, Universitaetsstr. 30, 95447 Bayreuth, Germany

^dUniversity of Bamberg, Feldkirchenstr. 21, 96045 Bamberg, Germany

Abstract

In this paper, two systematic literature searches are used to pursue questions about digitization in management reporting on the one hand and role-specific questions on the other. We assume that greater digitization in terms of efficiency and effectiveness will change the role of management accountants in general and in reporting in particular, as this should lead to more automation and possibly more time for consulting activities from management accountants/controllers. After a strictly documented filtering process, a total of 51 papers remained for the analysis of the research questions posed. As a result, in addition to research gaps in management reporting, the most important information technology (IT) tools in management accounting and management reporting can be identified. Concerning corporate performance and management accounting performance, the research also reveals a connection with digitization/IT trends in controlling, controller roles, and role conflicts. The systematic literature evaluations serve as a basis for further research to verify the possible causal relationships found.

© 2022 The Authors. Published by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by-nc-nd/4.0>)

Peer-review under responsibility of the scientific committee of the 26th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems (KES 2022)

Keywords: digitization; IT tools; management accounting; management reporting; role theoryIntroduction

* Corresponding author. Tel.: +49-7361-91490-22.

E-mail address: patrick.ulrich@hs-aalen.de

1. Introduction

At the latest because of the current coronavirus pandemic, the topic of digitization should have reached the consciousness of the public, politics, and business, since almost all areas of life are disrupted in some form by restrictions. Accordingly, the topic also represents an important starting point for action for companies. To remain competitive, companies are forced to think about how to adapt to the new conditions and maintain their relationships with external parties [1].

In this context, the presence of the topic of digitization can also be used to optimize previously insufficiently digitized business processes. Today, the topic of data availability, in particular, is emerging as a key trend. In the course of improved data availability, the potential for the use of IT tools such as AI (artificial intelligence) is increasing [2]. Among other things, artificial intelligence (AI) can be used today to improve the quality of decision-making processes and accelerate decision-making in companies [3]. By using IT tools, managers are enabled to generate analyses and reports independently, generate information resources themselves and use digitally retrievable data sets. In addition to optimizing the decision-making process, this also illustrates the possibility of improving overall reporting [4]. In the context of digitization and modern IT tools, the management accountant (or controller) is enabled to surrender the task of data collection to automated processes. This allows the controller to take a more active role in the management decision-making process [5].

There are already some papers on the role change in management accounting, on the identity of management accountants, and also on the role of digitization in this context, but rather on the level of generic management accounting. Since previous research has insufficiently addressed the management reporting process and the role issue in this process, this will be addressed in this paper.

In connection with the human factor and digitization in controlling, it seems interesting to analyze which roles are taken in management reporting, how this relates to the distribution of tasks in management reporting and ultimately influences management accounting and company performance.

This paper presents the initial results of two systematic literature reviews (SLR) based on the following research questions. We chose to conduct two separate analyses because, in our view, the topics of digitization and roles tend to be discussed separately in the literature. We will then synthesize the results in the following:

- What are relevant IT tools/technologies in controlling and management reporting?
- Does digitization or the use of IT tools in controlling and management reporting have an impact on the company's success?
- How does digitization or the use of IT tools affect the roles and role conflicts in controlling and especially management reporting?
- Where are research gaps to be found?

The structure of the paper is as follows: Chapter 2 contains SLR methodology. Chapter 3 discusses the samples of the two SLRs. Chapter 4 shows initial results and chapter 5 contains an outlook on future research-

2. SLR methodology

The approach chosen for the SLR in this paper was based on a filtering process in which scientific papers are selected schematically [6][7]. The SLRs are geared to the above-mentioned research questions, among others [6]. On the one hand, the topic area concerns questions about digitization in management reporting and, on the other hand, role-specific questions. For the sake of clarity, a division into two SLRs seemed to make sense. Accordingly, SLR 1 is referred to below as SLR "Digitization" and SLR 2 as SLR "Roles". The data collection took place in February 2021, while the evaluation was carried out between February to August 2021.

Due to the desired comprehensive coverage of possible results for each SLR, not only one database was chosen, but the databases EBSCO, JSTOR and ECONBIZ. The use of selected databases has the advantage that filters can be applied to journal articles already in the search process and that these show a variety of scientifically high-quality results due to the extensive database available.

The databases were searched for selected keywords in English and German [6][8]. Different variations of the keywords were also included in the database search with the symbol "*". This symbol generalises and lists all special characters as well numbers and letters that follow the last letter before the "*" [8][9]. The searched keywords were linked to each other by selecting "AND" in the search engines [6][10].

The terms "digit*", "IT", "tool" and "technolog*" were used as synonyms for the term "digitization" in SLR 1. Synonyms of the term "reporting" in SLR 1 are the terms "report*", "Bericht*" and "account*". Accordingly, the following word combinations result for SLR 1: (digit*; IT; tool; technolog*) AND (report*; Bericht*; account*).

In SLR 2, the data search was expanded to include the term "controlling" due to the limited research on the topic of roles and management reporting to date. For this purpose, the terms "controll*", "report*", "Bericht*" and "account*" were entered as synonyms for "controlling/reporting". The terms "role*", "Rolle*", "task*", "Aufgabe*", "conflict*" and "Konflikt*" were used as synonyms for the term "roles". The following word combinations result for SLR 2: (controll*; report*; Bericht* and account*) AND (role*; Rolle*; task*; Aufgabe*; conflict*; Konflikt*).

The selection of the data was also based on screening criteria, which refer to the language, type and journal of the results, as well as content-related aspects, in order to absolutely address the research questions posed. This is to ensure that the results relevant to the present research are selected [6][11]. For the selection of results, it is possible to work through the complete text of the entire results. This is useful if the scope of the results is small. It is also possible to evaluate the research results obtained based on their results or methods or to select the research in stages (title, abstract, full text). The latter seemed to make sense due to the large number of results following two SLRs [11].

After receiving the results, a content filtering process was carried out according to quality criteria adapted to the research questions [12]. The further filtering process of the two SLRs consists of duplicate filtering, language filtering, title filtering, abstract filtering, time filtering, content filtering and empirical filtering.

3. Sample Description

The literature review included two separate systematic literature reviews.

First, the sample of SLR for digitization is described. Before duplicate filtering, a total result of 2412 papers could be presented. After duplicate filtering, 2070 papers were still included. After language filtering (only English and German), this number was reduced to 1908 papers. After the selection of titles, 91 papers could be presented. When filtering the titles, all obviously thematically irrelevant papers were first sorted out. The selection focused on the topics of management reporting and management accounting. In some cases, where the title did not allow a clear decision, the pure term Accounting was retained. Titles with the topic Report on technologies were sorted out, but not the topic technologies in reporting. In addition, papers were selected and focused where the title contains the topic of role conflicts or has a possible reference to roles in management reporting. We included only publications that dealt with digitization in a specific manner. Abstract filtering reduced this to 46 papers. Abstract filtering also focused more on digitization and management accounting, management reporting, roles and role conflicts. First, obviously irrelevant abstracts were sorted out. Abstracts on the topic of accounting were retained if the articles also appeared to be useful for the topic of management accounting. Most irrelevant abstracts often had a very diverse character and can be sorted out without special mention. In addition, the following categories can be pointed out as thematically valuable, but too broad for the present dissertation and therefore sorted out: IT and Accounting Curricula, Sustainability, Banking Sectors and Financial Markets, and Accounting and Standards/Guidelines. Abstracts on the topic of accounting, which refer to external digital business reports, were retained for the time being to examine possible important content on the topic of IT tools in reporting. In addition, an exception was made for one abstract on the topic of banks/insurance companies, as this indicates generally important content on roles and digitization. The temporal filtering reduced the number to 42. Subsequently, the content was checked and categorised. In this process, 21 relevant paper were identified. The papers were checked for content relevance by classifying them in the categories of role/task profiles, role conflicts and/or digitization & IT tools. Conference reports, reports that were obviously irrelevant in terms of content, and papers with restricted access were sorted out - including three duplicate papers, two papers that were not available despite being requested, and two papers with restricted access. After empirical filtering, 8 papers could finally be analysed, which represent papers of a qualitative or quantitative nature, a mix of both (mixed methods qualitative + quantitative) or SLRs.

In the following, we will go into detail about the SLR to roles. Before duplicate filtering, a total result of 3728 papers could be presented. After duplicate filtering, 2989 papers were still included. After language filtering (only English and German), this number was reduced to 2851 papers. After selecting the titles (only manuscripts that dealt with tasks or roles in the title were included), 165 papers could be selected. When filtering the title, all obviously thematically irrelevant papers were sorted out first. In addition, papers on finance accounting were neglected. Terms such as management accounting and management accountant were included. In addition, topics such as the role of accounting in management issues were retained. In some cases, where the headline did not allow a clear decision, the pure term Accounting was included in the next filtering step. In addition, the focus was on roles in the context of digitization. If it was not clear from the title whether digitization was the topic of the paper, it was not sorted out for the time being. Abstract filtering reduced these to 106 papers. When sorting out the abstracts, the focus was placed on explanations of roles, tasks, competencies and digitalization in controlling and management reporting. Accordingly, some papers could be sorted out that obviously did not belong to this category.

It became clear that in addition to the main topic searched for, there were often papers with a focus on topics such as the role of financial reporting (explanations of its importance), accounting, standards/IFRS and risk management. Furthermore, a few papers can be classified under the category Sustainability Environmental Controlling or Green Controlling. In order not to lose the focus on the main topic of this paper, the above-mentioned categories are excluded. Other abstracts examined and sorted out also contained role explanations and areas of responsibility relating to auditors and bank auditors or the topic of the audit committee. In addition, papers that were too specific were sorted out. These included insurance companies, universities and hospitals. However, there was one exception, for example, where the paper had a hospital-specific role description of management accounting, but this could contain important information on role conflicts in general. In addition, an exception was made for one abstract on the topic of banks/insurance companies, as this indicates generally important content on roles and digitization. Temporal filtering reduced the number of papers to 87 and content filtering to 65. 43 papers remained for analysis after empirical allocation.

4. Initial results of the SLRs

The following is an excerpt of the results obtained: Selected research papers highlight the main topics of enterprise resource planning (ERP) systems, warehousing tools, big data, real-time data mining, data mining, machine learning, automation/robotic process automation (RPA), analytics, business intelligence (BI), self-service, dashboards and mobile devices in controlling. These results demonstrate, among other things, the importance of automation, cloud solutions, self-service and mobile solutions for reporting. In addition, the influence of IT on controlling, which is noticeable in practice, the roles in controlling and the change in the roles of the controller specifically towards the business partner are discussed. However, it is evident that less attention is paid to the influence of digitization on management reporting tasks and to role changes specifically in management reporting. In the context of management reporting, the focus is more on IT tools that can be used or are used. The following roles for managerial accountants [26] in reporting were derived:

- Service Expert: Ensures the execution, coordination, and continuous improvement of operative controlling processes.
- Functional Lead: Defines and communicates controlling strategies and guidelines; provides methodological and technical expertise.
- Change agent: Drives change processes, the use of new technologies, and the development of new business models.
- Scorekeeper: Performs routine tasks in operational controlling processes.
- Guardian: Monitors the achievement of financial targets and looks at opportunities and risks; ensures compliance with guidelines.
- Business Partner: Advises managers, critically challenges them, and proactively works on business challenges and opportunities.
- Data Engineer: Ensures data quality and appropriate data governance; develops and implements reporting, analytics, and planning solutions.

- Data Scientist: Performs analysis of Big Data, and develops and maintains statistical models and machine learning solutions.
- Decision Scientist: Ensures that relevant questions are addressed with Data Science and that the results of these analyses are translated into initiatives.

When it comes to roles, tasks and role conflicts, the research analysed tends to refer to a role change in controlling in general: Studies of SLRs increasingly examine the assumption of the role as a business partner (cf, e.g., [17][33][34][30] [35][36][25][37][19]). Wiegmann/Tretbar/Strauß [19] clarify in their explanations that the use of IT trends can promote the business partner role in controlling [19]. Koch/Storm [30] also describe in their research a role development in controlling from the traditional data procurer and preparer via more complex areas of activity to the business partner as known until now or the further development of the business partner role [30].

Another current area of research is emerging in the direction of the data scientist. With the increasing use of IT tools, the question of a necessary increase in knowledge regarding digitization in controlling is becoming increasingly important. In this context, authors address the question of overlapping tasks of controllers with data scientists or the role designation of the controller as data scientist [23][24][25][26]. Accordingly, studies show the expectation of a development away from purely traditional roles of the controller, whereby despite the role changes, scorekeeping, among other things, can still be seen as present in controlling [38][34][36].

Table 1. Results Systematic Literature Review with Focus on Roles and Role Conflicts

Topic Roles and Tasks in Controlling	Topic Role Conflicts in Controlling
Burns/Baldvinsdottir [41]; Byrne/Pierce [42]; Valančieng/Gimžauskieng [43]; Ernst et al. [38]; Yazdifar/Askarany/Askary [44]; Emsley/Chung/Honga [45]; Goretzki/Weber [46]; Albu et al. [14]; Hoffjan/Trapp/Boucoiran [47]; Loo/Verstegen/Swagerman [36]; Chen et al. [15]; Clinton/White [16]; Graham/Davey-Evans/Toon [33]; Krystek/Reimer [35]; Nevries/Weide [48]; Schäffer/Weber [49]; Weibenberger/Angelkort/Göbel [50]; Weibenberger et al. [37]; Goretzki/Strauß/Weber [17]; Halbouni/Nour [18]; Wiegmann/Tretbar/Strauß [19]; Lepistö et al. [51]; Zarzycka [52]; Freistühler et al. [23]; Karlsson/Kurkkio/Hersinger [53]; Kokina/Blanchette [27]; Matanovic/Sabel/Wöhrmann [24]; Oesterreich et al. [25]; Pasch [54]; Rajeevan [55]; Schäffer/Brückner [26]; Andreassen [56]; Horton et al. [34]; Knudsen [32]; Koch/Storm [30]; Oppi/Vagnoni [57]; Wolf et al. [31]	Byrne/Pierce [42]; Goretzki/Weber [46]; Nuñez Palomino/Frezatti [58]; Amilin [40]; Byrne/Pierce [59]; Heinzelmann [22]; Oppi/Vagnoni [57]; Wolf et al. [31]

In summary, it can be assumed that with a rising digitization and the increased use of IT tools in management reporting, the controller is increasingly taking on tasks in which he assists management in an advisory, evaluative and action-initiating capacity and/or carries out IT-based tasks [39].

With regard to corporate and controlling success, research also points to a connection with digitization/IT trends in controlling, controller roles [37][19][40][27][28] and role conflicts. Management reporting is a key task of controlling [39]. Since the relationship between digitization in management reporting and its success has hardly been researched to date, the developed SLRs form the basis for further role-specific analyses and serve as a basic framework for hypotheses to be elaborated. Table 1 shows a distinction between papers that discuss management accountants' tasks and roles (left-hand side), whereas much fewer papers explicitly list or discuss role conflicts based on theoretical foundations such as role theory.

5. Implications and Open Research Topics

In the course of digitization and the use of IT tools, there may be role changes in controlling [56]. With the integration of new roles or through role shifts, there are new skill requirements, expectations and role perceptions and

thus potentials for role conflicts [31]. This can be seen as a starting point for further research regarding roles and task areas in management reporting.

It can also be pointed out that IT trends and the change in the role of the controller can have a positive effect on the quality, effectiveness and efficiency of reporting and controlling. Moreover, it has a positive effect on decision-making in the company [27][28][19]. Wiegmann/Tretbar/Strauß [19], among others, point to reduced effort and accelerated processes through IT use [19]. Since previous research has only insufficiently addressed individual areas of management reporting, further research could also add value in the context just mentioned.

Figure 1 illustrates possible cause-effect relationships in a general framework. This is intended to serve as a basis for further empirical research:

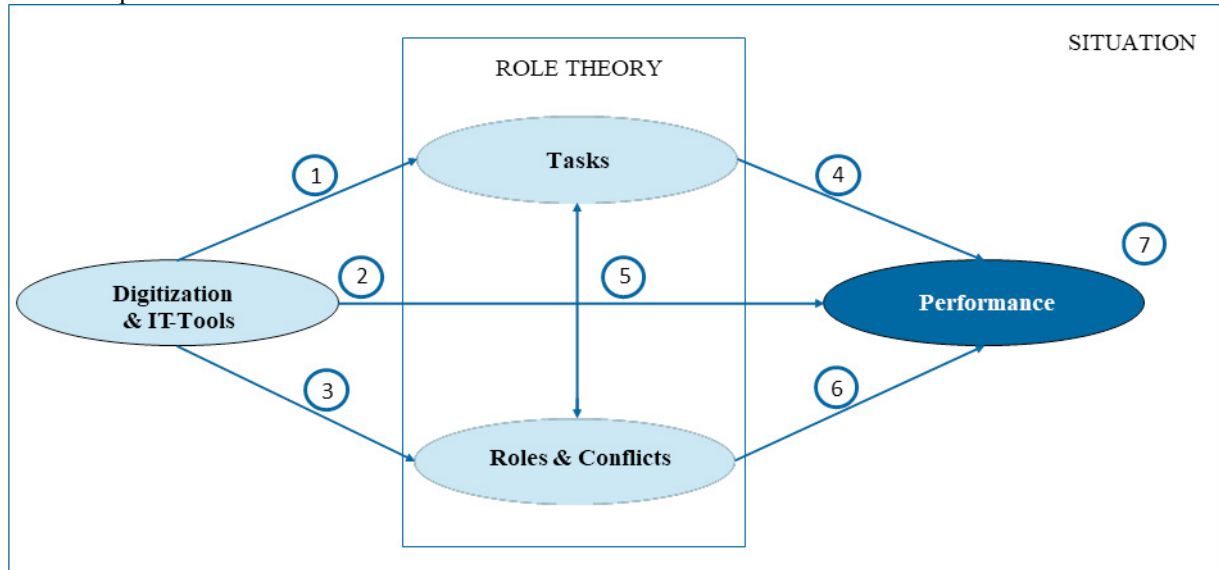


Fig. 1. Presentation of the cause and effect relationships to be examined.

After comparing the literature reviews on "digitization" and "roles", as well as the supplementary consideration of current books, journals, and articles from corporate practice, the previously explained findings can be summarized as follows:

- The importance of presented IT tools AI, RPA, Analytics, SSBI, Dashboarding and Mobile Reporting is reinforced.
- An overview of suitable software providers could be given.
- An overview of roles in controlling could be given.
- The controller role overview with the distinction of business partner, scorekeeper and navigator appears useful for evaluating controller roles.
- The additional role of the Data Scientist appears to be an important topic in the context of IT tools, which will be taken up in further research.
- On the topic of roles and role conflicts in management reporting, empirical expansion needs to emerge.
- There is a gap in research on the topic of management reporting tasks.
- There is a need to catch up in various cause-effect relationships to the aforementioned topic complex.

Hypotheses will be derived for the following topics:

- correlation between the level of digitization and the use of IT tools and management reporting task distributions.
- correlation between the level of digitization and the use of IT tools and success.
- correlation between the level of digitization and the use of IT tools and roles and role conflicts.
- correlation between the distribution of tasks in management reporting and success.

- correlation between roles and role conflicts and the distribution of tasks in management reporting.
- correlation between role and role conflicts and success.
- correlation between management reporting success and controlling and company success.

The situation is presented here as exogenous / endogenous because there are both exogenous elements (e.g., industry dynamics) and endogenous elements (e.g., organizational structure) of the situation. Since this is the simplified framework, not all detailed variables are included.

Accordingly, in further research, the topic area should be included as follows: Some of the IT tools mentioned above are to be examined for their influence of management reporting tasks, management reporting roles and role conflicts in management reporting. For this purpose, tasks, roles and role conflicts in management reporting are to be elaborated on the basis of a survey. Finally, IT tools, tasks, roles and role conflicts are to be reviewed for their success in management reporting, controlling and for the company as a whole.

References

- [1] Xiong, J., Wang, K., Yan, J., Xu, L., and Huang, H. (2021). "The window of opportunity brought by the COVID-19 pandemic: an ill wind blows for digitalisation leapfrogging." *Technology Analysis & Strategic Management*: 1-13 (doi: 10.1080/09537325.2021.1979212).
- [2] Kruse, L., Wunderlich, N., and Beck, R. (2019). "Artificial Intelligence for the Financial Services Industry: What Challenges Organizations to Succeed." *Proceedings of the 52nd Hawaii International Conference on System Sciences*, T. Bui (ed.), Hawaii International Conference on System Sciences: 6408-6417 (doi: 10.24251/HICSS.2019.770).
- [3] Gualdi, F., and Cordella, A. (2021). "Artificial Intelligence and Decision-Making: the question of Accountability." *Proceedings of the 54th Hawaii International Conference on System Sciences*, T. Bui (ed.), Hawaii International Conference on System Sciences: 2297-2306 (doi: 10.24251/HICSS.2021.281).
- [4] Alpar, P., and Schulz, M. (2016). "Self-Service Business Intelligence." *Business & Information Systems Engineering* **58** (2): 151–155.
- [5] Leitner-Hanetseder, S., Lehner, O. M., Eisl, C., and Forstenlechner, C. (2021). "A profession in transition: actors, tasks and roles in AI-based accounting." *Journal of Applied Accounting Research* **22** (3): 539-556 (doi: 10.1108/JAAR-10-2020-0201).
- [6] Fink, A. (2014). "Conducting research literature reviews – From the internet to paper.", 4. edition, Los Angeles. Sage Publications.
- [7] Randolph, J. J. (2009). "A guide to writing the dissertation review." *Practical Assessment, Research & Evaluation* **14** (13): 1-13.
- [8] Eisend, M. (2014). "Metaanalyse." München, Mehring. Hampp.
- [9] Torres-Carrion, P. V., Gonzalez-Gonzalez, C. S., Aciar, S., and Rodriguez-Morales, G. (2018). "Methodology for systematic literature review applied to engineering and education." *2018 IEEE Global Engineering Education Conference (EDUCON)*, Tenerife. 17.04.2018 - 20.04.2018, IEEE: 1364-1373 (doi: 10.1109/EDUCON.2018.8363388).
- [10] Easterby-Smith, M., Thorpe, R., and Jackson, P. R. (2012). "Management Research." 4. edition, Thousand Oaks. Sage Publications.
- [11] Snyder H. (2019). "Literature review as a research methodology: An overview and guidelines." *Journal of Business Research* **104**: 333-339.
- [12] Becker, W., Ulrich, P., and Stradtman, M. (2018). "Geschäftsmodellinnovationen als Wettbewerbsvorteil mittelständischer Unternehmen", in Becker, W., and Ulrich, P. (eds) *Management und Controlling im Mittelstand*, Wiesbaden. Springer Gabler.
- [13] Smith, M., Abdullah, Z., and Razak, R. A. (2008). "The diffusion of technological and management accounting innovation: Malaysian evidence." *Asian review of accounting* **16** (3): 197-218.
- [14] Albu, C., Albu, N., Faff, R., and Hodgson, A. (2011). "Accounting Competencies and the Changing Role of Accountants in Emerging Economies: The Case of Romania." *Accounting in Europe* **8** (2): 155-184.
- [15] Chen, H., Huang, S. Y., Chiu, A., and Pai, F. (2012). "The ERP system impact on the role of accountants." *Industrial Management & Data Systems* **112** (1): 83-101.
- [16] Clinton, B. D., and White, L. R. (2012). "The Role of the Management Accountant: 2003-2012." *Management Accounting Quarterly* **14** (1): 40-74.
- [17] Goretzki, L., Strauß, E., and Weber, J. (2013). "An institutional perspective on the changes in management accountants' professional role." *Management Accounting Research* **24** (1): 41-63.
- [18] Halbouni, S. S., and Nour, M. A. (2013). "An empirical investigation of the impact of globalisation and information technology on the role of the management accountant: Evidence from the United Arab." *International journal of accounting, auditing and performance evaluation: IJAPE* **9** (3): 286-306.
- [19] Wiegmann, L., Tretbar, T., and Strauß, E. (2014). "Business Partner 2.0: wie IT-Trends die Rolle des Controllers verändern." *Controlling: Zeitschrift für erfolgsorientierte Unternehmenssteuerung* **21** (3): 197-201.
- [20] Strauß, E., Quinn, M., and Kristandl, G. (2015). "Möglichkeiten und Grenzen eines IT-gestützten Controlling- und Reportingsystems für mittelständische Unternehmen mit mobilen Endgeräten." *Controlling: Zeitschrift für erfolgsorientierte Unternehmenssteuerung* **21** (6): 313-317.

- [21] Rîndașu, S.-M. (2017). “Emerging information technologies in accounting and related security risks: What is the impact on the Romanian accounting profession.” *Journal of accounting & management information systems: JAMIS* **16** (4): 581-609.
- [22] Heinzelmann, R. (2018). “Occupational identities of management accountants: the role of the IT system.” *Journal of Applied Accounting Research* **19** (4): 465-482.
- [23] Freistühler, S., Kempkes, J. A., Suprano, F., and Wömpener, A. (2019). “Controller und Data Scientist in der Unternehmenspraxis: eine empirische Analyse der Aufgabenprofile im digitalen Zeitalter.” *Controlling: Zeitschrift für erfolgsorientierte Unternehmenssteuerung* **31** (3): 63-69.
- [24] Matanovic, S., Sabel, R., and Wöhrmann, A. (2019). “Controller vs. Data Scientist: eine empirische Analyse des Status quo der Aufgaben.” *Controlling: Zeitschrift für erfolgsorientierte Unternehmenssteuerung* **31** (6): 54-62.
- [25] Oesterreich, T. D., Teuteberg, F., Bensberg, F., and Buscher, G. (2019). “The controlling profession in the digital age: understanding the impact of digitisation on the controller's job roles, skills and competences.” *International Journal of Accounting Information Systems* **35**: 1-23.
- [26] Schäffer, U., and Brückner, L. (2019). “Rollenspezifische Kompetenzprofile für das Controlling der Zukunft.” *Controlling & Management Review: Zeitschrift für Controlling & Management* **63** (7): 14-30.
- [27] Kokina, J., and Blanchette, S. (2019). “Early evidence of digital labor in accounting: Innovation with Robotic Process Automation.” *International Journal of Accounting Information Systems* **35**: 1-31.
- [28] Weich, I., and Löchte, E. (2019). “Self-Service-Reporting: Do it yourself?” *KoR: internationale und kapitalmarktorientierte Rechnungslegung; IFRS* **19** (6): 265-267.
- [29] Cavélius, F., Eendenich, C., and Zicari, A. (2020). “Back to basics or ready for take-off? The tensions on the role of management controllers in the digital age.” *Comptabilité – Contrôle – Audit* **26** (2): 89-123.
- [30] Koch, R., and Storm, L. (2020). “Controller 4.0: die Rolle des Controllers im digitalen Zeitalter.” *Zeitschrift Führung und Organisation: ZfO* **89** (1): 38-42.
- [31] Wolf, T., Kuttner, M., Feldbauer-Durstmüller, B., and Mitter, C. (2020). “What we know about management accountants' changing identities and roles – a systematic literature review.” *Journal of Accounting & Organizational Change* **16** (3): 311-347.
- [32] Knudsen, D.-R. (2020). “Elusive boundaries, power relations, and knowledge production: A systematic review of the literature on digitization in accounting.” *International Journal of Accounting Information Systems* **36**: 1-22.
- [33] Graham, A., Davey-Evans, S., and Toon, I. (2012). “The developing role of the financial controller: evidence from the UK.” *Journal of Applied Accounting Research* **13** (1): 71-88.
- [34] Horton, K. E., Araujo Wanderley, C. de, Costa Souza, G. H., and Gonçalves de Araujo, J. (2020). “Roles and Attitudes in the Management Accounting Profession: An International Study.” *Management Accounting Quarterly* **21** (3): 1-9.
- [35] Krystek, U., and Reimer, M. (2012). “Strategisches Controlling: strategische Controller; eine Befragung unter Personalberatern zur Rolle der strategischen Controller in der Unternehmenspraxis.” *Controlling: Zeitschrift für erfolgsorientierte Unternehmenssteuerung* **24** (1): 10-15.
- [36] Loo, I. de, Verstegen, B., and Swagerman, D. (2011). “Understanding the roles of management accountants.” *European business review: EBR; the official journal of the International Management Centres, Europe* **23** (3): 287-313.
- [37] Weißenberger, B. E., Wolf, S., Neumann-Giesen, A., and Elbers, G. (2012). “Controller als Business Partner: Ansatzpunkte für eine erfolgreiche Umsetzung des Rollenwandels.” *Controlling & Management Review: Zeitschrift für Controlling & Management* **56** (5): 330-335.
- [38] Ernst, E., Vater, H., Reinhard, H., and Poschmann, S. (2008). “Veränderungen im Rollenbild des Controllers: theoretische Grundlagen und Erfahrungen aus der Unternehmenspraxis.” *Die Betriebswirtschaft: DBW* **68** (6): 729-742.
- [39] International Group of Controlling (2017). “Controlling-Prozessmodell.”, 2. edition, Freiburg. Haufe.
- [40] Amilin, A. (2017). “The impact of role conflict and role ambiguity on accountants' performance: the moderating effect of emotional quotient.” *European Research Studies Journal* **XX** (2A): 237-249.
- [41] Burns, J., and Baldvinsdottir, G. (2005). “An Institutional Perspective of Accountants' New Roles – The Interplay of Contradictions and Praxis.” *European Accounting Review* **14** (4): 725-757.
- [42] Byrne, S., and Pierce, B. (2007). “Towards a More Comprehensive Understanding of the Roles of Management Accountants.” *European Accounting Review* **16** (3): 469-498.
- [43] Valančiene, L., and Gimžauskiene, E. (2007). “Changing Role of Management Accounting: Lithuanian Experience Case Studies.” *Engineering Economics* **55** (5): 16-23.
- [44] Yazdifar, H., Askarany, D., and Askary, S. (2008). “Management Accountants' Role in Dependent and Independent Companies: Does Ownership Matter?” *Journal of Accounting, Business & Management* **15** (2): 1-21.
- [45] Emsley, D., Chung, L., and Honga, I. (2010). “How Management Accountants' Cognitive Style and Role Involvement Combine to Affect the Effort Devoted to Initiating Change.” *Abacus* **46** (3): 232-257.
- [46] Goretzki, L., and Weber, J. (2010). “Der Wandel der Controller: eine rollentheoretische Betrachtung am Beispiel der Hansgrohe AG.” *Controlling & management review: Zeitschrift für Controlling & Management* **54** (3): 163-169.
- [47] Hoffjan, A., Trapp, R., and Boucoiran, T. (2011). “Die Rolle des Controllers in internationalen Unternehmen: empirische Analyse am Beispiel deutsch-französischer Unternehmen.” *Controlling & management review: Zeitschrift für Controlling & Management* **55** (3): 184-188.
- [48] Nevries, P., and Weide, G. (2012). “Die Leistungen von Top-Controllern in den Phasen des strategischen Planungsprozesses: Rollen, Aufgaben und Instrumente.” *Controlling: Zeitschrift für erfolgsorientierte Unternehmenssteuerung* **24** (1): 4-9.

- [49] Schäffer, U., and Weber, J. (2012). "Zukunftsthemen des Controllings." *Controlling: Zeitschrift für erfolgsorientierte Unternehmenssteuerung* **24** (2): 78-84.
- [50] Weißenberger, B. E., Angelkort, H., and Göbel, S. (2012). "Integration der Rechnungslegung und Rollenwandel von Controllern: Ergebnisse einer empirischen Untersuchung." *Controlling: Zeitschrift für erfolgsorientierte Unternehmenssteuerung* **24** (2): 85-92.
- [51] Lepistö, L., Järvenpää, M., Ihantola, E., and Tuuri, I. (2016). "The tasks and characteristics of management accountants: insights from Finnish recruitment processes." *Nordic journal of business: NJB* **65** (3/4): 76-82.
- [52] Zarzycka, E. (2017). "The role of management accountant in enterprises operating in Poland." *Zeszyty Teoretyczne Rachunkowości* **93** (149): 235-252.
- [53] Karlsson, B., Kurkkio, M., and Hersinger, A. (2019). "The role of the controller in strategic capital investment projects: bridging the gap of multiple topoi." *Journal of Management & Governance* **23** (3): 813-838.
- [54] Pasch, T. (2019). "Strategy and innovation: the mediating role of management accountants and management accounting systems' use." *Journal of management control: Zeitschrift für Planung & Unternehmenssteuerung* **30** (2): 213-246.
- [55] Rajeevan, S. (2019). "Management accountant's role and society's expectations: Sri Lankan study." *Asian journal of accounting research* **4** (2): 202-232.
- [56] Andreassen, R.-I. (2020). "Digital technology and changing roles: a management accountant's dream or nightmare?" *Journal of management control* **31** (3): 209-238.
- [57] Oppi, C., and Vagnoni, E. (2020). "Management accountants' role and coercive regulations: evidence from the Italian health-care sector." *Qualitative Research in Accounting & Management* **17** (3): 405-433.
- [58] Nuñez Palomino, M., and Frezatti, F. (2016). "Role conflict, role ambiguity and job satisfaction: Perceptions of the Brazilian controllers." *Revista de Administração* **51** (2): 165-181.
- [59] Byrne, S., and Pierce, B. (2018). "Exploring management accountants' role conflicts and ambiguities and how they cope with them." *Qualitative Research in Accounting & Management* **15** (4): 410-436.