Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 225 (2023) 2790–2797

Procedia Computer Science

www.elsevier.com/locate/procedia

27th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems (KES 2023)

Use of Online MIS in Management Accounting – Initial Results from an Empirical Study

Robert Rieg[a], Patrick Sven Ulrich[b]*, Carmen Finckh[c]

[a]*Aalen University, Beethovenstr. 1, D-73430 Aalen, Germany and University of Bamberg, Feldkirchenstr. 21, D-96405 Bamberg, Germany*
[b]*Aalen University, Beethovenstr. 1, D-73430 Aalen, Germany*
[c]*ESB Business School Reutlingen, Alteburgstr. 150, D-72762 Reutlingen, Germany*

Abstract

Managerial accountants spend a large part of their working time on more operational activities in cost accounting, reporting, and operational planning and budgeting. In all these areas, there has been increasing discussion in recent years, both in theory and practice, about using more digital technologies. For reporting, this means not only an intensified discussion of technologies such as RPA and AI but also more intensive changes to existing reporting systems. In particular, management information systems (MIS), which are maintained by managerial accountants and used by managers for corporate management, should be mentioned here. Based on an empirical survey in a large German company, this article discusses the requirements and assessments of users when switching from a regular MIS to a cloud-based system.

Keywords: Management accounting; Management Information System; Online MIS, Digitization

1. Introduction

Management accountants provide companies with data, information, calculations, and management support [1]. In this respect, management accountants provide valuable services to the company, as managers often base their decisions

* Corresponding author: Patrick Ulrich. Tel.: +49-7361-9149022.
E-mail address: patrick.ulrich@hs-aalen.de

10.1016/j.procs.2023.10.271

on the data and information provided or evaluated by management accountants. Since management accountants deal with data and information, their work is by definition already IT-based. However, this does not mean that "modern" technologies such as those currently under public and scientific discussion have to be used here [2].

In the field of management accounting, empirical studies [3] and also corporate practice shows that the methodological, instrumental, and IT-side decision support in terms of the degree of automation still falls far short of what is discussed in theory and would be technically and technologically possible. While big data [4], data analytics [5], and, in particular, predictive analytics [6], prescriptive analytics [7], and artificial intelligence [8] are discussed in the theory of management accounting, many companies rely on traditional information systems, ERP systems, data warehouses, business intelligence, and (largely manual) evaluations based on Microsoft Excel [9]. In addition, in many companies that are introducing "modern" corporate IT, the old systems are being continued by management accountants as "shadow IT" [10].

However, digitization is bringing about enormous changes not only for management accountants but also for decision-makers and companies as such: In management accounting itself, new systems like SAP-S4/HANA [11] mean that faster evaluations are possible in real-time. As a result, this means that both the time management accountants have for strategic issues and the role profile of management accountants could change in the future [12]. At the same time, new, possibly digital, competencies [13] will become necessary. Conversely, companies that do not implement and use modern digital technologies, or do so later than other companies, could suffer competitive disadvantages as a result of the fact that their planning, reporting, and other subareas do not meet the changed requirements for speed and dynamism.

Online MIS is a special case of those modern technologies [14]. Here, management accountants and managers gain access to the management accounting information system via a web interface or app to view standard reports and also perform their specific evaluations. The introduction of an online MIS is intended to accomplish several things: On the one hand, operational decision-makers can view decision-relevant data and information ad hoc in decision-making situations (e.g., in management, in sales at the customer, in production). On the other hand, the online MIS should relieve management accountants of routine planning and reporting tasks that do not always add value and free up more time for strategic consulting [15]. From the perspective of management accounting, however, there are no theoretically sound findings on the use of online MIS and the corresponding motives of use by the management accountants.

Cloud-based management information systems have therefore been a fairly new phenomenon in management accounting practice in recent years. Quite a few companies (and especially their managing directors and management accountants) do not always work via the cloud, but with hybrid solutions or on-premise solutions of ERP software such as SAP or Oracle, but more often still with "manual" solutions such as Microsoft Excel [16].

Manual intermediate steps and data storage far away from the corporate data warehouse naturally not only complicate data management but also make the analyses based on the data uncertain. Traditionally, the role of controllers has been to use existing data to produce reports and analyses for management and to advise management on its decisions [17]. In recent years, however, it has become apparent that despite increasing technical capabilities, the controller still spends a great deal of time on the operational preparation of data. Unfortunately, this usually leaves little time for advising management. Under the umbrella term "business partner" [12], a role model has been established in management accounting in recent years that attributes more consulting competence to the management accountant and, at the same time, is intended to relieve the management accountant of more operational tasks such as calculation and reporting to have more time for value-creating activities [18]. At the same time, cloud-based management information systems were introduced that enable managers to extract data and information themselves in real-time and to create evaluations themselves [19]. This was done to relieve management accountants of this additional work, thus giving them more time for consulting.

To date, there is no real academic research on the topic of information systems in management accounting that addresses the implications for the role and responsibilities of management accountants. In this respect, we transfer general studies and preliminary work on management information systems [20] and business intelligence to the field of management accounting.

The core argument of the research project, and thus of the paper, is as follows: If management accountants consider the "new" online MIS to be meaningful and useful, they would have to use less Microsoft Excel and more online MIS in their daily work. In this respect, we approached the topic of the implementation and use of the Online MIS

analogously to the categories of information system use proposed by Davis and focused here primarily on the subjectively perceived usefulness [20].

This paper presents a first excerpt of an empirical study accompanying the introduction of an online MIS in the management accounting department of a large industrial group. In parallel to the implementation, we conducted interviews and a questionnaire among business managers and management accountants regarding the perception of the online MIS and its effects on the daily work of managers and management accountants. In this paper, we discuss the preliminary results of the management accountants' assessment. Our contributions to the literature are as follows:

- we provide a theoretically and practically sound study of the perceptions of the implementation of online MIS in management accounting in practice.
- we can prove for the first time in the literature that online MIS does not - as hoped - replace Excel, but that online MIS is used by management accountants only complementary and "on top", if at all.

The remainder of the paper is organized as follows: chapter 2 presents measures, data, and variables. Chapter 3 contains descriptive and confirmatory results of the hypothesis tests. Chapter 4 contains a discussion and summary.

2. Measurement, Data, and Sampling

The following chapter 2 is structured as follows: first, a description of variables and operationalization follows in 2.1. 2.2 describes the sampling procedure.

2.1 Variables and Operationalization

The first aspect of understanding the use and usage of online MIS is to measure the frequency of use. Given that in management accounting the tool of choice is still spreadsheet programs [21] it is adequate to measure additionally the frequency of use of such spreadsheets, here MS Excel. This allows us to understand the complementary or substituting effects of both instruments. Both variables, named Use_MIS and Use_XLS are measured on a scale from 1 to 7 which represents the frequency of use starting from 1 = never to 7 = multiple times per week [22].

To measure the usage and application of online MIS we developed several items based on research on service and decision quality [23] as well as technology acceptance [24]. We structured these items into two groups: a) general assessment of the usefulness and usability of the system, and b) usefulness for concrete application in management accounting and managerial decision-support.

2.2 Sampling

To understand the use of online MIS we conducted a study in a large German technology firm with several hundreds of managers and management accountants. Having the same institutional framework for all respondents allows us to reduce variation caused by different industries, owner structures, or sizes. Having said that, we expect to find a clearer picture in one large firm compared to a sample with many firms small and large. The case company operates in industrial manufacturing with more than 30 thousand employees and generates a yearly revenue above 6b euros. The company is active in 50 countries and structured into four business divisions.

A questionnaire was developed and pretested and sent by the company in February until begin of March 2019 to 500 employees who are known as users of an online performance measurement system. In total n=112 complete cases could be obtained from the case company. All respondents work in management accounting or perform corresponding tasks to support managerial decision-making.

The online MIS in question was implemented before the sampling took place so that our study can focus on decisions to use an already adopted system. Staff members can choose to perform data analyses with a spreadsheet or with the online MIS.

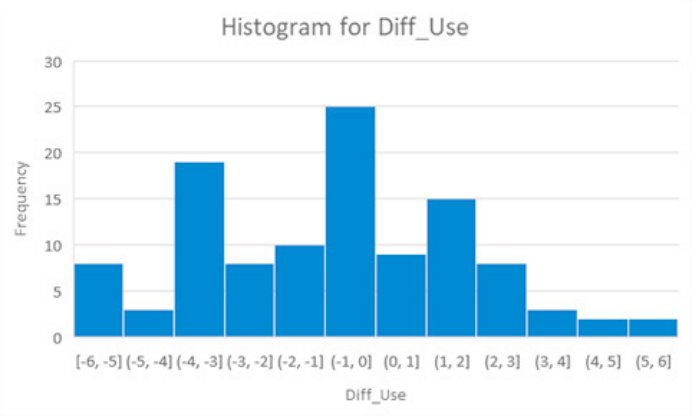
3. Results and Hypotheses tests

Chapter 3 is organized as follows. First, the descriptive results are presented in 3.1. 3.2 shows the results on frequency of use and usability. 3.3 discusses the frequency of use and usability in management accounting.

3.1 Descriptive results

The average frequency of use of online MIS is 4.1 on a scale from 1 to 7 with a standard deviation (SD) of 1.9 which is less than that for Excel with 4.7 (SD 2.1). Both variables share a low correlation of 0.15 with a 95% confidence interval of [-.04; 3.3]. A histogram of the difference between both variables calculated per respondent, which is calculated as Diff_Use = Use_MIS – Use_XLS, reveals interesting details (see figure 1): a) often respondents use both tools in similar frequencies because of the mean of -0.61 which is near zero, b) However, Excel usage seems a bit more common given more cases on the first quintiles of the histogram, c) one can interpret this pattern as complementing usage of online MIS and Excel not as a displacement.

Fig 1. Histogram for differences in frequency of use online MIS vs. Excel



3.2 Frequency of use compared to general usefulness and usability

Table 1 depicts the correlations between the frequency of use of online MIS and Excel compared to the items measuring the general usefulness and usability of online MIS. The rationale for including the correlations with the use of Excel is that respondents use both tools and with both columns, one can see differential results and more clearly if the assessment of online MIS is linked to the use of online MIS compared to the use of Excel. The overall result is a positive one.

Table 1: Correlations between Frequency of use and general usefulness

item number			Use_MIS	Use_XLS
	Use_XLS	Pearson-correlation	0.152	
		Sig. (2-sided)	0.110	
		N	112	
1	I spend less time on data collection due to the implementation of Online MIS	Pearson-correlation	.528**	.240*
		Sig. (2-sided)	0.000	0.011
		N	112	112
2	I have chosen to use Online MIS voluntarily	Pearson-correlation	.302**	.198*
		Sig. (2-sided)	0.001	0.036
		N	112	112
3	I find Online MIS is relevant for my job	Pearson-correlation	.516**	.345**
		Sig. (2-sided)	0.000	0.000
		N	112	112
4	I trust the data in Online MIS	Pearson-correlation	.310**	.198*
		Sig. (2-sided)	0.001	0.037
		N	112	112
5	I perceive information being displayed simple and appealing	Pearson-correlation	.375**	.267**
		Sig. (2-sided)	0.000	0.004
		N	112	112
6	The handling of the Online MIS appears simple and intuitive	Pearson-correlation	.335**	.377**
		Sig. (2-sided)	0.000	0.000
		N	112	112
7	I believe Online MIS helps me to understand numbers sufficiently	Pearson-correlation	.457**	.255**
		Sig. (2-sided)	0.000	0.007
		N	112	112
8	I find the representation in Online MIS is suitable for both, users with an affinity for numbers and "non-numbers"	Pearson-correlation	.447**	.296**
		Sig. (2-sided)	0.000	0.002
		N	112	112
9	I spend more time on analyzing information due to Online MIS	Pearson-correlation	.262**	.229*
		Sig. (2-sided)	0.005	0.015
		N	112	112

** statistically significant on a 1% level

* statistically significant on a 5 %level

3.3 Frequency of use compared to application in management accounting.

The next table 2 depicts similarly to table 1 the correlations of frequency of use with seven items measuring the application of these tools in management accounting. Again, we infer from the positive correlations to online MIS usage as well as the differences to correlations of an item with the use of Excel a clear positive picture. The online MIS is applicable for management reporting, data analysis, and decision support of managers.

Table 2: Correlations between Frequency of Use and Application in management accounting

item number			Use_MIS	Use_XLS
	Use_XLS	Pearson-correlation	0.152	
		Sig. (2-sided)	0.110	
		N	112	
1	I find that using Online MIS improves my ability to visualize results	Pearson-correlation	.381**	0.156
		Sig. (2-sided)	0.000	0.101
		N	112	112
2	I find that using Online MIS improves my ability to analyze results	Pearson-correlation	.480**	.261**
		Sig. (2-sided)	0.000	0.01
		N	112	112
3	I find that Online MIS improves my ability to present a management reporting to my manager	Pearson-correlation	.383**	.189*
		Sig. (2-sided)	0.000	0.046
		N	112	112
4	I find that Online MIS improves my ability to give my manager recommendations	Pearson-correlation	.576**	.279**
		Sig. (2-sided)	0.000	0.003
		N	112	112
5	Overall, I find Online MIS useful when it comes to gathering information	Pearson-correlation	.519**	.261**
		Sig. (2-sided)	0.000	0.005
		N	112	112
6	Overall, I find Online MIS useful when it comes to preparing management reporting	Pearson-correlation	.411**	0.076
		Sig. (2-sided)	0.000	0.423
		N	112	112
7	Overall, I find Online MIS useful when it comes to discussing management reporting with my manager	Pearson-correlation	.496**	0.137
		Sig. (2-sided)	0.000	0.148
		N	112	112

** statistically significant on a 1% level

* statistically significant on a 5 %level

4. Discussion and Conclusion

This paper presented the first findings of an empirical survey among management accountants of an industrial group related to the implementation of an online MIS. The study shows that - contrary to what is assumed in the literature - management accountants do not voluntarily abandon the "old" Excel system and only use a new online MIS. In addition, it is clear from the empirical study that management accountants do not see the online MIS as a replacement for the old system, but use it for other purposes: In particular, better visualization is emphasized.

Global ERP implementations and the use of business intelligence (BI) tools for management reporting purposes are significantly related to changes in MA practices [25] Our study shows concrete changes in MA practices due to the introduction of an online MIS system. An interesting aspect of this case study is the parallel use of Excel and online MIS for management reporting. The parallel use leads to generally high satisfaction with the online MIS system in the company with simultaneous slight Excel dominance and affinity.

The online MIS application has been developed to eliminate the use of Excel for the creation of management reports. From an implementation perspective, the question arises to what extent parallel operation promotes or even hinders the introduction of new systems in management accounting during a transition period. Our study shows that the advantages of the online MIS system are perceived by all users, but still, both systems are operated in parallel. If the use of parallel applications were officially prevented, there would be a danger of shadow-it systems [10].

The question arises to what extent the preference for Excel is a transitional phenomenon or whether it is due to the liking of management accountants for the Excel application. Management accountants' preference for Excel could be due to both force of habit and the fact that Excel offers indispensable additional benefits that make it difficult to switch systems. As discussed in the Riley et al. study [26], management accountants prefer Excel despite its known

limitations. Management accountants' Excel preference may be a barrier to the adoption of new applications and may prevent or delay the transition to modern IT solutions.

Our study shows differences in the evaluation of the online MIS system by online MIS system users and Excel users. The evaluation of the benefit of the online MIS depends on usage intensity. Online MIS users recognize the benefits of the online MIS system more clearly than Excel users who also use online MIS. The study also allows for an evaluation of what conditions would need to be created to intensify MIS use.

The study also offers the possibility of evaluating the data differentiated according to the hierarchy of the respondents. This gives us indications of the extent to which executives in controlling and business managers exhibit the same behaviors in IT use as employees in controlling. This would indicate hierarchy-specific differences in Excel affinity, for example, which could be relevant for business partner discussions.

The results represent a first excerpt of a more comprehensive analysis. The comparative assessment of online MIS and Excel was examined in greater depth. In addition, the corresponding view of the business managers was also surveyed. Not discussed in this paper, but of relevance for the future and also inquired about in the study, are differences in perception in the role expectations of and role fulfillment by management accountants on the part of business managers, which result from the new IT landscape and changed task constellations.

Finally, some limitations of the study are presented: This is only an intra-case analysis of a specific large German company. However, both the limited external validity and the specifically German view of management accounting (or "controlling" in this case) [27] could at least be mitigated by an increased internal validity due to the use of established scales from the literature.

References

[1] Budding, Tjerk, and Wassenaar, Mattheus (2021) “New development: Is there a management accountants’ expectation gap?” Public Money & Management **41 (4)**: 346-350.

[2] Saputro, Vecco., Ritchi, Hamzah, and Handoyo, Sofik. (2021). “Blockchain Disruption on Management Accountant’s Role: Systematic Literature Review”, *Journal of Accounting Auditing and Business*-Vol **4 (1)**.

[3] Rikhardsson, Pall., and Yigitbasioglu, Ogan. (2018) “Business intelligence & analytics in management accounting research: Status and future focus”, *International Journal of Accounting Information Systems* **(29)**: 37-58.

[4] Möller, Klaus, Schäffer, Utz, and Verbeeten, Frank. (2020) “Digitalization in management accounting and control: an editorial”, Springer **(1)**.

[5] Nielsen, Steen. (2018) “Reflections on the applicability of business analytics for management accounting–and future perspectives for the accountant*”, Journal of Accounting & Organizational Change*.

[6] Appelbaum, Deniz, Kogan, Alexander, Vasarhelyi, Miklos, and Yan, Zhaokai. (2017) “Impact of business analytics and enterprise systems on managerial accounting”, *International Journal of Accounting Information Systems* **(25)**: 29-44.

[7] Lepenioti, Katerina, Bousdekis, Alexandros., Apostolou, Dimitris, and Mentzas, Gregorys. (2020) “Prescriptive analytics: Literature review and research challenges”, *International Journal of Information Management* **(50)**: 57-70.

[8] Losbichler, Heimo, and Lehner, Othmar. M. (2021). “Limits of artificial intelligence in controlling and the ways forward: a call for future accounting research*”, Journal of Applied Accounting Research*.

[9] Ramachandran Rackliffe, Usha, and Ragland, Linda. (2016) “Excel in the accounting curriculum: Perceptions from accounting professors”, *Accounting Education* **25 (2)**: 139-166.

[10] Myers, Noah, Starliper, Matthew W., Summers, Scott L., and Wood, David A. (2017) “The impact of shadow IT systems on perceived information credibility and managerial decision making”, *Accounting Horizons* **31 (3)**: 105-123.

[11] Färber, Franz, May, Norman, Lehner, Wolfgang, Große, Philipp, Müller, Ingo, Rauhe, Hannes, and Dees, Johannes. (2012) “The SAP HANA Database--An Architecture Overview”, *IEEE Data Eng. Bull*. **35 (1)**: 28-33.

[12] Rieg, Robert. (2018) “Tasks, interaction and role perception of management accountants: evidence from Germany*”, Journal of Management Control* **29 (2)**: 183-220.

[13] Pan, Gary, and Seow, Poh-Sun. (2016) “Preparing accounting graduates for digital revolution: A critical review of information technology competencies and skills development”, *Journal of Education for business* **91 (3)**: 166-175.

[14] Alshirah, Malek., Lutfi, Abdalwali, Alshirah, Ahmad, Saad, Mohamed, Ibrahim, Nahla, and Mohammed, Fatihelelah. (2021) “Influences of the environmental factors on the intention to adopt cloud based accounting information system among SMEs in Jordan”, *Accounting* **7 (3)**: 645-654.

[15] Weißenberger, Barbara E. (2021) “Künstliche Intelligenz als Zukunftstechnologie im Controlling”, *Controlling & Management Review* **65 (2)**: 8-17.

[16] Walter, Johannes (2021) “Critical Success Factors of Hybrid-ERP Implementations”.

[17] Clinton, B. Douglas, and White, Larry R. (2012) "The role of the management accountant: 2003-2012", *Management Accounting Quarterly* **14 (1)**: 40.

[18] Wolf, Tanja, Kuttner, Michael, Feldbauer-Durstmüller, Birgit, and Mitter, Christine. (2020) "What we know about management accountants' changing identities and roles–a systematic literature review", *Journal of Accounting & Organizational Change*.

[19] Alpar, Paul, and Schulz, Michael. (2016) "Self-service business intelligence*", Business & Information Systems Engineering* **58 (2)**: 151-155.

[20] Davis, Fred D. (1989) "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS quarterly*: 319-340.

[21] Beaman, Ian, and Richardson, William. (2007) "Information Technology, Decision Support and Management Accounting Roles", *Journal of Applied Management Accounting Research* **5 (1)**: 59-68. // Seethamraju, Ravi (2015) "Barriers to the Adoption of Management Accounting (MA) Process in Enterprise Resource Planning (ERP) Environments", in 48th Hawaii International Conerene on System Sciences, HI, USA: 4201-4210.

[22] Fourné, Sebastian P.L., Guessow, Daniel, and Schäffer, Utz. (2018) "Chapter 7 Controller Roles: Scale Development and Validation", in Performance measurement and management control: The relevance of performance measurement and management control research, M. J. Epstein (ed.), Bingley, *UK: Emerald Publishing*: 143-190.

[23] Fleischman, Gary M., Johnson, Eric N., and Walker, Kenton B. (2017) "An Exploratory Examination of Management Accounting Service and Information Quality*", Journal of Management Accounting Research* **29 (2)**: 11-31 (doi: 10.2308/jmar-51614). // Wook Seo, Young, Chang Lee, Kun and Sung Lee, Dae (2013) "The impact of ubiquitous decision support systems on decision quality through individual absorptive capacity and perceived usefulness", *Online Information Review* **37 (1):** 101-113.

[24] Venkatesh, Viswanath, Morris, Michael and Davis, Fred. (2003) "User Acceptance of Information Technology: Toward a Unified View", *MIS quarterly* **27 (3)**: 425 (doi: 10.2307/30036540).

[25] Gullkvist, Benita. (2013) "Drivers of change in management accounting practices in an ERP environment*", International Journal of Economic Sciences and Applied Research* **6 (2)**: 149-174.

[26] Riley, Jennifer. (2020) "Will we ever give up our beloved Excel?" *Management Accounting Quarterly* **21 (2)**: 1-9.

[27] Goretzki, Lukas, Löhlein, Lutz, Schäffer, Utz, Schmidt, Alexander, and Strauss, Erik. (2021) "Exploring the Role of Metaphors in Social-Identity Construction: The Case of the German Controller", *European Accounting Review*: 1-27.