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List of Abbreviations

AI	–	Artificial Intelligence
AWS	–	Amazon Web Services
BA	–	Business Analytics
BI	–	Business Intelligence
ERP	–	Enterprise Resource Planning
ICV	–	Internationaler Controller Verein (International Controller Association)
IGC	–	International Group of Controlling
IMA	–	Institute of Management Accountants
IT	–	Information Technology
MA	–	Management Accounting
NoSQL	–	Not only Structured Query Language
OLAP	–	Online Analytical Processing
RPA	–	Robotic Process Automation
SSC	–	Shared Service Centre
SQL	–	Structured Query Language

1. Introduction

Digitalisation is impacting companies and, in particular, management accounting (MA) in various ways that are not fully researched yet (Becker and Nolte, 2019, p. 86). However, Schäffer and Weber (2016, pp. 8–9) are of the opinion that MA is going to change fundamentally in the next years. The implications of digitalisation on MA and the profession of a management accountant need to be understood as it is crucial for organisations to acknowledge its relevance for their success (Becker and Nolte, 2019, p. 76; Kirchberg and Müller, 2016, p. 95; Lawson, 2019, p. 43). In order to stay competitive, organisations have to properly analyse the inexhaustible amount of data available (Brands and Holtzblatt, 2015, p. 12; Chamoni and Gluchowski, 2017, p. 9; Lawson, 2019, p. 43). However, this is not the sole indication of what to do; changes on several levels are required (Schäffer and Weber, 2016, p. 9).

Initially, varying definitions for MA exist, with some of them differing considerably and without a primary one being recognisable (Weber and Schäffer, 2016, p. 1). Nevertheless, some organisations attempted to make a clear statement (ibid, p. 33). The Institute of Management Accountants (IMA) published a revised definition in 2008 stating the following:

“Management accounting is a profession that involves partnering in management decision making, devising planning and performance management systems, and providing expertise in financial reporting and control to assist management in the formulation and implementation of an organization’s strategy” (IMA, 2008, p. 1).

This highlights that merely providing information is insufficient and strategic partnering is vital to survive as a management accountant (Weber and Schäffer, 2016, p. 35). Similarly, the International Controller Association (Internationaler Controller Verein, ICV) and the International Group of Controlling (IGC) define it as follows:

“Controlling is a management activity. It means being objective-driven and directing all decisions towards achieving this end. Consequently, planning and calculative practices, as well as monitoring and control, are of central importance. This applies to each individual management decision as well as to the management of the corporation as a whole” (Gänßlen et al., 2012, p. 2).

Hence, both definitions support the idea of a close cooperation between management accountants and managers (Weber and Schäffer, 2016, p. 35). The American IMA uses the

term “MA” while ICV and IGC use the in German-speaking areas commonly recognized term “controlling” (ibid, p. 33). To avoid confusion, this thesis generally uses the Anglo-Saxon term MA. However, when directly referring to German literature the term controlling might be used as a synonym for MA.

It is necessary to know what is available on the digital spectrum before considering any transformations (ICV, 2014, p. 34). Digitalisation does not have a precise definition as it might change depending on the context but it is generally referred to as the conversion of data existing in analogue form into digital information (Nobach, 2019, p. 248). Particularly, several phenomena are related to it. Terms like Big Data and business analytics (BA) arose in the past few years and play a major role for MA (Heimel and Müller, 2019, p. 397; ICV, 2014, p. 3). But also robotic process automation (RPA) is a common issue considered in this context (Langmann, 2019, p. 5; Lawson, 2018, p. 4). Consequently, a wide range of technologies can be contemplated and action should not be limited to only one of them (Schäffer and Weber, 2016, p. 16).

Therefore, processes can be analysed in terms of their applicability of digital instruments (Keimer et al., 2017, p. 828; Langmann, 2019, pp. 53–54). Main processes like strategic planning, operational planning, forecasting, reporting and consulting are affected to various degrees (Keimer et al., 2017, pp. 827–828; Langmann, 2019, p. 10). Generally, repetitive and transactional tasks can be automated easily (Keimer et al., 2017, p. 828). Besides, it seems like resource-intensive processes such as reporting and budgeting are greatly impacted by digitalisation (Langmann, 2019, p. 10).

Simultaneously, not only the enterprises will evolve as a result of the digital transformation, but also tasks and responsibilities of management accountants in particular (Kirchberg and Müller, 2016, p. 95). In fact, management accountants play an important role in driving those developments (Langmann, 2019, pp. 44–45). New roles should be established, such as that of a pathfinder who keeps track of new technologies and checks their usability (ibid). Meanwhile, the increasingly common perception of the management accountant as a business partner is becoming more relevant than ever before (Langmann, 2019, p. 42; Schäffer and Weber, 2016, p. 13). Yet, it is challenged by its lacking application in practice (Langmann, 2019, pp. 42–43; Lawson, 2018, p. 8).

The aspiration to be an active support for management, while understanding information technology (IT) and analytical processes, results in the need for an advanced skill set of management accountants (Gänßlen et al., 2012, pp. 7–8; Heibel and Müller, 2019, p. 418). Correspondingly, the IMA updated its “IMA Management Accounting Competency Framework” to reflect the impact of changes in technology and the finance function in general (Lawson, 2019, p. 42). Additional research adds to that list of old and new relevant competencies (Becker and Nolte, 2019, p. 85; Heibel and Müller, 2019, p. 416; Keimer et al., 2017, p. 831; Nobach, 2019, pp. 265–266). Both reveal the demand for accountants with a new range of competencies who still can apply some of the older ones as well (Gänßlen et al., 2012, pp. 7–8; Lawson, 2018, p. 4, 2019, pp. 45–46).

To shed a light on these developments, this bachelor paper on ‘Digitalisation in Management Accounting’ deals with the research question: How does digitalisation impact management accounting now and possibly in the future? Consequently, the objective is to analyse how MA is changing in the light of digitalisation, to provide insight to current and future management accountants on what to expect and what is expected from them in their profession.

The research is organised as follows. A literature investigation gives an overview of what is considered by the term digitalisation, its potentials and challenges as well as its impact on the organisational setup of MA and the job of a management accountant. In terms of the last two aspects, processes in MA and applicable technologies are considered as well as changes in skill sets, roles and related jobs. Subsequently, a qualitative analysis based on four expert interviews with management accountants of three differing companies illustrates the situation in firms nowadays and how it will possibly look in the future. With that in mind, the following research sub questions shall be answered.

- With which methods and technologies are processes in MA digitalised?
- Which roles in MA evolved or gained importance as a result of digitalisation?
- What is the impact of digitalisation on skills in MA?

2. Dimensions of Digitalisation

As mentioned before, there is not only one specific definition of digitalisation but originally the term described the conversion of analogue data into digital information (Nobach, 2019, p. 248). In the past few years, several related phenomena and technologies arose (Gadatsch et al., 2017, p. 193; ICV, 2014, p. 3; Lawson, 2018, p. 4), some of which will be explained in this section and section 4.2. According to Heimel and Müller (2019, p. 398) Big data and BA are particularly relevant for MA and are thus introduced here.

Big Data is a recent trend in data analysis that started around 2010 (ICV, 2014, p. 3). In simple words, Big Data refers to huge amounts of data that are generated quickly, change quickly and can be of various forms (Langmann, 2019, p. 5). This interpretation reflects the 3 Vs of Big Data which have been introduced by the research and advisory enterprise Gartner (Gadatsch et al., 2017, p. 199; Sicular, 2013). Accordingly, volume, variety and velocity are characteristic for this term (Gadatsch et al., 2017, p. 199). Thus, Gartner (Sicular, 2013) defines Big Data as “[...] high-volume, -velocity and -variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making”. The latter is also considered by BITKOM which stresses the aim of gaining an economic benefit by using Big Data (BITKOM, 2012, p. 19). Considering the Vs of Big Data again this fact could amend the original 3 Vs with a new one called value as well as another commonly used V for veracity (Heimel and Müller, 2019, p. 399). Therefore, the characteristics of Big Data can be described by 5 Vs (Lippold, 2017, p. 6). They reflect the huge amount of data available (volume) in differing forms such as structured and unstructured (variety) and the speed at which it is being generated, changed, processed and filed (velocity) (Gadatsch et al., 2017, p. 199; Lippold, 2017, p. 6; Sicular, 2013). Additionally, these data should deliver truthful information (veracity) to realise benefits for the economy (value) (Heimel and Müller, 2019, p. 399; Lippold, 2017, p. 6)

About five years ahead of Big Data, BA became popular (ICV, 2014, p. 3). BA is described as the application of various methods like statistical analysis and algorithms with a focus on gaining insight from data in order to solve problems and support decision-making in companies (Chamoni and Gluchowski, 2017, p. 9; Langmann, 2019, p. 6). Several stages of BA can be defined which refer to differing time horizons and deliver varying degrees of value for the business (Lawson, 2019, p. 42). Starting with the past, descriptive analytics looks at

what happened and diagnostic analytics questions why it happened (ibid). Next, real-time analytics shows what is currently happening (Lanquillon and Mallow, 2015, p. 56). Looking to the future, predictive analytics asks “What is likely to happen?” and prescriptive analytics identifies what should be done (Lawson, 2019, p. 42). Throughout this changing time focus, the gained benefits from the results are multiplying for companies (ibid). Simultaneously, the complexity of the analysis is increasing (Lanquillon and Mallow, 2015, p. 56).

These distinctive viewpoints of BA are categorised further by Gluchowski (2016, p. 277). He shows that predictive and prescriptive analytics can be understood as part of advanced analytics whereas descriptive and diagnostic analysis would be classified as easy analysis methods (Lanquillon and Mallow, 2015, p. 62). For the former, the look at the past is complemented by prognostic analyses and simulations (ICV, 2014, p. 34). However, this perspective is criticized by Lanquillon and Mallow (2015, p. 62) who suggest looking at the complexity of applied methods. For instance, they recommend considering whether a few structured query language (SQL) queries can lead to results (basic analytics) or whether data mining or machine learning methods are necessary (advanced analytics) (ibid, pp. 62–63). Moreover, Big Data analytics is another classification because it partly belongs to BA, partly to analytics in general and it includes advanced analytics that are amended by Big Data potentials (Gluchowski, 2016, p. 277; Lanquillon and Mallow, 2015, p. 63).

An older phenomenon is Business Intelligence (BI) which dates back to 1989 (ICV, 2014, p. 3). According to Kemper et al. (2010, p. 9), BI is aiming to support decision-making with a holistic approach that is integrated, based on IT tools and specific to each company. In other words, BI solutions comprise the tools necessary for collecting und transforming raw data to acquire beneficial information for analyses (Heimel and Müller, 2019, p. 420). This means, BI seems to incorporate various technological approaches, making Big Data and other instruments merely a part of the broader term (ICV, 2014, p. 3).

Besides, certain similarities to BA are detected and Schön (2018, p. 432) even argues that no major difference between BI and BA can be found. Chamoni and Gluchowski (2017, p. 9) explain the distinction of BA with its focus on data-driven analyses that serve as a prognosis for planning. Since BI is considered an umbrella term and has been in use for a longer time, while digitalisation is a more specific and recent issue, the former is only considered as a basis here (Heimel and Müller, 2019, p. 398; ICV, 2014, p. 3). Although, it does not need to

be excluded completely. By complementing the traditional BI with Big Data analytics, explorative BI is formed (Schön, 2018, p. 429). The latter appears to be a more relevant version of BI for this paper as it takes the two major components of digitalisation (Heimel and Müller, 2019, p. 398) into consideration.

Other technologies relevant in the context of digitalisation like as robotic process automation (RPA), machine learning and artificial intelligence (AI) should be mentioned (Lawson, 2018, p. 4). RPA describes software robots that imitate human interaction between diverse systems by automatically handling repetitive, structured and rule-based processes (Keimer et al., 2017, p. 828; Langmann, 2019, p. 6). Machine learning refers to self-learning algorithms that make predictions of unknown information by obtaining rationale from data and deducing correlations (Langmann, 2019, p. 7). The standard RPA is not smart as it only follows programmed rules, but by combining it with machine learning, the system becomes capable of learning to draw connections itself and no longer requires structured data for RPA (ACCA et al., 2018, p. 39). AI belongs to information science and aims to simulate human ways of thinking, acting and problem solving on computers with the goal of finding new or more efficient solutions of tasks (Lämmel and Cleve, 2012, p. 13). It includes a variety of other technologies such as machine learning and artificial neural networks (see section 4.2.) (Buxmann and Schmidt, 2019, p. 7).

To summarise, digitalisation refers to the real-time processing of structured and unstructured data from numerous sources within non-relational databases or structured data memories by using intelligent algorithms (Heimel and Müller, 2019, p. 398). Hence, manifold methods are available for the MA (ibid). Which processes are handled with the methods mentioned here is explained in section 4.1. and the technologies are further specified in section 4.2. However, before delving into these topics, it is important to identify the reasons for and against the use of digitalisation in MA, including possible obstacles, in the subsequent section.

3. Potentials and Challenges of the Digital Transformation for Management Accounting

Digitalisation should not stay unconsidered in MA as it provides companies with manifold benefits. They range from enhanced quality, efficiency, speed and better decision-making to value-added potentials and newly available resources (Becker and Nolte, 2019, p. 76; Heimel and Müller, 2019, p. 416; Kieninger et al., 2015, p. 6). A lot of them are interlinked and this part points out where these potentials result from.

Efficiency is increased by various factors (Langmann, 2019, p. 38). Automation and the relocation of repetitive activities to Shared Service Centres (SSC) allows for an acceleration of several processes like planning, forecasting, reporting and consolidation (KPMG and Universität St. Gallen, 2013, p. 24; Langmann, 2019, pp. 37–38; Schön, 2018, p. 442). Likewise, the quality of prognoses, analyses and decision-making is boosted as they are based on enriched information and verifiable findings derived from predictive analytics and machine learning (Heimel and Müller, 2019, p. 416; Kieninger et al., 2015, p. 6; Schön, 2018, p. 442). Thus, through both automation and predictive analytics, forecasts are created more accurately (Heimel and Müller, 2019, p. 415; Schön, 2018, p. 442). Simultaneously, mobile solutions are enabling management to make high-quality decisions wherever they are based on up-to-date information obtained via their phones (Matyac et al., 2015, p. 63). Having that high-quality basis for decisions also minimises risks (Heimel and Müller, 2019, p. 416). Besides that, information can be processed faster, and this sped-up reaction time means decisions can also be made in a more timely manner (ibid, p. 415). The possibility to check for improvement potentials and optimise patterns in cause-effect relationships, partly even in real-time, translates into productivity gains (ibid, pp. 415–416).

Moreover, the implementation of IT solutions, especially automation, as well as the continuous use of the aforementioned SSC leads to resources being made available (Kirchberg and Müller, 2016, p. 94; KPMG and Universität St. Gallen, 2013, p. 24; Langmann, 2019, p. 38). This is the case because the capacity needed for rote activities is reduced significantly (Kirchberg and Müller, 2016, p. 94). Therefore, management accountants can focus on supporting decision-making and assisting in strategic matters (Lawson, 2018, pp. 8–9).

A huge potential for advanced value-adding activities is perceived (Becker and Nolte, 2019, p. 76). New business models, the changed focus of management accountants as well as

real-time insights in and reactions to performance are arguments for that (Becker and Nolte, 2019, p. 76; Lawson, 2018, pp. 8–9). Overall, a competitive advantage can be gained through the proper management of data and information made available by digitalisation (Brands and Holtzblatt, 2015, p. 12).

The ease of making use of all these benefits is impeded by a set of requirements. As with every major alteration that is planned to be implemented in a company, a proper change management and its alignment with the overall strategy are crucial (ACCA et al., 2018, p. 33). This entails an open exchange of information and constructive criticism which help build a performance culture (Schäffer and Weber, 2016, p. 14). Without an active employee engagement, drivers of change will have a harder time trying to implement modifications (ACCA et al., 2018, p. 33). Besides this culture of change, a trial-and-error culture needs to be set-up (Schäffer and Weber, 2016, p. 12). In an environment where less stability is inevitable and more uncertainty has to be faced, disruptive changes are creating more pressure (Heimel and Müller, 2019, p. 418; Schäffer and Weber, 2016, p. 16). To cope with this, allowing employees to try and learn is vital but not easy, as it clashes with another management philosophy that promotes safety by avoiding mistakes (Schäffer and Weber, 2016, p. 16).

Furthermore, it is necessary for management accountants to be aware of ongoing trends (Brands and Holtzblatt, 2015, p. 4). Before anything can be automated, suitable processes and tasks have to be identified and then prioritised (Lawson, 2018, p. 9). This in turn requires management accountants who actively deal with digitalisation to know which technologies are existing and where they are applicable (Heimel and Müller, 2019, p. 418; ICV, 2014, III). That means they also have to keep in mind their companies' limitations concerning affordability, practicability in the existing IT infrastructure and ease of use with the given know-how (Brands and Holtzblatt, 2015, p. 4). Here another factor, the high costs associated with implementing efficient IT-systems, is addressed as well (ICV, 2014, p. 15). Yet, to ensure positive outcomes from any technologies, the proper management of data, which constitute the basis for everything, is essential (Schäffer and Weber, 2016, p. 9).

One of the key challenges is that the competencies of management accountants have to be adjusted to properly deal with digitalisation and make the most of it (ICV, 2014, III; Schäffer and Weber, 2016, p. 9). This aspect is further detailed in section 5.1. To tackle it

companies can think about implementing training measures that convey required specialist and methodological knowledge and internally develop their employee's skills in a goal-oriented manner (Nobach, 2019, p. 266).

Furthermore, according to Brands and Holtzblatt (2015, p. 4) the following needs to be considered. Security is vital as data needs to be protected to align with laws and prevent an organisation's reputation from being damaged. This task does not only involve those working in IT but also those in MA who are actively working with a lot of sensitive data. Moreover, BA will not automatically add value to data. Instead, analyses have to be done in a structured way with clearly defined objectives in order to generate benefits. Another obstacle in this context is the fact that data does not only exist in structured form obtained from enterprise resource planning (ERP) systems, but also in unstructured form extracted from the web. Therefore, options to provide an adaptable structure need to be found and BA should be able to link these differing structures.

Finally, it is unclear how exactly the number of workplaces in MA is going to be affected (Heimel and Müller, 2019, p. 420). With the opportunity of self-service, through which managers can receive relevant information in real-time directly from the systems themselves, management accountants seem to lose some of their presence in reporting (Schäffer and Weber, 2016, pp. 10–11). Among others, these uncertain facts are addressed in the next sections on organisational structure and changes in the profession.

4. Impact of Digitalisation on the Organisational Setup of Management Accounting

Keimer et al. (2017, pp. 828–829) mention a number of effects of digitalisation on an organisation. As processes are digitalised, procedures change, and these consequences are further explained in section 4.1. Moreover, the MA and IT-departments ideally work together more closely to functionally connect existing knowledge. These adaptations lead to a changed organisational structure. In MA-factories, repetitive tasks can be performed, while in MA-hubs, specialist know-how can be collected from several areas and bundled to allow for detailed analyses. These new forms need to be compared with already existing

structures such as SSCs or centralised and decentralised MA in order to strategically adopt improved setups.

In line with this, SSC are not a result of digitalisation, but were implemented before this trend (Langmann, 2019, p. 37). SSCs are usually organisationally independent entities in which repetitive, standardised procedures are bundled (Heimel and Müller, 2019, p. 419; Langmann, 2019, p. 37). The digitalisation of the activities performed within them is now the relevant factor (Langmann, 2019, p. 37). Consequently, an increasing focus on shared services is expected by Kirchberg and Müller (2016, p. 86) as more and more tasks are accomplished there. Simultaneously, the authors argue that the number of employees within SSCs will decline significantly as a result of the expanding automation. Besides SSCs, sub forms like Centres of Expertise or Centres of Excellence are appearing where experts with specialised knowledge offer consultancy services (Heimel and Müller, 2019, p. 419; Langmann, 2019, p. 41).

Furthermore, Langmann (2019, p. 36) reports that MA is increasingly being centralised due to a heightened efficiency pressure; automation and standardisation are a natural consequence. Heimel and Müller (2019, pp. 421–422) expound two more reasons for the necessity of standardisation. The first is to integrate and ensure security and flexibility of data and analyses on a company-wide level, which is an important step towards a MA-governance (section 5.2.). The second is to be able to implement new technological tools and in particular, to automate processes. Thus, a highly standardised infrastructure has to be built in which data are compatible and driver models work effectively. Once that is established, MA can also support the selection of tools and methods which fit into the optimised business environment. In terms of Big Data, this entails that MA needs an internal and external process that allows for a conceptual and technical integration of all data in the internal processes (Heimel and Müller, 2019, p. 421; Kieninger et al., 2015, p. 7). Independent of whether data are stored centrally or decentralised according to functionalities, MA should have sovereignty over all data that are relevant for the whole business, in order to keep being the “single source of truth” (Heimel and Müller, 2019, pp. 421–422). This data governance role is further explained in section 5.2.

Moreover, changes in steering principles can be expected (Horváth & Partners, 2017, p. 3). Generally, business steering will become proactive-predictive and move away from the

current reactive-analytical concept (Kieninger et al., 2015, p. 5). Across the whole company, it will be based on quantified driver models (Horváth & Partners, 2017, p. 16). Additional changes arise from the possibility of self-controlling, where management is enabled to withdraw relevant information from the systems themselves (Heimel and Müller, 2019, p. 416). This aspect is enhanced by the technological advances of mobile computing (see section 4.2.) (Nobach, 2019, p. 260). Besides, self-service BI also enables other end users to easily create and adjust their own reports and analyses (Schürmann et al., 2017, p. 200).

Meanwhile, a new organisational area or at least new positions for data scientists are evolving (Langmann, 2019, p. 39). A data scientist (see section 5.3.) is believed to have expertise that a management accountant is unlikely to possess (Langmann, 2019, p. 41). The increasing use of shared services and appearance of new positions closely connected to MA raises doubts about the necessity of MA and how its headcount will be influenced (Heimel and Müller, 2019, p. 420; Kirchberg and Müller, 2016, p. 86; Langmann, 2019, p. 39). Surely, several MA positions will be cut (Lawson, 2018, p. 4). Nevertheless, Lawson (2018, p. 4), Kirchberg and Müller (2016, p. 94) as well as Schäffer and Weber (2016, p. 13) are optimistic that an enhanced focus on MA as a business partner (see section 5.2.) even has the potential to create new workplaces to be able to handle this complex task.

4.1. Processes

Having a clear idea which activities exist in MA sets a basis for improving processes and implementing new IT-systems (IGC, 2011, pp. 56–57). Thus, to understand where and how digitalisation can be applied in MA, actions taking place within this department are analysed. To begin with, general MA processes are outlined. Afterwards, it is explained which of these procedures can be influenced and adjusted with new technologies. The latter are then further explained in the subsequent section 4.2.

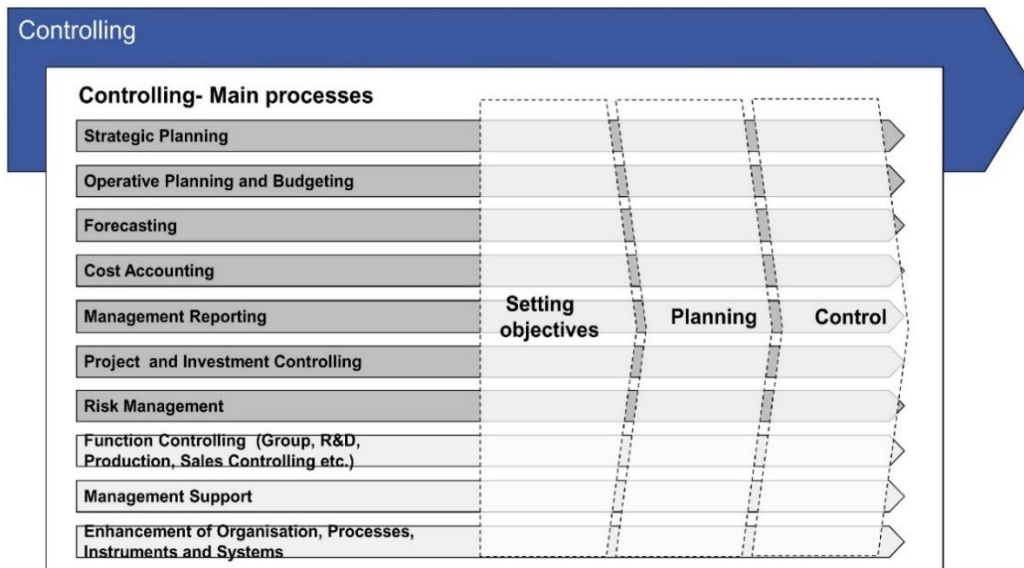


Figure 1: IGC (2011) Controlling Process Model (Möller, 2018, p. 10)

In 2011, the IGC introduced a MA process model which was updated six years later to fit the implications of digitalisation and Big Data (Haufe Online Redaktion, 2018; Nasca et al., 2019, p. 78). The model defines ten main procedures occurring in MA (IGC, 2011, p. 13). This original concept is shown in Figure 1. Its dark grey segments indicate the seven core processes (IGC, 2011, pp. 20–21). Among others, they include planning, budgeting, forecasting, accounting, reporting and risk management (ibid, p. 21). In addition, functional controlling, business consultancy and the improvement of the organisation and its parts are considered relevant (ibid).

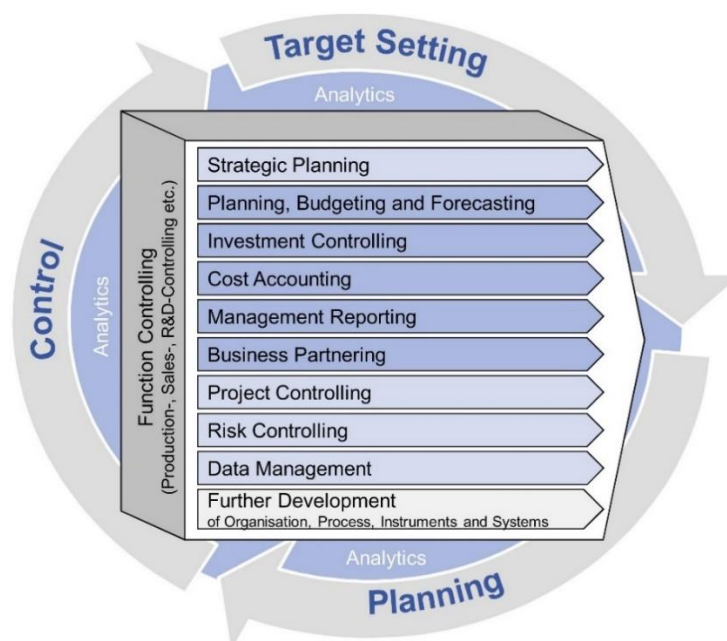


Figure 2: IGC (2017) Controlling Process Model 2.0 (Möller, 2018, p. 12)

Figure 2 shows the revised version of the IGC process model. Möller (2018, p. 13) and Haufe Online Redaktion (2018) point out the adjustments that have been made. They include but are not limited to the following: First, the seven core processes were reduced to the five dark blue ones because strategic planning, project and risk controlling are no longer considered as part of the core while business partnering is now included; data management has been added as a new process; and the function controlling has been moved to a second dimension spanning all ten main processes. These MA procedures are surrounded by the circular management process of target setting, planning and steering. Finally, the model has been amended by analytics which has become an integral part of the whole MA process.

The impact of digitalisation on each main process differs and it is particularly the specific actions within each of them that change instead of merely its results (Keimer et al., 2017, p. 828). Kirchberg and Müller (2016) suggest that planning, reporting and cost accounting are the fields that will shift the most as a result of digitalisation. According to a study analysing the impact of the digital transformation on MA, the four process categories data management, management reporting, planning, budgeting and forecasting, as well as the development of organisation, processes and so on, are expected to be affected the most severely (Nasca et al., 2019, p. 79). Meanwhile, the study indicates strategic planning as being influenced the least out of the ten main processes by the IGC (ibid). An outline by Langmann (2019, p. 11) supports this idea. Analogous, about two thirds of corporations plan to use BA to analyse costs as well as for planning and budgeting (Chamoni and Gluchowski, 2017, p. 14). To understand how those areas are affected in particular, a more detailed look is provided.

An overview based on Müller and Schulmeister and published by Kirchberg and Müller (2016, p. 91) shows the extent to which sub-processes are impacted by digitalisation. In strategic planning, the strategic analysis and financial evaluation of the strategy describe the biggest effects. For budgeting, it is the preparation of individual plans and budgets while in forecasting it is the establishment of a data base and the creation of the forecast. Cost accounting seems to change the most severely as all its sub-processes are at least moderately affected with the strongest impact on quotation plan calculation and standard order costing. Nonetheless, several sub-processes of management reporting also record

intense effects. These are the management of the data process and reporting system process, as well as the number-based part and the deviation analysis and commentary to generate reports.

In general, two areas of reporting will be concerned, Kirchberg and Müller (2016, p. 93) explain. Firstly, the contents will be more agile and future oriented, and secondly, the method of creating and distributing reports will change. This entails that reporting will get faster and more complex as real-time methods, larger databases and simulations are being used. Paper reports will increasingly become a phenomenon of the past as they will be substituted by cloud-based forms. Heimel and Müller (2019, p. 416) add to this that real-time reporting and mobile solutions are entering the reporting process and allow management to quickly get ad-hoc information for steering the business. For instance, deviations can be analysed immediately with the help of dashboards and drill-down options. Thus, quick counteractive measures are either enabled by this fast information availability or by prescriptive technologies. Basically, as Langmann (2019) conveys, there are numerous software solutions available (section 4.2.) to support the reporting process along all steps. In one example, with the help of RPA, data are extracted and aggregated from diverse, separated software applications such as Microsoft Office, e-mail programmes and ERP systems (Langmann, 2019, pp. 16–17).

Furthermore, Kirchberg and Müller (2016, p. 92) lay out a handful of changes made possible in planning, budgeting and forecasting. In the data and number-driven part of planning, they anticipate the biggest impact of digitalisation where predictive analytics is concerned and external as well as internal data are added to the data basis. Correspondingly, planning becomes predictive as algorithms will automatically prognosticate data and numbers and employees will solely validate them. Moreover, data are generated and loaded into the systems automatically, which affects not only planning, but also budgeting and forecasting. Langmann (2019, p. 25) amends that planning sheets can be created and their entered data can be collected from several sources with the help of RPA. Despite everything, there are limitations to the application of algorithms in the planning process as Kirchberg and Müller (2016, pp. 92-93) point out. They can only perform well within set parameters. Data input outside of this scope would not lead to more valuable alternatives being generated but to potentially misleading results. Therefore, it can be helpful to initially limit the usage of

predictive analytics to certain time-consuming subfields of planning. In addition, the original way of planning can be conducted parallelly and quality controls monitoring the set parameters and their observance can be integrated.

In terms of internal cost accounting, there will be a closer integration with financial accounting, as Kirchberg and Müller (2016, pp. 93–94) elaborate. This means, for instance, imputed costs are more easily aligned with financial accounting. Additionally, there will be an extensively automated calculation of cost and profit contribution scenarios. On the contrary, commenting in reports and providing business consultancy will not necessarily be automated but the steps undertaken can be based on an extended source of information. For a business partner, this offers the opportunity to extend both the scope of support provided and its quality.

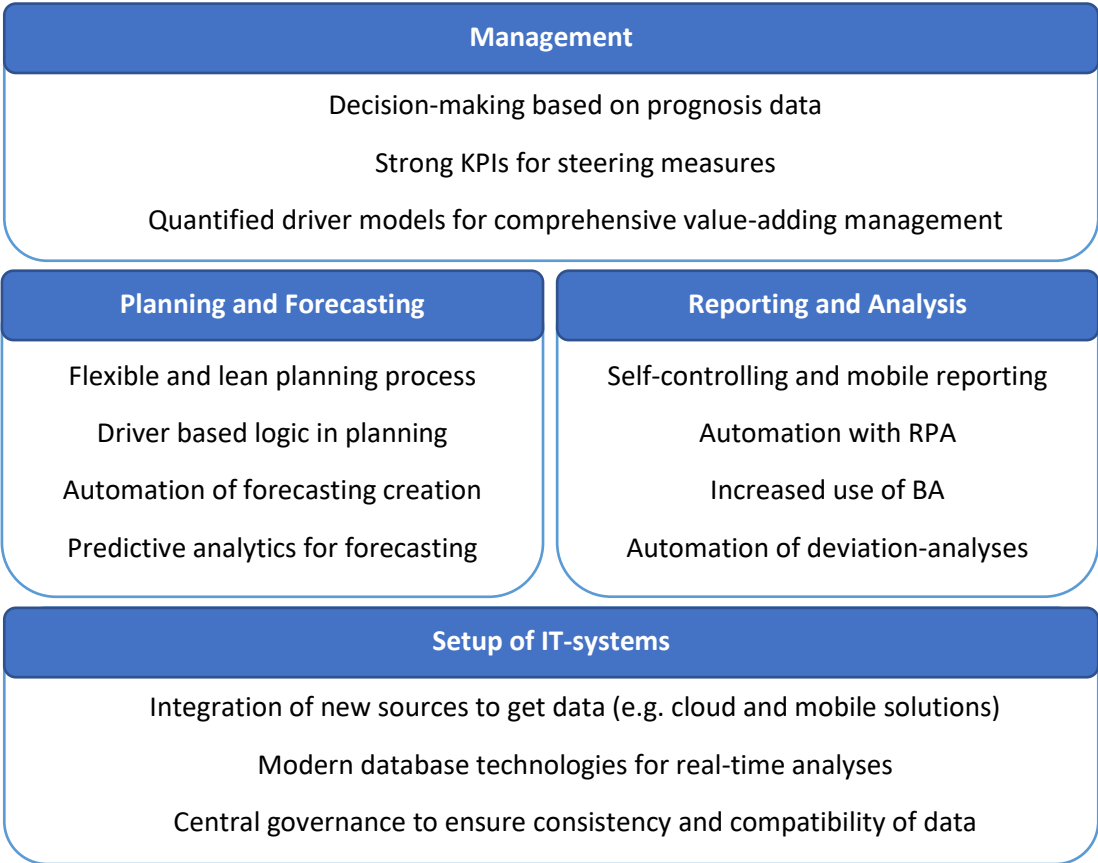


Figure 3: Impact of digitalisation on processes in MA (Nobach, 2019, p. 253)

To summarise, potential applications of digitalisation in the MA processes are manifold. Figure 3 illustrates some of these impacts. For a more feasible understanding of the technologies which can be used in certain process steps the next section points out various software solutions available.

4.2. Methods and Technologies

In general, the usage of IT is not new to MA as (Heimel and Müller, 2019, pp. 397–398) point out. Since the 1970s computers and ERP-systems have been in use. A decade later spreadsheets and BI, relational databases and data warehouses started to make their way into the department. Now, numerous new methods and technologies that can be applied in enterprises arise in connection with digitalisation and constitute a driver of the latter (Keimer et al., 2017, p. 830). However, it is also important to mention that there are no new MA-instruments as such because of the IT software, Horváth (2019, p. 8) explains. Instead, the author argues, familiar instruments such as target costing are simply applied with IT tools and these tools are enabling an efficient use of the instruments in MA. Yet, he acknowledges the potential of modifications of existing instruments driven by the IT. In order for management accountants to know which types of software exist on the market and for what they are suitable, knowledge of the technologies they are based on is helpful (Kirchberg and Müller, 2016, p. 88; Nobach, 2019, p. 264). Hence, to provide that first insight, this section discusses what the before-mentioned trends (section 2) and additional techniques entail, gives examples for their use and which software exists based on them.

Big Data is a complex issue and naturally has several technological bases (Schön, 2018, pp. 419–420). Namely, in-memory computing, NoSQL databases and analytical databases (ibid, p. 420). BA utilises Big Data with methods such as data mining and sentiment analysis (Heimel and Müller, 2019, pp. 403–404; Langmann, 2019, p. 13). Automation, particularly RPA, can be based on machine learning and artificial intelligence (ACCA et al., 2018, p. 39). Other considerable technologies are cloud computing (Keimer et al., 2017, p. 830) and mobile computing (Matyac et al., 2015, p. 63).

In-memory computing plays a large role in the digital era. Especially since the introduction of SAP S/4HANA by the well-known ERP systems provider SAP in 2015, this in-memory platform can be considered a driver of digitalisation in MA (Langmann, 2019, p. 35). In-memory computing refers to the storage of necessary data on main memory instead of on hard drives (ICV, 2014, p. 35). The former works much faster and allows for quicker calculations and analyses (Keimer et al., 2017, p. 831). Queries from hard disks take milliseconds while queries from in-memory databases only take nanoseconds to process (Schön, 2018, pp. 420–421). Although this memory cost substantially more than the classical one, a price

reduction is visible (ICV, 2014, p. 35; Schön, 2018, pp. 420–421). Langmann (2019, p. 35) further explains the software technology. Within the HANA database, compressed data are saved on the central memory. Accordingly, processes are completed on a database-level where data are readily available in real-time and only results are visible for the user. This prevents the former timely necessity of extracting data from warehouses to have an analysis base. Nevertheless, it can still be beneficial to have a separate data warehouse, especially when using external data sources. Moreover, a switch from row-oriented storage of structured data to a column-oriented method is typical (ICV, 2014, p. 35). The technology results in less storage capacity needed and higher speed of analyses which is crucial in the digital age where an increasing amount of data need to be processed (Langmann, 2019, p. 35). Furthermore, the integration of cost accounting in MA and financial accounting is possible as SAP S/4HANA integrates general ledgers and subledgers to a large extent in one table (Kirchberg and Müller, 2016, p. 93). This means, book entries are available simultaneously and both departments are easily aligned (Langmann, 2019, p. 35).

Not only Structured Query Language (NoSQL) databases differ from relational and online analytical processing (OLAP¹) databases and are described as non-relational databases that can handle extensive amounts of structured and unstructured data (Schön, 2018, p. 421). In the past, data was aggregated in the SQL format while nowadays the NoSQL format is more common (Heimel and Müller, 2019, p. 420). For example, the aforementioned SAP HANA database but also Microsoft Cassandra and MongoDB use this approach (ibid). The difference is that data do not necessarily have to be stored in a structured way and absolute consistency of data does not have to be ensured at all times (Schön, 2018, pp. 422–424). Rather, the focus could be on availability or avoidance of breakdowns, depending on the area the database is used in (ibid).

Analytical databases simply refer to platforms which are capable of processing huge amounts of data to allow for analyses (Schön, 2018, p. 426). They are classified by in-memory storage, mainly in a column-oriented way, parallel saving and processing as well as data compression (ibid, pp. 426–427). Despite these new types of databases, in many

¹ OLAP describes, from a user perspective, a multi-dimensional database with user-friendly options to flexibly perform analyses (Kemper et al., 2010, p. 106). The data storage is separated from the user interface and its form can thus be chosen freely, albeit, relational and multidimensional forms are applied preferably (ibid).

corporations, relational databases are still in use (ibid, p. 426). Thus, Schön (2018, p. 428) summarises that it is likely that Big Data technologies will be integrated in OLAP databases and ERP-systems or at least will amend these instead of merely substituting them.

Data mining refers to the drawing of primarily unknown connections between data (e.g. from social media) by systematically looking for patterns in it with the help of statistical probability and mathematical methods (Schön, 2018, p. 380). Additionally, its methods can draw upon machine learning and AI (Kemper et al., 2010, p. 115). Schön (2018, pp. 380–381) is of the opinion that data mining and predictive analytics are quite similar. Basically, the method is an enabler of BA (ICV, 2016, p. 8). Some examples of BA software are Microsoft Power BI, KNIME, Tableau, RapidMiner and Sisense (Brands and Holtzblatt, 2015, p. 6; Langmann, 2019, p. 34).

Similarly, sentiment analysis allows for the quantification of unstructured data from social media, portals etc. to make it accessible for reporting (Langmann, 2019, p. 13). This happens in real-time by applying algorithms and text filters, also referred to as text mining, which search for information, evaluate them and transfer them into metrical or binary data for statistical analysis (Kemper et al., 2010, p. 118; Langmann, 2019, p. 13). Hence, soft factors such as buying behaviour, opinions and discussions found online as well as social changes can be identified and help form a general picture of the market to adjust forecasts and plans accordingly (Langmann, 2019, p. 22). Based on these sentiment analyses and other Big Data insights, implications for the management can be visualised with value driver trees (ibid, p. 13). For this purpose, unstructured but quantified data are connected with financial KPIs in a cause-effect model and thus enables driver-based management (ibid).

This visualisation is enhanced by dashboards or cockpits where the results of reports and analyses can be illustrated in a well-structured and interactive manner (Schön, 2018, p. 375). On the one hand, the information available and its level of detail are adjusted depending on the users and their access rights (ibid, p. 112). On the other hand, new functionalities allow for flexibility in creating new graphs, and links to underlying reports allow for an adaptable and deeper analysis (ibid, pp. 107, 375). Some charts are used preferably in business contexts such as tree maps, bubbles or sunbursts (ibid, p. 386). Various software providers deliver options for this visualisation; Schön (2018) gives the examples of Qlik View, Diamant/3 IQ and SAP Lumira.

ACCA et al. (2018, p. 10) explain that RPA does not refer to physical robots used in manufacturing but software which is programmed to execute repetitive, rules-based and high-volume tasks that are usually performed by humans. The authors further name a key benefit of this technology. It operates independently of specific systems and can thus be deployed across existing software without having to change it. This entails that the automation logically imitates data transfers and cross-system workflows that normally are mundane, time-consuming jobs. Examples for RPA software are UiPath, Blue Prism and Automation Anywhere (Langmann, 2019, p. 34).

In general, AI comprehends attempts to simulate cognitive abilities with machines in order for them to autonomously solve problems and improve these solutions by continuously learning (Schäffer, 2019, p. 19). Buxmann and Schmidt (2019, p. 6) point out the difficulty of finding a common definition of AI. Yet, they further explain that two forms of AI are distinguished – “strong AI” and “weak AI” or “narrow AI”. Strong AI generally entails concepts trying to model and imitate processes in human brains whereas narrow AI focuses on programs which show intelligent behaviour merely in specialised areas (Buxmann and Schmidt, 2019, p. 6; Pennachin and Goertzel, 2007, p. 1). Pennachin and Goertzel (2007, p. 1) thus also refer to an “Artificial General Intelligence”, meaning software that is able to solve complex problems in various domains and controls itself. These days, weak AI is a more feasible application and part of current AI software (Buxmann and Schmidt, 2019, p. 6). The common requirement of AI is the ability to learn which is described further below as machine learning (ibid, p. 7).

In fact, the term AI was already coined in 1956 but only recently, a few additional factors are supporting its rise (Schäffer, 2019, p. 19). One of these is Big Data, since AI draws upon large amounts of highly qualitative data when experiencing new cases requiring decisions (Schäffer, 2019, p. 19; Schäffer and Weber, 2019, p. 3). Peter Buxmann describes AI as a second wave of digitalisation (Schäffer, 2019, p. 20). This emphasises that the technology is still relatively undiscovered in terms of its usage in MA (Horváth & Partners, 2017, p. 27; Schäffer, 2019, p. 20). Mertens and Barbian (2019, pp. 13, 16–17) are uncertain in which areas of MA AI will be applied as the cost-benefit has to be analysed as well. Simultaneously, others underline the importance of AI and that it will inevitably be a highly relevant aspect that businesses will be confronted with in the future (Sauer and Sturm, 2019, p. 42;

Schäffer, 2019, p. 20). Possible future scenarios are that AI suggests specific ideas for decision-making to the management accountant or that systems automatically make their own decisions and develop steering measures in accordance with management processes (Michel and Tobias, 2017, p. 39). One limitation of AI is that, depending on the specific algorithms used, it operates in a black box and the decisions made are often incomprehensible, leading to an acceptance or legality risk in some cases (Schäffer, 2019, p. 22). A well-known software example using AI is IBM Watson Analytics (BARC, 2019, pp. 144–145). This tool can be considered relevant for usage in MA, particularly for processes such as management reporting and risk management where data collection, correlations, visualisation and predictions can add value (ICV, 2016, p. 48).

Artificial neural networks are a technology strongly related to the current AI and are a technical replication of human neural networks (Mertens and Barbian, 2019, p. 11). These networks are trained to learn from analysed data by searching for patterns, adjusting the strength of connections and taking wrong results into consideration, to ultimately find solutions for previously unknown cases (ibid, p. 12). Hence, Buxmann and Schmidt (2019, p. 7) refer to artificial neural networks as the basis for machine learning.

Machine learning enables applications to enhance their analysis quality and results with the increasing amount of data being analysed as the algorithm is capable of continuously learning the magnitude of influences and how they are related (Langmann, 2019, p. 7). For instance, BA models can be constantly amended and improved to achieve the highest possible analysis quality (ibid, p. 8). Some IT-solutions are provided by DataRobot, BigML and PredictionIO (ibid, p. 34).

Cloud computing refers to data and applications which are storable and accessible via the Internet instead of through on-premise hardware and systems (Matyac et al., 2015, p. 63). Hence, the computing capacity can be extended cost-effectively and organisations can expand their capabilities (Keimer et al., 2017, p. 830; Matyac et al., 2015, p. 63). Moreover, data can be accessed anywhere, anytime (Keimer et al., 2017, p. 830). For many firms, data security in a cloud might still be a concern, but these solutions will gain ground in the future (Heimel and Müller, 2019, p. 421). Especially for small and medium-sized companies, cloud solutions are a feasible option as they can be implemented more cost-effectively and flexibly (Langmann, 2019, p. 24). The leading public cloud providers that are currently used by

companies are Amazon Web Services (AWS), Microsoft Azure and Google Cloud, followed by VMware Cloud on AWS and IBM Cloud (Flexera, 2019, pp. 4, 33). Some of the software mentioned in this section is also offered on cloud (Brands and Holtzblatt, 2015, p. 6), such as KNIME which is provided via AWS and Microsoft Azure (KNIME, n.d.). In the end, a lot of providers offer hybrid solutions so users can choose either on-premise solutions or cloud services, or both (Langmann, 2019, p. 34).

The immense use of handheld devices, especially smartphones, calls for mobile computing as Matyac et al. (2015, p. 63) point out. They highlight that mobile phones and related devices are performing similarly to computers and are now able to apply advanced analytics. Such mobile solutions are also supported by cloud services as they harness the time- and location-independent access (Keimer et al., 2017, p. 830; Langmann, 2019, p. 16).

Clearly, some tools, especially machine learning, are frequently mentioned in relation with others and provide options how their functionality can be enhanced by smartly connecting them (ACCA et al., 2018, p. 39; Kemper et al., 2010, p. 115; Langmann, 2019, p. 8). The importance of knowing available software solutions and understanding the technologies behind them to a certain degree (ICV, 2014, p. 34) is further laid out in the following sections.

5. Changes in the Management Accountant Profession

Due to digitalisation a transformation of roles and skills in the finance function is vital to exploit the potentials emerging from it (Horváth & Partners, 2017, p. 18). Job profiles with similar and yet different functions are developed (ICV, 2014, p. 33). Thus, on the one hand, it is important for management accountants to stay relevant to not risk losing one's job (Heimel and Müller, 2019, p. 424). On the other hand, such, for example, data scientists unburden management accountants from transactional tasks and enable them to focus on real-time, agile business management based on predictive and prescriptive analytics (ibid, p. 418). The nature of these developments is further described below.

5.1. Skills and Knowledge

Current skills possessed by management accountants do not match the requirements of the digital era, as Lawson (2018, p. 4) drastically points out. He calls for a rebalancing of old and new proficiencies. This part examines the skill set necessary to make the most of the digital transformation.

The IMA (2019, p. 3) designed and recently updated a competency framework for management accounting to address the new requirements arising from the fast-changing business environment including technological impacts. Accordingly, six knowledge areas have been identified and amended by their required competencies. The domains are shown in Figure 3Figure 4 and constitute a general basis of old and new skill sets. As Lawson (2019, p. 45) points out, the most important one in terms of what is changing due to the digital evolution is called “Technology & Analytics”. The proposed skills allow management accountants to analyse data by managing technology (IMA, 2019, p. 4). They include information systems, data query and data governance to handle acquired data, various methods of data analytics and data visualisation to effectively present extracted knowledge (IMA, 2019, p. 4; Lawson, 2019, pp. 45–46). Likewise, this suggests a shift from providing management with only hindsight and oversight to contributing insight and foresight (Lawson, 2018, p. 16).



Figure 4: IMA Management Accounting Competency Framework (IMA, 2019, p. 3)

As it is visible in Figure 4, the technology and analytics domain is intertwined with the leadership, strategy and business acumen domains; therefore, connecting the skills within them allows management accountants to understand the information delivered by the data and communicate a reasonable story based on them (Lawson, 2019, p. 46). This storytelling competency is especially relevant for a management accountant in the role of a business partner (section 5.2.) since receiving facts comprised in an authentic story allows managers to recall information for a longer period of time (Langmann, 2019, p. 48). It is further explained that this skill is particularly useful for presenting reports where tables and diagrams are intended to be pared down and visual tools help to focus the reader on the core issues (ibid).

The aforementioned ability is strongly connected to the overall necessary competency of communication which, according to Gänßlen et al. (2012, p. 8) and Langmann (2019, pp. 47–48), also gained importance in the light of business partnering. Additionally, social skills play a role as the latter author highlights. He argues that a management accountant needs to discuss persuasively by not only having facts available but also speaking the same language managers use, acting confidently, showing initiative and drawing connections. Only by applying such soft skills can they evaluate a managers' preferences and attitudes (Gänßlen et al., 2012, p. 8). Furthermore, in connection with the self-controlling by managers, they need professional guidance from management accountants on how to use new tools (Nobach, 2019, p. 266). This means communication is not only relevant in connection with management but also with IT to get additional help from this department, Lawson (2018, pp. 16–17) argues. He describes this as speaking the languages of technology, analytics and business, to interpret data and share the obtained insights.

Naturally, business knowledge is crucial to successfully provide management with guidance and support (Gänßlen et al., 2012, p. 8). Insights are not automatically resulting from the use of new applications but from an active interplay between management accountants and data (Stransky et al., 2019, p. 83). This means, without the necessary business know-how and the ability to ask the relevant decision-making questions, data cannot be derived properly with the new technologies (Lawson, 2019, p. 46). Then, it is required in order to understand the reasoning behind patterns which are derived from statistical methods applied in analysis tools (Stransky et al., 2019, p. 83). This connection is also visible in the IMA

competency framework above (see Figure 4) because the technology and business acumen domains are intertwined. In this context, Lawson (2019, p. 46) further explains that the technological innovations will impact the business and knowledge of it is required to understand how processes, models and risks might change. The author also addresses the MA's position in business as a cross-functional role. The business has to be known in order to support the reorganisation of processes across the whole firm. In other words, operational and industry-specific knowledge combined with skills in quality and project management for continuous improvement are needed (*ibid*, p. 44).

In general, analytical, statistical, mathematical and technological skills are necessary to fulfil tasks in MA (Becker and Nolte, 2019, p. 85). The focus on analytical skills is perceived as relevant in many situations, examples being to comprehend the complex planning, develop quantitative ideas and analyse deviations to ultimately minimise intuitive decisions merely based on gut feeling (Gänßlen et al., 2012, p. 8). For that matter, the ICV (2016, p. 8) refers to the differentiation between structure-testing and structure-discovering methods of analysis made by Backhaus et al. (2018, p. 15). Examples given by the authors are regression analysis, variance analysis and time series analysis for the former analysis method as well as neural networks and cluster analysis for the latter. Certain knowledge in analytics and statistics are beneficial for a management accountant to be able to design, calculate and assess basic analysis models as well as to have a basic understanding of the systems applied by data scientists as Langmann (2019, pp. 46–47) explains. Similarly, mathematics refers to knowing adequate calculation methods for BA (Nobach, 2019, p. 264). From a statistical perspective some familiarity with variables and statistical parameters, probability distributions and confidence intervals as well as causalities and correlations are enumerated as examples by the author. Furthermore, IT skills, especially concerning the application of analysis software such as KNIME or RapidMiner are relevant (Langmann, 2019, p. 47; Schäffer and Weber, 2016, p. 14). Additionally, a basic knowledge of programming languages like R and Python is considered increasingly valuable (Keimer et al., 2017, p. 831; Langmann, 2019, p. 47).

To summarize the four above mentioned skill areas, Becker and Nolte (2019, p. 85) state that these are existing in various sciences such as business administration, computer science and engineering. Hence, Egle and Huber (2018) stress the necessity to acquire

statistical know-how considering that computer scientists, statisticians or engineers could otherwise take over the management accountants' jobs. However, the ICV (2016, p. 12) is of the opinion that management accountants do not need to have the same skill sets as mathematicians, but simply an understanding similar to theirs.

Additional skills relevant in MA can be listed. Management accountants need to be far-sighted and have conceptual skills to drive transformations as change agents and theoretically translate MA issues in analysable data models (Langmann, 2019, pp. 44–45). Furthermore, they should develop a digital mindset to understand the technological possibilities available and embrace them instead of perceiving them as a risk (Kirchberg and Müller, 2016, p. 88; Lawson, 2018, p. 17). This works well with a willingness to innovate and a proactive can-do mentality (Nobach, 2019, pp. 265–266). In combination with project management skills, the implementation of new analysis tools during the process of project coordination can be undertaken. (Langmann, 2019, p. 47) Besides that, general skills such as critical thinking, problem solving, self-responsibility, reliability, perseverance and collaboration remain beneficial in MA (Lawson, 2019, p. 45; Nobach, 2019, pp. 265–266). In the end, a management accountant's professional and methodological competencies should be extended and amended by the above mentioned skills (Nobach, 2019, pp. 265–266).

A study undertaken by Drerup et al. (2018) in 2017 analyses the competencies required in job postings for management accountants. Surprisingly, it contradicts the perception of a greater need for statistical software knowledge. At the same time, required IT and software skills increased the most. Microsoft Office applications, especially Microsoft Excel, are commonly expected in this context, followed by a steadily remaining necessity for SAP knowledge, particularly for SAP ERP and SAP Business Warehouse. Generally, a diverse picture is given in job postings, stating progressively more specific software experience that is needed. Despite a high relevance of databases in MA, specific knowledge demands are mentioned only by roughly a quarter of the analysed job advertisements. Examples given for respective know-how refer to Microsoft Access, SQL and IBM Cognos TM1. Finally, programming skills are mentioned in some cases and if so, it is mostly Visual Basic for Applications as an extension of Microsoft Office. This once more underlines the continuing importance of Microsoft Office tools in MA practice.

To conclude, studies reveal that skills in analytics and communication continuously gained importance over the last two decades (Drerup et al., 2018, pp. 16–18). Correspondingly, Lawson (2018, pp. 16–17) describes the necessity of speaking the analytics, business and technology languages to connect all aspects, and provide and get support to and from the people working in the respective areas.

5.2. Roles

In the past and even now, management accountants are often perceived as service providers who mainly extract numbers and build reports (Langmann, 2019, p. 46). This means they spend a lot of time on cost accounting, closing activities, reporting, planning and commenting (ibid, pp. 42–43). Langmann (2019, pp. 42, 46) explains some changes that are occurring. Due to the ongoing digitalisation and automation, a lot of these tasks will be taken over by IT-systems. Especially since the mere roles of people who provide numbers and information in the form of reports generate little added value for the business. Therefore, a shift of the role perceptions of MA is predicted and becoming detectable. Ultimately, the new roles should secure the MA's right to exist in the long run.

Nowadays, a common role expectation in literature is that of the management accountant as a business partner (e.g. Langmann, 2019, pp. 42–43; Lawson, 2018, p. 4; Schäffer and Weber, 2016, p. 16). Why is this role perceived as crucial and what does it entail? First and foremost, value creation is the key focus of MA (Lawson, 2018, p. 7). Accordingly, enterprises require the establishment of the business partner role to generate added value with MA and relieve management from work (Langmann, 2019, p. 42).

As a business partner, the management support should be comprehensive and cover all aspects of a manager's tasks, Gänßlen et al. (2012, p. 5) explain. Naturally, they state, this is not limited to numbers. Value is created by formulating strategies, conducting analyses and planning and finally executing them (Lawson, 2018, p. 7). Moreover, motivation, incentives, culture and organisation can be relevant (Gänßlen et al., 2012, p. 5). In other words, business partners need to act proactively by providing ideas, identifying potentials and ensuring long-term financial success (Gänßlen et al., 2012, p. 5; Langmann, 2019, p. 42). When meeting at eye level, MA is also considered as sparring partner who supports management

by independently driving and coordinating business measures (Langmann, 2019, p. 42). Ultimately, Gänßlen et al. (2012, p. 5) point out, the right balance between involvement and idea creation as well as restriction and critical counterpart needs to be found. The authors summarise the role responsibilities in three aspects: unburdening, complementing and constraining. Unburdening means to help with managers' workload, second, complementing means being economically conscience and third, constraining is to ensure goal congruence.

When looking at this realistically, it becomes obvious that not as many management accountants as desired are taking the role of a business partner (Langmann, 2019, p. 42). Despite technological possibilities of automation, many employees are still too busy with low value-adding tasks (Lawson, 2018, p. 8). In smaller sized firms, capacities are insufficient, big firms struggle with missing role models and uncertain responsibilities while throughout all sizes, corporations often simply lack the competencies (Langmann, 2019, pp. 42–43). Thus, the next part reveals how the increasing demand for a business partner role is reflected in an enhanced need for special skills of management accountants. Yet, beforehand, an insight into other potential roles in MA is given.

There is one more role which Langmann (2019, pp. 44–45) perceives as especially relevant in connection with digitalisation – the role of a pathfinder or innovator. These people are responsible for keeping track of and implementing new technologies like analytics software, which connects them with data scientists and requires change management skills. In particular, all processes, instruments and methods should be developed toward being state-of-the-art. Hence, innovations need to be checked concerning their usability in MA. It also entails the creation of concepts to answer questions in MA with analytical data models. Serving as the interface between technical concerns and MA is what makes this role valuable.

A third role which is thought to gain relevance in the future is that of governance, also referred to as functional lead. (Langmann, 2019, p. 46). The governance role is responsible for developing, establishing, documenting and ensuring compliance with companywide standards and guidelines (ibid, p. 43). These principles can contain definitions of key performance indicators, access rights to data, calculation schemes and so on (ibid, pp. 43–44). Accordingly, the governance makes certain that data relevant for steering is consistent and

compatible (Heimel and Müller, 2019, p. 414). Aside from the data, analysis models, results and decisions also have to be compatible and consistent (Kieninger et al., 2015, p. 9), allowing for a correct and high-quality consolidation of data to derive a holistic picture for management (Heimel and Müller, 2019, p. 414). In this connection, efficiently managing raw and master data is indispensable (Schäffer and Weber, 2016, p. 9). Additionally, clear rules for participants in the decision-making process, such as in relation to data protection, have to be set and their adherence monitored (Heimel and Müller, 2019, p. 415).

The content and organisation of the MA-governance will change as a result of digitalisation (Heimel and Müller, 2019, p. 414). For instance, Big Data requires rules on which data from which sources can be used in certain ways and cloud computing raises additional questions concerning data security (Langmann, 2019, p. 44). Despite their need, central standards must not interfere with the flexibility of each function in business, but to enable the appropriate usage of BA and Big Data on all company levels, a balance should be kept (Kieninger et al., 2015, p. 9). The MA-governance also plays an instrumental role in terms of standardisation (see section 4) (Heimel and Müller, 2019, p. 422). In the end, MA ideally is the main organiser of the transparent governance (Kieninger et al., 2015, p. 9).

Additional roles which might be relevant for MA are those of an initiator and a project manager as the ICV (2014, p. III) mentions. Accordingly, the management accountant should initiate the Big Data integration into management levels and supervise it as a project manager. In this context, the ICV also points out the coordinating role of MA. It emphasises the desire to consider all subsystems of management when new technologies are rolled out.

Furthermore, the role of a change agent becomes pressing because considering the volatility and complexity of the world, it is a valuable role perception (Ropers, 2018, p. 18). It contributes to the suggestion and implementation of transformations in the business processes (Nobach, 2019, pp. 265–266). Fitting soft skills and agile management methods are especially desired in this context (Ropers, 2018, p. 18). In connection with an enabler role who helps with the implementation process, the necessary adjustments can easily be made (Michel, 2017 cited in Nobach, 2019, pp. 265–266).

To summarise, there will be a further shift of the focus on specific roles in the upcoming years, Langmann (2019, p. 46) elaborates. It will likely support the idea of the biggest demand for business partners followed by pathfinders to both take care of operative tasks. Simultaneously, the service provider's role will decline as technologies take over their tasks.

5.3. Associated New Jobs

Data scientists and business analysts are two more terms that appear in connection with the digital transformation in corporations (ICV, 2014, p. III). Asking whether the management accountant should become a data scientist or business analyst is not necessarily a question regarding his or her role but could constitute a whole new proficiency (ibid, p. 32). Although, some authors like Ropers (2018, p. 18) and Lawson (2018, p. 9) simply refer to it as new potential roles.

A business analyst, similar to the project manager role described above (section 5.2.), is defined by the ICV (2014, p. 32), as a key project manager who is responsible for the implementation of various Big Data applications in the company's processes. The ICV continues by detailing this role's tasks. First, the adequacy of solutions related to Big Data is proofed in terms of business strategy and guidelines. Next, an implementation plan is developed. Relevant stakeholders, specific responsibilities and fitting approaches are selected. Then, the progress of the project is tracked and information on the achievement of results is frequently shared. This evaluation and review of results entails the development of key performance indicators and the conduction of various analyses e.g. concerning the cost-benefit. Moreover, problem-solving measures are designed. Ultimately, the business analyst becomes a negotiator or mediator between concerned stakeholders, which means misunderstandings due to communication errors arising from differing specialised knowledge are avoided.

In comparison to the business analyst, a data scientist is charged with the task of implementing Big Data and other digital solutions from a technological perspective, the ICV (2014, p. 32) states. At this point, it also stresses that this does not necessarily refer to the task of programming. The organisation thus further explains the responsibilities (ibid, pp. 32–33). The data scientist designs concepts on how the analysis of data might help with

the solution of firm-specific problems. IT solutions are evaluated in terms of their technological applicability and the potential implementation processes are debated with the IT department. Finally, the results of the assessment and discussion are presented to relevant shareholders who might have less IT knowledge. Similarly, Ropers (2018, p. 19) describes part of the data scientist's tasks as developing use cases and fitting data models, which requires generating data sets for analytical purposes. Furthermore, Lawson (2018, p. 9) includes the tasks of creating a manageable and suitable data strategy, as well as extracting information from Big Data pools. Finally, its role as an interface to the management and especially the IT department is highlighted (ICV, 2014, p. 32; Ropers, 2018, p. 19).

From the presented profile and tasks of a data scientist, his or her necessary skills can be deduced. First, analytical and statistical skills, mathematical knowledge and IT know-how, particularly concerning AI, databases and programming languages such as Python and R are listed (Heimel and Müller, 2019, p. 424; Ropers, 2018, p. 20). Additionally, a general business and economics expertise, in order to understand processes, targets and the overall business model, are beneficial (Ropers, 2018, p. 19). Methodological and conceptual skills for all kinds of quantitative methods from Big Data over data mining to predictive analytics and machine learning are also important (Kirchberg and Müller, 2016, p. 89; Langmann, 2019, p. 39). In addition, commonly required social competencies together with communication skills are added (Heimel and Müller, 2019, p. 424; Lawson, 2018, p. 9).

At certain points, there is an overlap of the profiles of management accountants, data scientists and business analysts (ICV, 2014, p. 33; Lawson, 2018, p. 9). For example, Lawson (2018, p. 9), who describes the data scientist as a new role, lists analytical skills along with business understanding, communication and social skills as the possessed skill set. In this case, there is no difference to a management accountant perceivable. Consequently, the question regarding the likelihood of either the distribution of roles or the replacement of one of the roles is raised by the author. The following potentials and suggestions can be found in literature.

Generally, MA needs elements of both business partners and data scientists (Keimer et al., 2017, p. 831). Whether and how the role of a data scientist will be incorporated or separated from MA is still uncertain in terms of the best implementation strategy (Stransky et al., 2019, p. 83). On the one hand, it depends on the skills management accountants

possess (ICV, 2014, p. 33). On the other hand, it will likely depend on the size of each organisation (ibid). Small and medium-sized enterprises probably will not have the resources to employ data scientists (Becker and Nolte, 2019, p. 85; Langmann, 2019, pp. 41–42). Naturally, due to less available resources in small and medium-sized companies, it is unlikely for these companies to distinguish between as many roles and jobs as big firms do (Heimel and Müller, 2019, p. 424; ICV, 2014, p. 33). Instead, one person performs tasks that are considered a part of various roles while in bigger organisations, there is usually a stricter distinction between them (ibid).

Some argue that it is most likely that the data scientist occupation will evolve beside that of the management accountant and they will then work together closely (Stransky et al., 2019, p. 83). The ICV (2014, p. 33) supports this viewpoint, reasoning that, although some functions of business analysts and data scientists coincide with those of a management accountant, the latter can still analyse processes, interpret key performance indicators and negotiate between diverse colleagues and partners. Lawson (2018, p. 10) describes the workings of this collaboration as follows. Data scientists become an active support of management accountants who are able to derive guidance for decision-making by using provided data and analyses coming from Big Data pools.

All in all, authors support both ideas that neither management accountants can be replaced by data scientists in the long term (Nobach, 2019, p. 262) nor that management accountants can fully take over a data scientist's tasks (Langmann, 2019, p. 41). This places emphasis on the value of a management accountant at the interface with a data scientist (ibid). In the end, it is important that relevant skill sets are present in MA, either internally or externally (Keimer et al., 2017, p. 831). When considering the employment and training of data scientists or the acquisition of external know-how, companies should bear in mind that skilled data scientists are highly requested but still scarce (Chamoni and Gluchowski, 2017, p. 16; Heimel and Müller, 2019, p. 425).

6. Digitalisation in Practice

In order to gain insights on the current situation of digitalisation in MA practice and perceptions of management accountants on possible future developments, the literature

review is amended by a qualitative analysis. Four semi-structured expert interviews with management accountants working in different positions at three companies of varying sizes were conducted for that purpose. The interviews took place in person or via phone between 19 July and 8 August 2019 and lasted about 40 minutes each. Semi-structured interviews were chosen to have a comparable standardised questionnaire but still be able to clarify issues and get deeper insights by asking additional questions. With the consent of the participants, the interviews were audio recorded and transcribed in the appendix to allow for a proper analysis. First, the information is summarized and then analysed by making comparisons between the interviews and findings in literature, and by drawing conclusions.

A short overview of the respective companies the interview partners are working for is provided in Table 1. Two of the interviewed management accountants come from a more technical perspective (Appendix, Interviews 2 and 3) while the other two are more concerned with general management accounting tasks (Appendix, Interviews 1 and 4). This is also visible in the answers given during the interviews which are summarized in Table 2.

Interview no. – company	1 – Henkel AG & Co. KGaA	2 & 3 – Biotronik Corporate Services SE		4 (Anonymous)
Type of company and industry	Manufacturing company in fast moving consumer goods industry	Manufacturing company in medical technology industry		Service company in IT industry
Total no. of employees	53,000	9,000		500
No. of employees in department / respective MA	4 / 17	4 / 33	6 / 33	1
Department of interviewee	Regional Controlling	Corporate Reporting Processes	Corporate Reporting Services	Controlling

Table 1: Information about companies and MA departments of interview partners (Appendix, Interviews 1 – 4)

Since both of the more technically oriented management accountants work for the same company, a comparison with the bigger and smaller firms might not reflect a realistic picture in all aspects. For instance, a general management accountant is not necessarily aware

of technologies applied and planned to be implemented (Appendix, Interviews 1 – 4). Thus, the conclusion that these companies fall behind the other one simply because some technological tools were not mentioned would be misleading. Besides that, it cannot be concluded that all issues addressed in the fourth interview are typical for medium-sized companies because they might arise from the fact that the MA department was only set up recently (Appendix, Interview 4). Nevertheless, the decision to create a new MA department is likely one that small and medium-sized firms, rather than bigger ones face, as the latter typically have an MA department, while in the others, management or external service providers are usually taking care of respective tasks (Berens et al., 2005, pp. 187–188).

Question	Summary
Technologies & Methods	
Significant technological innovations for MA	<ul style="list-style-type: none"> • In-memory computing • Robotics and automation • AI • BI tools • Hardware developments
Their impact on MA	<ul style="list-style-type: none"> • Self-service • Automated, real-time reporting • Increased flexibility • Enhanced importance of data management • Changed time ratio for data collection and data analysis • MA can become business partner for more profitable company
Current application of BA, especially predictive and prescriptive analytics	<ul style="list-style-type: none"> • Basic (descriptive) BA, yes • Predictive analytics not really used, nor prescriptive analytics • Instead, BI tools still common • Experimental use of predictive indicators in forecast to take out human biases • Statistical linear extrapolations and mathematical schemes partly used for plausibility checks in planning • Statistical programming language R partly used by another department as a leading planning value
Future application of BA, especially advanced analytics	<ul style="list-style-type: none"> • Advanced analytics should be applied • For budgeting, strategic planning, predictive forecasting e.g. in connection with supply chain demand planning • More linear projections – for reference, mostly not as leading planning value

Use of in-memory computing in MA	<ul style="list-style-type: none"> • Unfamiliarity with term • Currently only used in BI department of MA • Will be used more in future as firms plan to use SAP S/4HANA
Use of cloud solutions	<ul style="list-style-type: none"> • In general, yes, but mostly not in MA • Due to security concerns or restrictions • Only a private cloud used for SAP-system
Use of RPA in MA	<ul style="list-style-type: none"> • Uncertainty about term – some use it, some do not • Used in SCCs or [in a basic form] for process integration between SAP and TM1 – data transferred in both directions – and for automatized sending of reports via mail • Others e.g. focus on in-memory computing first
Examples of software used in MA	<ul style="list-style-type: none"> • BA/BI tools like Power BI and IBM Cognos TM1 • SAP – ERP (SAP ECC) with all relevant modules and SAP BW • MS Office, especially Excel and databases like MS Access • CRM-system • Financial accounting system • Third-party and internally developed tools
Planned software implementations/changes in MA	<ul style="list-style-type: none"> • Short-term: in-memory computing, Qlik Sense, IBM Planning Analytics, add-ins on existing programs • Mid-term: SAP S/4HANA • Long-term: IBM Watson
Potentials to apply more new tools in the time to come	<ul style="list-style-type: none"> • Optimisation of interfaces between (main) tools • Minimisation of subsystems • Further development of tools • In mid- and long-term strategic planning
Processes	
Processes in which technologies related to Big Data and BA are being used in MA	<ul style="list-style-type: none"> • Reporting, planning and analysis processes • Statistical methods used in sales planning processes • Currently only basic Big Data approach: • Focus on data in ERP, rarely link to external sources – market data used for planning • High data volume – e.g. in inventory tracking of single products
Processes in which digital tools will be used increasingly	<ul style="list-style-type: none"> • Everywhere where it is possible • Management accountant “without the tools cannot do his job” (Appendix, Interview 1) • A lot of potential in planning processes • Automation in forecast updates, closing procedures, reporting
Future impact of ongoing digitalisation on the	<ul style="list-style-type: none"> • Initially a lot of time spent preparing data for analyses • Spend less time on manual, repetitive tasks and standardised processes as they are automated (from 80 % to 20 %)

time spent on specific processes	<ul style="list-style-type: none"> • More time for high value adding tasks that cannot be replaced by machines like analytic tasks, consulting, advising, concept creation, further development of systems (from 20 % to 80 %)
Roles	
Most prominent role taken	<ul style="list-style-type: none"> • Classic management accountant = reporter and controller • Own roles: navigator, facilitator, pathfinder, consultant, service provider
Impact of digitalisation on current role now and in the future	<ul style="list-style-type: none"> • Not many pure controllers needed • Navigator of digitalisation and service provider of digital tools not directly impacted • Others see positive impact – eases life and allows to focus on big-scale issues • Prospectively think bigger, wider and deeper than now
Additional roles relevant in MA now and in the future	<ul style="list-style-type: none"> • Change agent • Project manager • In future: internal business partner, moderator, consultant, pathfinder and innovator
Skills	
Shift in skill sets required in MA in the past years?	<ul style="list-style-type: none"> • Skills definitely changed compared to the past • Necessity for IT skills increased the most • Specialised knowledge in this area becoming necessary
Skills to use new software applications present in MA?	<ul style="list-style-type: none"> • Depends on level and work experience in MA • Mindset change to life-long learning necessary • Generally, most employees have them as they are needed to do most jobs • Training possibilities to develop them
Different skills asked for in the future?	<ul style="list-style-type: none"> • Most importantly cross-functional understanding of different areas and departments – to have holistic overview → mindset change • Deeper IT knowledge required • Project management and engineering skills needed when working on projects • Even more communication
Enhanced focus on analytical skills and communication skills in MA now and in the future?	<ul style="list-style-type: none"> • Yes, definitely, now and in future • Analytical skills generally have been required, now to understand, widely and deeply analyse and consult business • Communication skills important e.g. in international firms concerning cultural differences, for more and more alignments and for presentation of relevant issues to not overwhelm with information overload

	<ul style="list-style-type: none"> • Yet, typical controller partly a “fairly poor communicator” (Appendix, Interview 1)
Requirement of skills related to data scientists such as statistical, programming, and IT skills now and in the future?	<ul style="list-style-type: none"> • Different opinions • More technical MA: programming and IT skills already required by everyone in MA • Other MA: no need for programming skills when there are BI experts • Statistical skills required for some in strategical planning • Further develop skills in future • → Necessity to have all skills present in an organisation and to collaborate with each other
Outlook	
Occupation of management accountant at risk or not?	<ul style="list-style-type: none"> • Generally, not at risk • MA needed as financial interface between many departments and for high-value business consulting based on interpersonal aspects • Only classical management accountant who sticks to rigid education is at risk
Minimisation of number of employees in MA?	<ul style="list-style-type: none"> • Mostly unlikely, only in some companies aiming for a leaner administrative department and with too many people building reports • For others Big Data is a “treasure” (Appendix, Interview 2) with the possibility to create a high value added and a competitive advantage – number of employees in MA will remain constant, partly even increase • Tasks are changing as some are done by machines, but the technology needs to be taken care of and other opportunities arise → firm is not going to be automatized completely
Substitution of MA department?	<ul style="list-style-type: none"> • Partly by machines and automated systems • → Simply focus on other tasks
Further issues	<ul style="list-style-type: none"> • Technology and processes important

Table 2: Summary of expert interviews (Appendix, Interviews 1 – 4)

For some management accountants, one of the biggest potentials of digitalisation is not simply Big Data and BA, but RPA (Appendix, Interview 1). In general, the interview partners struggle identifying specific applications of BA and Big Data, while the automation of certain process steps seems to be more widely recognised and perceived as a change but also support of tasks (Appendix, Interviews 1 – 4). Furthermore, BI might not be a new innovation, but it seems to continuously be widely applied and perceived as an important tool in MA

(ibid). Thus, there might not be such an awareness whether BA and Big Data are actively utilised, simply because BI has been in use for longer (ICV, 2014, p. 3) and is perceived as a central technology. Moreover, the synonymous use of BA and BI (Schön, 2018, p. 432) makes it more difficult for management accountants to recognize that a tool like Power BI is considered as BA (Brands and Holtzblatt, 2015, p. 6).

The interviewees working in a more technical area of MA see in-memory computing as one of the main technological advances MA benefits from while the other two more business-oriented management accountants are not familiar with the term (Appendix, Interviews 1 – 4). This shows how already, there are distinctions between more technical and more business-oriented management accountants. Therefore, it might seem less unlikely and more understandable that new jobs and roles are emerging in that area as well (ICV, 2014, p. 32). Nevertheless, even in the same company, it does not seem to be known exactly which technologies another MA department uses, since the interviewees made different statements on the planned or already incorporated in-memory computing (Appendix, Interviews 2 and 3).

Concerning the affected processes, mainly planning, forecasting and reporting but rarely budgeting and project management were given as examples (Appendix, Interviews 1 – 4). This focus might be limited because there can be separate departments for differing areas (ICV, 2014, p. 33) such as risk reporting or cost accounting. In the smallest company interviewed, the data management currently constitutes a time-consuming process (Appendix, Interview 4). Generally, the time spent on standard reporting and other repetitive tasks is still relatively high, but management accountants are aware of the huge potentials arising from automation to gain more time for analytic, business partnering and system development processes (Appendix, Interviews 1 – 4).

Management accountants are often on the receiving end of the implementation of new tools (Appendix, Interview 1). Correspondingly, two interviewees referred to the BI team, as the one that knows more (ibid) or the place where implementations are already more advanced (Appendix, Interview 2). This indicates that such management accountants do not take the role of an innovator in terms of digitalisation the way more BI-oriented management accountants do (Appendix, Interview 3). However, they can still function as a change agent in terms of process design as they notice potentials for improvement in their

daily work and might want to drive changes there (Appendix, Interview 1). Because the business environment in general is very volatile and there is a rising number of digital transformations, a driving force and guidance throughout the process is required (Nobach, 2019, pp. 265–266; Ropers, 2018, p. 18) and the perceived need for a change agent role is understandable (Appendix, Interview 1). Moreover, if they are willing to take the role of a pathfinder in cooperation with IT specialists, they can play a crucial role in levelling the playing field by ensuring that data are collected and managed properly to base analyses upon it (Appendix, Interview 4).

Two interesting aspects can be pointed out. First, the management accountant actively dealing with new technologies and possessing the IT skills deemed important, points to taking the role of service provider (Appendix, Interview 3). This role's importance is said to decline (Langmann, 2019, p. 46), but as services are provided not for management directly but for other departments, it seems to be fitting here and able to remain relevant once combined with the innovating role (Appendix, Interview 3). Second, particularly in a medium-sized company, the desire to become a business partner seems to be very strong (Appendix, Interview 4). This could be explained by the close cooperation of MA and management in such a firm. Thus, despite struggles to initially set up proper analysis, this employee perceives it as a personal task to offer deeper and wider insights with the work. Hence, the management accountant of the IT company is an example for someone with a clear vision, aiming to drive changes to set up and improve the processes and tools for an enhanced added value, ultimately trying to get a bigger picture to become a full business partner with a comprehensive understanding of the business. Naturally, the increasing relevance of a business partner is also highlighted in interviews with other firms (Appendix, Interviews 1 and 2).

The most significant change in the skills required in MA is concerning IT know-how (Appendix, Interviews 1 – 4). The need for these skills increased massively over the past few years and will continue to do so for the foreseeable future. Yet, which related skills in particular are necessary still differs between MA departments. While some require programming skills and a few basic statistical skills, others do not have to possess these when they can contact BI specialists. This reflects the necessity of having people in the corporation who are capable of applying these skills and can closely work together with those focused on

other competencies. Nevertheless, an understanding of IT-related aspects is crucial, otherwise communicating with IT-specialists on eye-level is not possible (Appendix, Interview 4; Langmann, 2019, pp. 46–47). Likewise, being able to handle new software applications is crucial to get started in MA (Appendix, Interview 1) but in case there is a need for more knowledge, software providers offer specific trainings, which are opportunities that are eagerly taken by some employees (Appendix, Interview 4). Communication skills constitute a basis for a profession in MA (ibid) and yet, some management accountants are lacking them (Appendix, Interview 1). Therefore, despite the knowledge of a need for them, a focus on further developing them to not only make agreements but also present information in a smart way should be set (Appendix, Interview 1 – 4). Generally, a mindset for life-long learning should be followed which enables management accountants to adapt to changes more easily (Appendix, Interview 2).

In the end, there are two parts to digitalisation, as it is described by one interviewee (Appendix, Interview 2). Accordingly, there is not only the technologies but also the corresponding processes. Without properly analysed and well-designed lean processes, or sufficient organisational setup, the potential of digitalisation cannot be fully exploited. This is because even highly sophisticated technologies cannot handle processes that require too many manual interactions. Thus, efficient processes constitute a basis for the implementation of digital tools in order for both to work well together. The importance of creating a suitable basis first is also addressed by the management accountant of another firm who stresses the need for setting up a sufficient data management system before digital tools can be applied on the data to do more sophisticated analyses (Appendix, Interview 4). In this case, this might be something smaller firms are more concerned with, especially if the MA department is relatively new (ibid). Nevertheless, it can constitute a challenge for many corporations trying to handle the digital transformation which might be the reason why Schäffer and Weber (2016, p. 9) mention this first in their list of challenges and Egle and Huber (2018) also address the need to identify processes and appoint someone responsible for data management.

Here, the use of SSCs was a step in a similar direction. For their setup, repetitive, standardisable processes had to be identified (Camin, 2018, p. 32). This is now also the case for RPA (Langmann, 2019, p. 6). Hence, already having a SSC seems to be beneficial for the

integration of RPA because it can build upon the SSC relatively easily (Camin, 2018, pp. 34–35). Thus, at Henkel, which has a SSC, this is exactly where RPA is being used increasingly (Appendix, Interview 1).

The outcomes of the interviews confirm what has been analysed and predicted in literature to a large degree. Though for example the following discrepancies can be found. Cloud solutions might constitute an affordable solution (Langmann, 2019, p. 24) but in practice, it seems like security concerns or restrictions are still too high for them to be actively used in MA (Appendix, Interviews 1 – 4). And while most of the role perceptions confirm what has been laid out conceptually, the governance role who has the task of restraining the management to stick to set goals (Schäffer and Weber, 2015, p. 188) was not really addressed in the interviews (Appendix, Interviews 1 – 4).

7. Expected Developments

Langmann (2019, p. 53) is of the opinion that especially the reporting and planning processes will be fundamentally based on IT solutions. This development is supported by the results of the expert interviews which mostly mention technological applications in these central processes, including forecasting (Appendix, Interviews 1 – 4). Both parties also agree that management accountants will remain vital for the interpretation of data, although, the author stresses the need to understand the analytics applied by machines. Decisions will not only be based on financial data but also non-financial data which requires Big Data and BA to analyse the structured and unstructured data (Stransky et al., 2019, p. 83). The ICV (2016, p. 56) confirms what is desired by one management accountant (Appendix, Interview 1), that predictive analytics will support planning and forecasting to minimise current weaknesses such as the influence of human biases. In addition, the opinion of the ICV, that planning will not be substituted by predictive indicators, also corresponds with another expert's view that they are mainly used for plausibility checks but not necessarily as the only value considered (Appendix, Interview 3).

In the long term, AI will find its way into MA and can, for instance, suggest ideas in decision-making (Michel and Tobias, 2017, p. 39). This vision is shared by one of the experts who expects that when interacting with a bot, the bot will act as an artificial partner and can be

asked for solutions (Appendix, Interview 2), something which is made possible by natural language processing embedded in AI (Sauer and Sturm, 2019, p. 43). Potentially, not only these co-pilots but also autonomous systems could be enabled at some point in time (ibid, p. 38).

Some of the most important skills for the future include a cross-functional understanding of other departments to develop a holistic view of the company, a deeper IT know-how and a continuous but stronger focus on communication skills (Appendix, Interviews 1 – 4). In this context, the prospectively closer cooperation with data scientists is highlighted (Langmann, 2019, p. 46). It is not only important to utilise suitable technologies for data management and analyses but also to have experts in the company who are able to select those tools which can answer relevant questions in business (Chamoni and Gluchowski, 2017, p. 16). This is also stressed in one of the expert interviews (Appendix, Interview 1). Therefore, appropriate training measures to develop or get data scientists and similar specialists in the firm will become increasingly relevant (Chamoni and Gluchowski, 2017, p. 16).

Schäffer and Weber (2015, p. 187) assume that the MA currently goes through a transformation that will continue for about one or two decades. In the process, some authors raise concerns about the loss of typical jobs in MA to technologies and those able to handle it (Egle and Huber, 2018). However, all the interviewed management accountants are optimistic that they will stay in their occupation and believe that the tasks will simply change (Appendix, Interviews 1 – 4). Strategic elements will be in focus (Schäffer and Weber, 2015, p. 187; Stransky et al., 2019, p. 83) but also consulting will contribute a high value to companies (Appendix, Interview 2). Hence, Big Data and related technologies are not perceived as a threat but a “treasure” (ibid) that can help create a competitive advantage. To utilise this, the number of people in MA should remain constant or even partially increase (Appendix, Interviews 1 – 4). Therefore, in the end, not everything will be digitalised and people will remain central to all processes in a corporation (Sauer and Sturm, 2019, p. 43) because employees who take care of software will also be needed (Appendix, Interview 1).

8. Conclusion

Digitalisation is an ongoing trend, concerning corporations in manifold ways (Becker and Nolte, 2019, p. 86; Kirchberg and Müller, 2016, p. 81). Companies are facing adjustments to keep up with competitors (Gleich et al., 2014, p. 5). This paper analyses what these look like for the MA department of firms and ultimately the profession of a management accountant. The research leads to the following conclusions, aiming to answer the initial questions. Digitalisation impacts MA in manifold ways already and it will continue to do so in the future, especially since this phenomenon has only just begun (Heimel and Müller, 2019, pp. 425–426). Four areas in particular were thus analysed to describe the ongoing changes: First, the methods and technologies with which processes in MA are digitalised; second, the roles in MA which evolved or gained importance as a result of digitalisation; and third, the impact of digitalisation on skills in MA.

Certain technologies that are useful for specific processes in MA are identified: RPA is especially relevant for reporting as there are a lot of standardised processes where it can be utilised (Langmann, 2019, p. 25) and in-memory computing helps deriving data in a timely manner (Keimer et al., 2017, p. 831). BA, and in particular, advanced analytics, are beneficial for forecasting and planning because they can, for instance, apply algorithms and create extrapolations with statistical methods (Langmann, 2019, pp. 23–24). Additionally, future-oriented guidance needed for business partnering can be deduced from prescriptive analytics (Heimel and Müller, 2019, p. 418). In combination with Big Data, more data, along with internal and external variables derived with data mining, can be taken into consideration (Langmann, 2019, p. 23; Schön, 2018, p. 380). As a result, less biased forecasts and planning scenarios can be created (Appendix, Interview 1; ICV, 2016, p. 56). Big Data continues to play a role when technologies can be enhanced with machine learning to develop smart tools capable of recognising patterns from previous data analysed (Langmann, 2019, pp. 7–8). Based on that, AI can be applied which aims to operate similarly to human intelligence (Buxmann and Schmidt, 2019, pp. 6–7; Schäffer, 2019, p. 19). In the long-term, it could suggest or make its own decisions based on complex analyses and will probably also be used in MA (Michel and Tobias, 2017, p. 39; Sauer and Sturm, 2019, pp. 42–43; Schäffer, 2019, p. 20). Eventually, all these technological innovations might sound like they have huge potential to drive the MA forward, but these can only be tapped fully if a consistent

and high quality data management is at the foundation of everything (Appendix, Interview 4; Schäffer and Weber, 2016, p. 9).

The following roles are central to a digitalised MA: One of the most valuable roles a management accountant can take in the light of ongoing digitalisation is referred to as strategic business partner (Stransky et al., 2019, p. 75). Accordingly, he or she will work closely together with its IT department and cross-functionally between various areas in the company (ibid). The necessity of cross-functional knowledge and interactions at many interfaces is also stressed by several management accountants in the expert interviews (Appendix, Interviews 1, 2 and 4). Correspondingly, they perceive the business partner role as very relevant for the future. Other roles that are considered important are change agents, innovators, pathfinders, navigators, project managers, consultants and corporate governance (Appendix, Interviews 1 – 4; Langmann, 2019, p. 46; Stransky et al., 2019, p. 75). Furthermore, there are new jobs, especially those of a business analyst and a data scientist that evolved during the course of digitalisation (ICV, 2014, p. 32).

The shift of a management accountant's roles and tasks naturally leads to new skills required (Stransky et al., 2019, p. 75). One of the most pressing needs is for management accountants to possess IT and technological skills to know which tools exists and to be able to use them, but also understand the logic behind to discuss technical concerns with those in charge of them (Appendix, Interview 4; Heimel and Müller, 2019, p. 418; Langmann, 2019, p. 53; Lawson, 2019, pp. 45–46). In combination with a cross-functional business knowledge, results can then be understood and analysed accordingly (Appendix, Interview 2; Lawson, 2019, p. 46; Stransky et al., 2019, p. 83). Communication remains crucial, maybe even more so in the future due to all the cross-departmental collaboration, notably with data scientists and management, and the enhanced focus on consulting the business (Appendix, Interviews 1 – 4; Langmann, 2019, pp. 47–48; Lawson, 2018, p. 17). Analytical skills also continue to be a general necessity in MA (Appendix, Interview 1; Langmann, 2019, pp. 47–48). More specific skills such as statistical, mathematical and programming ones are only partly needed (Appendix, Interviews 1 and 2; Becker and Nolte, 2019, p. 85). To summarise, numerous technological terms are circulating, but not every management accountant is familiar with them (Appendix, Interviews 1 and 4). However, if he or she wants to be able to look for and systematically categorise new trends and software in terms of their

usability, this knowledge might be helpful (Kirchberg and Müller, 2016, p. 88; Nobach, 2019, p. 264). Nevertheless, depending on the specific position one has in the MA, it seems to differ greatly whether the management accountant is mostly applying new tools once other teams researched and suggested them, or the management accountant personally is the driving force in implementing those innovations (Appendix, Interviews 1 and 2).

There are a couple of limitations to this research; they include the following: A first step towards digitalisation is the general analysis of which processes exist in MA (IGC, 2011, pp. 56–57). Yet, to be able to apply digital tools, the analysis has to go deeper (Langmann, 2019, pp. 53–54). Process steps have to be known to see where and how exactly tools can be applied to enhance the process (Keimer et al., 2017, p. 828; Langmann, 2019, pp. 53–54). This might also entail that processes have to be redesigned to incorporate automation, BA, etc. (Keimer et al., 2017, p. 828; Kirchberg and Müller, 2016, p. 95). These implications differ between companies (Brands and Holtzblatt, 2015, p. 10; Keimer et al., 2017, p. 831) and are thus not explained in detail. For guidance on how to make use of the digital transformation refer to, for instance, Brands and Holtzblatt (2015), the ICV (2016) or the ACCA et al. (2018).

Moreover, the research done within about four months and the small number of interviews conducted only deliver an exemplary picture of management accounting in practice. It does not intend to draw a full picture of the general situation of digitalisation in businesses. In addition, all the experts work for German internationally operating manufacturing or service companies which does not shed light on the status in businesses that are, for instance, headquartered in more or less innovative countries in terms of digitalisation. Yet, simultaneously, it allowed for some comparisons between medium and large-sized firms. Handing out definitions of processes, technologies and roles beforehand could lead to more comparable answers as interviewees might have considered different aspects of the same term.

Hence, further research can be conducted to obtain a more representative result of the status of digitalisation in the MA. Assessment models such as those provided by Langmann (2019), Kirchberg and Müller (2016) or Keimer et al. (2017) can be used for a more systematic comparison. Depending on the focus desired, more management accountants of each company size and several experts of each company operating in a specific or across various industries could be interviewed. Additionally, differences between national and

international but also, for example, European, American or Asian corporations could be analysed. The focus could also be set on the setup of MA and the implementation process of new technologies.

To sum it up, MA is indeed facing fundamental transformations (Schäffer and Weber, 2016, p. 8) and companies should act upon them to not risk becoming uncompetitive (Brands and Holtzblatt, 2015, p. 10). Finally, despite all the tools supporting and substituting some work, the development and monitoring of technologies requires human intelligence (Sauer and Sturm, 2019, p. 43) and interpersonal interactions still play a valuable role in MA (Appendix, Interviews 4). Thus, in the end, humans will always be at the centre of businesses (Sauer and Sturm, 2019, p. 43).

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Appendix

Interview 1

Interview with a Regional Head of Controlling at Henkel AG & Co. KGaA

Berlin, 19.07.2019

Technologies & Methods

Which technological innovations related to the digital transformation have a significant impact on MA?

I think I will structure the answer in two ways. First of all, we have a lot of tools, but I'm not sure if this is really digitalisation. The tool could be Alea, the tool could be Midas, those are lots of tools that help in the questions or the topic that we need to answer in management accounting. But I'm not sure if the question covers that tool. Just because it's a tool, it doesn't mean it's digitalised. How should I go ahead there?

It's more of a general question. Like is it Big Data related, is it business analytics, do you use robotic process automation or databases with in-memory computing, so on and so forth.

Yes, yes and more and more and more. I mean yes, there is whole teams working on robotics. Yes, there is whole teams working on what for controlling impacts me the most is the data layers over, those Big Data lakes, which in Henkel currently goes a lot in direction of Power BI; which in the end is not such a – I mean, yeah, for me this is a digitalisation tool. You're taking a tool that sources from various data pools, so to say. This helps for me and I think also in terms of reporting the information or making conclusions with the relevant stakeholders about the particular topics – whatever is relevant – are super, super relevant because it gives people access to data, to information without the need for a classical reporting team. And I think if you look at Henkel – and this is a change that happened a lot – [a year ago,] we were still called Reporting and Analytics and now we are actually called Business Controlling, which gives a lot more justice. Cause in the end, yes, there is still a lot of reporting going on. But this is more and more moving in the direction of self-service and automated reporting where you don't spend time on building the reports or figuring out some update of reporting. You have to do it more, okay, this is the information that's

available. – How do we proceed from there? To the extent of robotics, I see there's more of an experimental phase that we are in with Henkel. I'm sure other companies are a lot more advanced there. But when it comes to the interfaces like Power BI, I think we are doing quite well.

And when you say with methods and technologies, I think one thing that I see is a quite relevant development here is that we've transformed the shared service centre a bit there or that we are trying to transform the shared service centre. Cause this is a group of people, in the beginning, when there were companies like Henkel or other companies were setting up shared service centres, they really looked at standardised things that could be scaled up. And a lot of this had to do with report building and someone is making the same report every month or refreshing the same report every month. There I see that those people are more and more moving to – well I'm not sure if a data scientist is the right word but – people who are in charge of/ On the one hand, we are trying to develop the capability to opt robotics in the shared service centres. It's not something that works strictly with the IT department, it's really in the shared service centre where we are moving people who were doing reporting before, to more on the robotics side. Even though it might still be experimental, but this is happening. We see that we use more and more, especially if you look at [certain teams,] where we move more and more to people who are, what I would consider, like data scientists or data analysts, rather than a controller or a management accountant. If I look at the people who bring, at the moment, most value to me, are people who can take information – and I don't care if the information comes from the system or some kind of source pool – and make something out of it that can help me in the decision-making. Whether this is then shown as a kind of dashboard or whether this is shown as a – I don't know, whatever – typically a dashboard I guess, I don't really mind so much, but the ability to connect various levels of input here, I think it is super relevant. And it will always get more and more. In the end, you don't need someone who can/ You need people who understand controlling, but you need people who can connect the various data sources and actually prepare the decision-making tools in such a way that it serves everybody. That's more and more important.

Cause in the end, if you take controlling very black and white, if you just need someone to make a report, you can ask, you can teach anyone to make a report, right. That's not a skill.

The skill is not I can make a report, or I can prepare information in a static way. It's more on a more advanced level there. It's, okay, how do we steer the business with that?

Ok, so I guess you kind of already answered the question:

How do the technologies you just mentioned impact the MA?

You already talked about the shifts and what is done where. So just a bit about specific technologies.

Do you apply business analytics, especially predictive and prescriptive analytics, and if so in which context?

Not systematically. But as I said, this is a bit of, what I say, experimental, we're trying out. But yes, we started with it, for example in the forecast. Where the regions are for example very involved in giving the right forecast. But in the end, you know that the forecast is always biased, that it's always political, etc. And why not use predictive indicators on the forecasting process and take out a lot of the human bias on the whole process. And this is what we are actually trying to do.

In the future, do you expect predictive and prescriptive analytics to be applied in the MA at your company, and if so for what?

I think it will become more and more relevant, yes. And I mean, we should. Wherever we can take the human bias out of something, we should apply it. And I think, it is moving in that direction but as I said, this is also a bit of a cultural shift. People are used to a forecast where somebody gives input and the general manager gives input and the sales manager gives input and then you know what you are going to do when. Somehow this gives people a bit of comfort still. If you take it to a predictive forecast, then it's all gone. Because if you say, okay, I do my predictive forecast based on GDP growth rate, I don't think that would be very relevant because a company might grow faster or slower than the country does, or the market does a such. But if you start connecting it with supply chain demand planning. – How much do we have in the demand planning? How much orders have we got in the customer service? Based on that you do a forecast. I think that would be super, super helpful. And it started going in that direction, but not fully there yet or not at all there yet.

Is in-memory computing used in your MA presently and will it be prospectively?

I don't know. What is in-memory computing?

In-memory computing refers to databases. There is, for instance, SAP S/4HANA and the data is not stored on the hard drive but on the main disk. So, it can be processed much more quickly.

We're actually moving to SAP HANA. This is a process that takes a while but yes, that's the idea.

Do you make use of any cloud solutions these days and will you in the time to come?

Yes, I cannot tell you exactly which one at all, but more and more I see that this is not something we can ignore. Super sure on when something qualifies as cloud or not. But tools like OneNote or something. Is this a cloud computing based information sharing?

Good question. I think partly it is, because the data /

Cause if you look at a steering region or the world as such, people are not going to be in the same place. I mean, this is what I see in [my region] as well, makes absolutely no sense. I give you the example of we have an intern. [...] [Gives example of unnecessarily long internal HR process] So, ok, put everything in OneNote – basically what they did with us – and there we have the documentation, work with that. [...] This is more and more important, especially if you work in regional teams where you are not typically in the same locations. And I see this on knowledge sharing – very simple between teams – but I also see it in terms of systems. And I think if you look at the majority of our systems, we pull data from a server somewhere, but most people have access to that server and that system that pulls the data from wherever the base is. This is not something that we work a lot with, that is static databases that are only used in one country or something.

I think, controlling can learn a lot from supply chain. I think, if there is an area that has really gone quite far in terms of digitalisation and using information – it's supply chain. Whether it's forecasting, demand planning, order quality, deliveries servicing, I think that supply chain has really done some super exciting things. Whether it's Henkel or outside Henkel but AI or Big Data usage is really quite advanced there. Like this morning, I was in a short training with a guy who works in supply chain. And he basically came to explain a tool that

they've been developing. And it does exactly what you were saying earlier, where you connect various data sources whether it's SAP or an internal planning thing or whatever, it's like three or four sources. And then they have a Power BI layer over it and then you can, for instance, see super relevant things like, I look at my warehouse footprint around the world and I see the composition of the products. – What is the turnover of the products? What stock or inventory do I call dead inventory? – I haven't sold it and I am not forecasting to sell it. – What part is slow-moving? What part is a heavy rotation? – I need to order more. And if something is heavy rotational, I need to order more. I can see it exactly there. I see the brand, I see exactly what I need to do. And if something is not moving, I know I need to do something about it or if something is dead, then okay, maybe think about destruction. These are the kind of insights, that are coming more and more and more and are extremely, extremely relevant.

As for the robotic process automation, you already said that it is basically used in the shared service centres mostly, right?

Yes. And here, I think, I see actually two important developments. One, is the part where you try to build something yourself. The other part is where you use externals. TME, for example, is something, I think we did it always in the past ourselves, wasted a lot of time on it and now we just work with a partner. And basically, what I did for my business trip: I had a bunch of receipts, I took a picture of it, then it's uploaded and then the tool – it's basically a web interface – automatically starts reading the information. So, I scanned it or took a picture, I uploaded it and then, day later, I got a message: "We processed all these files, please review if it is correct". Of course, since it was involving three different currencies it was a bit difficult, but it picked up the right names, it picked up the right concepts, it picked up the right amounts. – It was actually pretty good. And TME expenses of a business trip of six weeks took me half an hour work. Where in the past, a trip to Hamburg of one day took me two hours.

Ok, that's quite an improvement.

Could you give some examples of software and what they are used for in your MA?

You already mentioned the Power BI.

I think, Power BI is the big one. And a lot of the other tools we internally developed. I mean, I would say we have Alea, which is an external system. And then SAP and SAP HANA. But not sure if those are the relevant ones.

Yeah, I guess so.

And then there is a whole bunch that we developed internally. And if you want to check the one that I mentioned for TME, it's called RYDOO.

Which software changes/implementations are currently planned in your MA department?

SAP HANA is the big one, the big migration. Probably, there is a lot more, but the BI teams know more. To be honest, I am more on the receiving side. I don't always know what is on the developing side.

Do you see potentials to apply more new tools in the time to come?

Always. I mean, we use too many subsystems. Too much time spend on logging on and logging of and opening files. – Make this a lot easier.

Processes

In which processes are technologies related to Big Data and business analytics being used in your MA?

Big Data is the key word here, I guess.

Yes, Big Data and Business Analytics.

To be honest, everywhere, no?

I guess, kind of. I mean, Big Data is about the amount of data that you can use, and data are used anywhere in the MA.

In which processes will digital tools be used increasingly?

I'm now thinking where we don't use it.

Is there actually any process where it's not used?

Yeah, that's what I'm thinking of and I'm not aware of anything actually. I mean, controller without the tools cannot do his job.

Considering the ongoing digitalisation, how will the time spent on specific processes be impacted in the future?

Well, the example of TME I gave you; I hope, that everything is as fast as it is there. I really hope that we can use digitalisation a lot more in the planning process. Because in the end, the planning process as such is too much of a manual exercise based on the gut feeling of some persons. And in the end, here you can do a lot more. So, I see a lot of potential in planning. And for me, I would put another keyword here – I'd put automation here. I see a lot of things that are done currently manually, using some kind of system, but could really be done automatically. Whether it was the forecast update that I mentioned or particular closing processes or the construction of certain reports. In the end, if you look at many of the Alea reports then still at some point you do spend some time – okay, I need to open it, then I need to refresh it, I change the parameter from May to June. That's it and then okay – my report is up to date. It takes in the end five minutes, but you do this three times a day, five times a week – probably a lot more – then probably an hour or two hours you can save, right.

Yes, it's like a standardised process that the automation can handle.

Especially, in the standardised processes you can do so much. This is where I see the big potential in. And when you read all these articles about controlling and the impact of digitalisation, you are going to need less controllers – I mean, please. Most of the people spend time working on updating reports and something – that's really no value added.

Roles

What is the most prominent role you take, e.g. that of a business partner, consultant, controller, facilitator, innovator, navigator, pathfinder, reporter or service provider?

This in the end is a question of the type of personality you are, no? I think, if you compare the classic controller, he is a reporter and a controller, so to say. In the end, my approach is very different, and I come more from the facilitator or navigator role rather than the pure

controlling role. If you look at the setup of many companies, you don't need many pure controllers. You don't need the person who is going to prepare reports and tell you to look at a number. Most people can do this themselves. In the end, if someone tells me: "You have a GPI [Gross Profit One] problem." Yes, I know that. How are we going to fix this? This is where I think controlling is typically positioned at the crossroad of so many different departments. Whether it's supply chain or the TM or sales or marketing, in the end, you're interacting with all of them. And therefore, purposefully positioned to change things. And this in the end, is where I see one of the most important roles of the controller. Whether you are changing things and whether your attitude is you're getting things done. That's what's important.

How does the digitalisation impact your current role and which impact on it do you expect in the future?

It should make my life easier. I hope it only is going to make my life easier. And what I like is that more and more people start coming to me with: Hey, we've been working on this type of BI dashboard, and we've been working on this type of/ various data sources that they transferred into something actionable. If you're doing it, you're going to make my life easier. Like I mentioned, the guy that we had this morning who came from supply chain. And I tell my supply chain controller, ok, let's have a look at what they are going to present that's then how we are going to use it. Because we have a problem with slow movers. It seems like this guy has a solution. Perfect.

You said, that you perceive yourself as a facilitator and navigator.

Currently, is there another role you perceive as relevant in the MA and will there be another crucial role?

A change agent. You change things.

Skills

Did you perceive a shift in the skill sets required in MA in the past years?

Yes, like I said, we're hiring more and more people who have/ Well, maybe not necessarily the people that we hired in our team in the past. But look at the shared service centre

where I see the big innovations happening in terms of knowledge building. They're hiring more and more people who are more of the data analysts and maybe data scientists.

So, the data scientists are mostly in the shared service centres?

Yes, I mean, maybe it's a bit of a fancy name. In the past, they might have called themselves reporting specialist or something. But in the end, you see that we hire more and more BI analysts. If you look at our controlling support, those are BI experts not controlling experts.

Do employees in MA have the skills to use new software applications?

Depends where you look. I mean, no, we probably restructured a lot of them. If you don't have them, you'll be restructured. Depends on the level of course. If you are the head of the department, then someone will do it for you. But if you are at an entry to medium level and you don't have the skills, then that's really, really difficult.

So, they are crucial.

Yes.

In your opinion, will there be different skills asked for in the future?

Yes, probably. I don't know exactly which ones.

Do you perceive an enhanced focus on analytical skills and communication skills in MA and do you think there will be a focus on them in the future?

Analytical skills for sure, but I think controllers genuinely have good analytical skills. Where I see the most need is communication skills. Cause I think, the typical controller – as much as you can say it – is a fairly poor communicator. And that could be presentation, that could be verbally, but that could also be how you present the information. For me that is an art of communication. Reaction to words, don't overwhelm, focus on what's relevant in terms for the decision-making. That is for me communication and I think that's super important. If someone sends you a file and you're not training to look at it and it has pages of pages of tables. What does it really mean? And I'm not saying we do this well at [our business unit]. I'm not saying we do it well. But this is something where I see a lot of/

General space for improvement.

Yes.

To your mind, are skills related to data scientists such as statistical, programming, and IT skills currently required in MA and will they be in the future?

Depends on the setup, right? In our setup where we have all these business process organisations and BI experts grouped in teams where they work together, I don't need to know how to program. I need to know how to use the tools they give me or the information or the reports that they give me. That I need to use or need to know how to use. I don't need to know how to program. And I don't see it as an absolute requirement to know how to program. Yes, if you know it, it's super helpful. It's like we're driving a car. I need to know how to drive the car. I don't need to know how to build or fix or make the car, right?

Yes, that's true.

If I have an issue, it helps if I know how to do a quick fix. That's the same thing. If I get reports I can probably change it a little bit so that it works for me but I'm not going to have to build it from scratch. But it's important these people exist in the organisation and that they somehow get the freedom to work together and come up with things that drive things forward.

Outlook

What is your perception on whether the occupation of a management accountant is at risk or not?

The classical one, yes. And he should not be there. No one needs a person that just makes a report and sends it to you. A person that is the financial interface between many departments, that is super relevant. That I see as absolutely critical. And from that point of view, I don't see the occupation of someone that is positioned as the financial interface between different departments – steers or works on the forecast or works on a plan or prepares the information that whatever the topic is, whether you talk about GPI or whatever EBIT issue you might have, is able to solve and change things for the better – you are going to need that person always. Probably, you are going to need that person always. You don't need someone that sends you report, that's useless.

Will the MA department be minimised in terms of employees?

I think, in general, we can work with less controllers, yes. Definitely. And that's fine.

And that kind of answers also the question that follows. Will it be substituted? Yes, if you have a team that builds reports, they will be substituted. If you have a team that acts as the interface and the financial perspective or brains of an organisation – what do you call them, financial business partner or management accounting or controller or whatever – I think you will continue to need that person or those persons. Like in supply chain. I mean, in the end, you have a supply chain organisation and you have a lot of things that are being taken over by smart BI tools or actual robots who do stock picking – who knows what. And in the end, you are going to need people that are positioned in that organisation, who are taking care of that matter. In the end, the organisation is never going to be completely automatized.

Finally, do you have any further issues you would like to address?

The further issues I would like to address is that we need to keep bureaucracy out of the digitalisation advancements of controlling and management accounting. That ... slowly ... [inc., microphone rustling] an organisation. Soon as you have those layers, those hierarchies and those bureaucracies, whatever tool will come out of it will be useless.

Okay. Yes, I guess, that's the issue with big companies, probably. That there is always bureaucracy.

Yes.

Interview 2

Interview with a Controller for Corporate Reporting Processes at Biotronik Corporate Services SE

Berlin, 25.07.2019

Technologies & Methods

Which technological innovations related to the digital transformation have a significant impact on MA?

From my perspective, there are two main technological innovations important for management accounting. There is at first the in-memory computing which is from my perspective an enabler technology which will enable to, for example, handle Big Data. These things. Without such a technology we're not able to analyse in a minimum time data. And the second technological innovation I think will impact management accounting is the artificial intelligence. Whereas in-memory computing is a technology of the present – which is quite state-of-the-art but already invented – artificial intelligence is, from my perspective, still at the beginning. But I'm expecting in the next 20 years that this technology will change not only management accounting. It will change finance, it will change nearly every job somehow. Right now, in terms of artificial intelligence, I have just seen basic technologies with basic if-then-logic. But as I said, in future I'm expecting that this will change.

How do the technologies you just mentioned impact the MA?

For example, in-memory computing. In-memory computing will lead to the effect that the management accountant won't need that much time to collect data, to prepare reports and all these things right now. A management accountant needs to invest a lot of time to collect data. And he has less time to analyse these. So, on the one hand, I think there will be a dramatic time reduction in terms of spending time to collect data. And on the other hand, in-memory computing will enable to do real-time reporting. And also, things like predictive scenario analysis for strategic planning. Predictive analysis, all these things will be possible with in-memory technology. As I said, in-memory computing is the basis for all other things, I think.

And I would say that, as of now, a typical management accountant, he spends, I would say, approximately 80 percent on tasks like downloading reports and preparing standard reports. So, he's very busy with repetitive tasks and 20 percent he just has time for analytic tasks. So, this will change. This ratio will change. So, I'm expecting that the management accountant will have/ I think it will switch. For 20 percent he will invest his time to prepare data and for 80 percent he will have time to analyse these data. This is a change. But I also think that these technologies, they will bring the controlling back to the origin. It means that the definition of a controller is that he should be an advisor of the CEO and for the people who lead the company. But I think, right now he's very busy with standard activities like commenting the past and all this stuff. So, we will come back to the original definition of a management accountant.

Ok, back to your question. I said something about in-memory computing. And I think, the other technology here I mentioned before is artificial intelligence. And here I'm expecting that artificial intelligence will help to analyse the past, help to analyse deviations. But there will also be kind of interactions. I've seen already technologies which are called cobots. It's like a chat bot. Where you ask something, and the machine is answering. And this chat bot, they will be changed to interactive bots with whom you can speak. And this is a change of how a management accountant/ of the daily work. Cause I'm expecting that he has something like an artificial partner whom he can ask questions. And this will help. And this might be a change.

Do you apply business analytics, especially predictive and prescriptive analytics, and if so in which context?

We apply business analytics, of course. But predictive and prescriptive analytics is it's not yet applied. I know some departments who start to, who apply mathematical schemes and statistics but here, as I'm working for a medium-sized company, this is not is not yet used everywhere. Especially in the management accounting, I would say, it is very rarely used. But I'm expecting that, due to the shift I mentioned before between repetitive and analytic tasks, that there, the management accounting must focus on such analytics like predictive and prescriptive analytics. Because all the other tasks can be done by a machine, more or less. I think, this is the future.

In the future, do you expect predictive and prescriptive analytics to be applied in the MA at your company, and if so for what?

I think, especially for budgeting. But I think, not short-term budgeting but medium- and long-term budgeting. But also, for all kind of budgeting processes, I see a use. And of course – I don't know if it's the right name but – things like strategic planning, strategic controlling, long-term planning. For such things you need Big Data, you need all these IT power too and also intelligence to analyse these. And there I see an impact.

Is in-memory computing used in your MA presently and will it be prospectively?

It will be used prospectively, and it is already used but only in the BI department [Corporate Reporting Services]. And the BI department will implement it this year. But for the rest of the IT infrastructure, like our ERP, they will change in 2025.

Do you make use of any cloud solutions these days and will you in the time to come?

Yes, we are using cloud solutions. But as we are working in the medial branch, we have a lot of restrictions. We can't use, as of now, cloud solutions everywhere. But I am expecting this will change. For example, for our HR processes we're using cloud solutions. But all other solutions are on-premise solutions. But as I said, I am expecting that this will change but preconditioned for this change are changes in the regulation.

Ok, so management accounting, at the moment, cannot use it.

Yes, that's right.

Is robotic process automation currently utilised in your MA and will it be in the future?

It's not used in the management accounting department I'm working for now. It is used in my former company. It was heavily used. They founded an own department which is called RPA department. And as I left, they already worked with more than 100 robots, supporting finance and management accounting operating processes.

Do you expect it to change here?

Yes, I expect it. But ... it will take some time. I guess, that in the next ten years we will also apply it. But at first, we focus on in-memory computing which I think will be the basis for all the other technologies coming later. And maybe we don't use RPA and we directly go to

intelligent RPAs or to artificial. Cause as I said, the RPAs I know, the logic behind is very easy. So, not very sophisticated, at the moment.

Could you give some examples of software and what they are used for in your MA?

Yes, of course. In our MA, the most important software is our ERP. We're using SAP. SAP ECC with all relevant modules, including finance and controlling. And we're also using SAP BW solutions, that's a business intelligence solution. The ERP provides the data for the BW which is then used for analytic purposes. And of course, there are also some third-party products. But more or less they are connected to SAP. And SAP collects the data for later analysis.

Which software changes/implementations are currently planned in your MA department?

The main change, short-term, as I already explained, we will implement the in-memory computing for the BI department or BW. And mid-term, we are right now running an SAP S/4HANA transformation project. This will be implemented in 2025. It's planned to be implemented in 2025. This is the next big digital transformation project for management accounting. Because this technology includes in-memory computing, it includes artificial intelligence, it includes RPA. With this software we have the foundation to apply the new technologies from 2025 on.

Where do you see potentials to apply more new tools in the time to come?

I'm expecting more tools in the area of planning, especially of strategic planning, mid- and long-term, for business development purposes. Otherwise, all the tools we apply, they are already digitalised, but we will bring them on the next level.

Processes

In which processes are technologies related to Big Data and business analytics being used in your MA?

Management accounting processes which are impacted from Big Data and business analytics are our reporting processes and our planning processes and our analysis processes.

Right now, we are working with these, we have these kinds of processes, we apply these processes. But in terms of analytics, we are rarely using statistical methods to predict developments. For some sections like sales planning processes, there we are using statistical methods, but not in all sections of our planning processes. Right now, I think we only have a basic Big Data approach. As we're more focused on our data we have in our ERP. We rarely link to external sources.

In which processes will digital tools be used increasingly?

I think, the business analytic processes, they will change. And here we must develop our analytics to a kind of predictive analytics. In this area, I'm sure, other companies will invest, and we will also invest to be competitive.

Considering the ongoing digitalisation, how will the time spent on specific processes be impacted in the future?

As I mentioned, right now the time spent on standard reporting, for example, for a management accountant is very high. He's often busy to prepare these, he's needs to comment what happened in past. And all these things, they will change with new digital tools. Reports, especially standard reports – this is a technology which already exists, it's nothing new but in the next ten years no company can afford that reports were created manually – so standard reports, a management accountant will rarely need to create these. At month's end, the management accountant, he needs to explain why did our cost increase. And this is an analytic task. But at least the new tools, like artificial intelligence, they can help to find reasons. I'm sure, the first step will be a kind of proposal and saying us why, for example, did our raw material cost increase. And the management accountant he confirms it or not. So, this will be the first step. And the second step will be that this commenting more and more will be done by a machine. And what will be the impact? When you spend less time on repetitive task, you have more time for analytic task. So, I think, the management accountant in future, he will focus on consulting and advising the business. And this will be the focus. And I think, this is a high value task. And this task can hardly be replaced by a machine. And I think also, that the fame of a controller or management accountant will change. He will be a kind of business partner to the business for a more profitable company.

Roles

What is the most prominent role you take, e.g. that of a business partner, consultant, controller, facilitator, innovator, navigator, pathfinder, reporter or service provider?

At first, I'm a controller. But as this I'm involved in all digitalisation projects of the management accounting department. As for example in the S/4 HANA transformation project which is the main important digital transformation process for our management accounting in the next five years. In this role, when I'm working in projects, I would say I try to navigate and consult our department to make the right decisions – in terms of tool selections, new processes and opportunities, of new technologies.

How does the digitalisation impact your current role and which impact on it do you expect in the future?

I'm not directly impacted, as I'm leading the digitalisation. Other colleagues, colleagues who are working as a sales controller or production controller – I'm working on it to change their work. So, I'm indirectly impacted.

Currently, is there another role you perceive as relevant in the MA and will there be another crucial role?

I expect that in future it will be much more important for a management accounting employee to have cross-functional knowledge. For example, special valuable knowledge are IT engineering or project management skills. And of course, also intercultural knowledge and languages. Cause due to the digitalisation, these processes in a company, they are all linked. So, it is important for a management accountant to know what the production or the engineering department is doing to understand the impact on the numbers. And due the digitalisation, finance and engineering and production and all departments, they are linked. And as I'm expecting that the demand of repetitive tasks executed by a human will reduce, I think the people will be more organised in project work. And therefore, project management skills and intercultural skills will be more important.

I think, in future the role of the management accounting might change more to a role to moderate and consult the business. Not only the CEO, also the sales department, the logistical department, all departments. And for this, further skills will be required.

Skills

Did you perceive a shift in the skill sets required in MA in the past years?

Yes, of course, very much. As I started working in the management accounting department, it was more or less required you know bookkeeping, you know these standard controlling and management accounting tools, you have an understanding of these. Especially in the last ten years, I recognised that more and more companies are searching for management accountants with IT background. Who know programming, who understand the architecture of an ERP-system and the customising, to be able to automate processes to be more efficient and to handle new technologies. I think, that's the main point. The last ten years, I was in several projects involved where we're applying new software solutions. For example, when you want to make something better, you need to know how the IT is working. You need a basic understanding of the possibilities. So that's it, I think. To sum it up, I perceived that IT skills were required in the past years.

Do employees in MA have the skills to use new software applications?

That's difficult to answer. But in general, I would say that the level of education of a management accounting is in general quite high. So usually, he has the skill to handle new software application. It means to handle new software application always means life-long learning. This is a mindset change that you have never finished learning. So, this is a skill which is maybe rarely published in the management accounting section. But in general, I would say that the management accountants in general have the skills, yes.

In your opinion, will there be different skills asked for in the future?

Of course. As I said, from my point of view, the most important skill is a cross-functional understanding or an interdisciplinary knowledge of different areas. Like finance. Right now, a management accountant is more or less focused on finance and controlling processes. But in future a deeper IT knowledge is required. And it always depends on the function and when you're working more on projects, I think engineering and project management skills are much more needed.

Do you perceive an enhanced focus on analytical skills and communication skills in MA and do you think there will be a focus on them in the future?

Yes, of course. Especially as repetitive tasks like creating standard report are getting less and less important as they were done by the machines, there is more time for analytical skills. And analytical skill is a skill which has a high value added for the company. And I perceive that especially management accounts who are able to understand or to come to a conclusion and who are able to analyse and consult the business, they were very much required. Also, my company is an international company. And language between all countries is English. There are a lot of calls, you need to align with other regions. And therefore, and also for a management accountant, it's important to have these communication skills to work in an international company. And of course, in future, there will be a focus on both.

To your mind, are skills related to data scientists such as statistical, programming, and IT skills currently required in MA and will they be in the future?

That's a very good question. I know, that especially programming and IT skills are pretty much required already now. And I think, they will be more required in future. Scientists and statistical skills, they are required, but not in general for all management accounts. I think, in a few sections for very strategical planning, these people, they must have these skills also to handle the software. So, all are required. But I think in general, programming and IT is import for all management accountants. Statistical and scientists only for few. That's my expectation.

Outlook

What is your perception on whether the occupation of a management accountant is at risk or not?

I wouldn't say it is at risk. But where I'm sure is that it will dramatically change. So, in 20 years a management accountant will not do what he's doing now. Let's assume we put the workload of now in 2035 or 2040. I would say that at least 60/70 percent of this workload can be done by a machine. So, there are two possibilities. Possibility one is that a company says: OK I'm fine with the basic controlling set and I will reduce my controlling department

by 70 percent. Or – and this is what I think will happen – the controlling department changes the focus on advising and consulting tasks, on business partnering tasks, to provide a high value to the company.

Will the MA department be minimised in terms of employees?

It's a very good question. I think, there will be companies who will try to work with a very lean administrative department. But on the other hand, I think, maybe this might be possible for companies who produce basic products like milk. There it's not necessary to have big management accounting department. But when the company is linked with thousands or millions of customers and has to handle Big Data/ What I wanted to say is that this Big Data is a kind of treasure. But right now, we are not able to get all these coins from this treasure. So, when we are working with technologies like in-memory computing and when we are able to gather this Big Data treasure and to analyse this, then, there can be a high value added to the company and this will result to a competitive advantage for the company. In these cases, I expect that the management accountant department will remain maybe at the number of people they're right now, but they will focus then on advising and consulting tasks.

Finally, do you have any further issues you would like to address?

Yes, I would like to address one thing that technology is very important, but many people think that technology is the only key to, for example, be more efficient or to be more efficient and effective. But it is also very important that the processes behind there are lean or that they are best practice processes. Also, with a high sophisticated artificial intelligence, it is not possible to handle a very complex process with a lot of manual interactions. So, what I want to say is that processes and tools, they must go hand in hand. People often forget that it's also important to have efficient processes.

Interview 3

Interview with a Controller for Corporate Reporting Services at Biotronik Corporate Services SE

Berlin, 08.08.2019

Technologies & Methods

Which technological innovations related to the digital transformation have a significant impact on MA?

Also wir sind sehr stark auf dieser Reporting- und Planungs-Schiene unterwegs und von daher haben wir da recht viel – insbesondere meine Wenigkeit – mit dem TM1-System zu tun. Und da ist es zum einen spannend mit der In-Memory-Technologie. Das heißt, TM1 ist eine multidimensionale In-Memory-Datenbank – und das ist jetzt nur so meine Perspektive mit den Sachen, mit denen ich jetzt täglich oder regelmäßig arbeite – und von daher ist es da schon recht spannend, dass man da sehr flexibel auswerten kann, sehr performant unterwegs ist, die Datenräume sich beliebig zurecht slicen und dices kann und das Ganze auch noch mit einer flexiblen Berechnungslogik. [Es gibt im TM1] zum Beispiel eine Rule-Logik. Das heißt, gewisse Kennzahlen errechnen wir direkt on-the-fly – Währungsumrechnung, Menge mal Preis – also triviale Sachen, aber durchaus auch komplexere Themen. Ich bin da auch eigentlich vom Ursprung her eher Informatiker, also habe ursprünglich mal technische Informatik studiert. Und das ist von daher auch sehr spannend, da sind durchaus auch andere technische Entwicklungen, die uns da in die Karten spielen, wie zum Beispiel, also ich sagte ja, In-Memory. Das heißt, das ist alles im Arbeitsspeicher, dadurch ist das so schnell und die Arbeitsspeichermengen, die bezahlbar sind und auch generell das Volumen, was man in so einem Server einbauen kann als Arbeitsspeicher, wird auch einfach immer größer. Also da sind nicht nur Software-, sondern auch Hardwareentwicklungen, die uns in die Karten spielen und uns erlauben, größere Datenmengen, komplexere Berechnungen und so weiter auszuführen.

Also In-Memory Computing als das Hauptsächliche.

Genau, also zumindest jetzt von meinem täglichen Arbeiten. Das nutzen wir sowohl für die Planung als auch fürs Reporting, also auch die ganzen Standardberichte – PSR, MSPR, Real Cash und so weiter – sind auch eigentlich primär im TM1 vertreten und ermöglichen uns, aber auch den Controllern auch wieder sehr self-service-orientiert dort eben auch selber Auswertungen zu machen. Also wir bieten Standardberichte an, aber wenn der Controller dann tiefergehende Fragen hat, dann kann er auch selber in den Cube gehen, ohne mit komplexen Abfragen zu arbeiten, kann er sich die Daten direkt auf der Granularität, auf der Ebene, die er benötigt – bis auf das Material haben wir es zum Teil runter – ziehen.

How do the technologies you just mentioned impact the MA?

Die ermöglichen uns eine, zum Beispiel insbesondere auch in der Planung, recht flexible Planung zu halten. Also da ist ja dieser schöne Spruch: Der beste Plan nützt nichts, wenn er nicht zu verändern ist. Also durch diese flexible Technologie können wir da recht schnell auch noch high-level Data Spreading Anpassungen auf der Planung zum Beispiel vornehmen. Also wenn zum Beispiel irgendeine Region sagt, sie will die Umsätze senken und für ihre Region pauschal die Preise um fünf Prozent senken oder erhöhen, dann können wir das zum Teil mit einem Klick bei uns machen und da wird das automatisch nach unten verteilt und rechnet dann auch gleich automatisch die draus resultierenden Net Revenues neu. Wir haben auch das Thema Währungskurse, jetzt kommt bald zum Beispiel der Budget-20 Kurs und generell gabs da auch schon mal Anfragen, zwischendurch mal ein anderen Simulationskurs zu fahren. Das können wir dann zum Teil innerhalb weniger Minuten oder unter einer Stunde anbieten und direkt live durchrechnen lassen, also das ist sehr mächtig und da ist man sehr flexibel. Gerade in der Planung, aber zum Teil auch im Reporting, dass wir dann als technische Abteilung extrem schnell reagieren können oder, wie gesagt, auch Anpassungen auf Datenebenen vornehmen können, wo man wirklich eine Eingabe macht und es betrifft dann im Detail vielleicht Tausende Bewegungsdaten, die man dann damit irgendwie beeinflusst.

Do you apply business analytics, especially predictive and prescriptive analytics, and if so in which context?

Also so richtig predictive / Ich weiß die [Kollegen in einem der Geschäftsbereiche] setzen R auf TM1 Daten ein, die wir dann wieder reimportieren. Das ist dann ein externes Tool, was

einfach die Daten wieder ins TM1 rein lädt, um dann wieder für der ihre Berichte und Analysen zur Verfügung zu stellen.

R – diese Programmiersprache?

Genau, R, das ist eine statistisch-orientierte Programmiersprache, die darauf ausgelegt ist. Ansonsten hatten wir jetzt mal eine kleine – das ist auch wirklich ein ganz trivialer Algorithmus – lineare Hochrechnung des Actuals für die ROF Planung, also die Net Sales und Shipings, erstellt. Nur für eine interne Auswertung, einfach mal gegen die von den Ländern geplanten Mengen gegenzulegen, ob das so plausibel aussieht. Also weniger so predictive als führende Größe, sondern das wird glaube ich dann eher wirklich zur Plausibilisierung oder um auch mal zu schauen – wenn ich jetzt zum Beispiel einfach mal das Ist hochrechne, wie entwickelt sich das und wie verhält sich das oder wie sehen daneben die von echten Menschen geplanten Zahlen aus. Also das ist dann für uns eher ein Referenz- und Vergleichswert. Also zumindest jetzt von unserer Seite mit relativ einfachen Algorithmen. Ich hatte auch schon mal predictive / Ich komme ursprünglich ein bisschen aus der Beratung und da hatten wir auch mal einen Bayesianischen, statistischen Forecast, so einen Algorithmus mal angewandt, der ist dann nochmal deutlich mächtiger. Der beachtet dann Saisonalitäten und erkennt zum Beispiel regelmäßige Schwankungen und bietet auch solche Sicherheitsbereiche, also dass man dann auch sagen kann, der liegt da mit so und so einer Wahrscheinlichkeit der zukünftige Wert, das geht ja meistens umso weiter man in die Zukunft schaut, desto weiter auseinander. Ich weiß, es gibt da auch noch komplexere Algorithmen, die ich auch schon mal früher angewandt hatte, aber hier halten wir das jetzt eher mit einfacheren, die da, zumindest für unsere momentanen Anforderungen, ausreichen.

In the future, do you expect predictive and prescriptive analytics to be applied in the MA at your company, and if so for what?

Wie gesagt, diese eine lineare Hochrechnung, das war jetzt ein erster Schritt und das könnte ich mir durchaus zumindest vorstellen – die Anforderungen bekommen wir dann immer von den jeweiligen Fachabteilungen, – aber, dass das durchaus weiter ein Thema wird. Wir hatten zum Beispiel mit [einem Kollegen] einmal eine ROF Simulation mit Ist-Preisen und so weiter, also das man da auch so gewisse Referenzwerte einfach mit anderen hochgerechneten – zum Beispiel jetzt in dem einfachen Fall waren es Preise – mal

nebeneinander legt, um da einfach mal Referenzen zu haben. Also das, ich denke mal, wird immer mehr eine Frage werden und kommen, dass das interessant wird. Zumindest als Referenzwert, vielleicht nicht als führender Planungswert, der dann auch in die Produktion geht, aber zumindest als Orientierungswert, ob man sich im richtigen Bereich zum Beispiel bewegt oder um was-wäre-wenn Szenarien mal durchzuspielen, macht das durchaus Sinn.

Also du erwartest jetzt nicht, dass das so das Führende ist, sondern, es wird eher zum Gegenprüfen genutzt.

Ja, also ich glaube, zumindest von [dem einen Geschäftsbereich] wird es dann am Ende fast als Führendes verwendet. Also diese ROF Planung geht dann am Ende auch in die Produktionsplanung über und soweit ich das mal – also wir betreuen das nicht primär, wir betreuen nur den technischen Part von TM1 – wird glaube ich auch dort irgendwie dieser R-Forecast – ich kenne da jetzt keine exakten Details, was da für Algorithmen angewendet werden, – aber auf jeden Fall ist das da glaube ich fast schon die führende Größe.

Is in-memory computing used in your MA presently and will it be prospectively?

You already mentioned it basically.

Ja genau, wir setzen es jetzt schon mit dem TM1 ein und es ist auch geplant auf der SAP BW Seite mit dem HANA, also dort auch ein anderes großes – also das SAP betreuen auch mit als Corporate Reporting Services – und da wird's zukünftig dann auch noch in einem anderen Tool oder mit einem großen führenden Reporting System zukünftig kommen. Dass wir dort dann diese In-Memory Technik mit dem HANA haben.

Und dieses TM1 allgemein ist eigentlich eine riesige Datenbank oder wie muss ich mir das technisch vorstellen?

Ja, so in der Art. Naja, riesig – also wir versuchen eigentlich eher, dadurch, dass es In-Memory ist, es relativ klein zu halten. Also es sind schon, gegenüber dem, was man in einer normalen Excel-Datei vorfindet, deutlich größere Datenmengen, aber wir versuchen, es immer noch überschaubar zu halten, um es in mehr Arbeitsspeicher passend reinzukriegen und auch performant zu halten. Also auch gewisse Sachen mal aufräumen oder gewisse Entscheidungen treffen, dass man jetzt vielleicht nicht alles auf Buchungsebene hat, sondern irgendwo eine höhere Aggregation auf Monats- und nicht auf Tageslevel oder

ähnlichem. Also da muss man, gerade bei den In-Memory Sachen, schon ein Stück weit drauf achten, finde ich zumindest, dass man die Systeme noch so schlank hält, dass sie auch performant bleiben, weil da kann man sich das auch so verbauen, dass es dann am Ende auch nicht mehr so performant läuft.

Das heißt, die anderen Daten werden dann einfach irgendwo im Hintergrund gespeichert, aber nicht auf dem Arbeitsspeicher.

Oder wir ziehen uns zum Beispiel Ist-Daten einfach aus dem SAP System ab und die ziehen wir dann zum Beispiel nicht tagesgenau sondern – weil gerade in Planung und Reporting, reicht das dann – monatsgenau ab. Also, dass wir da einen gewissen Detailgrad / Die Planung findet ja eh auch nicht so extrem detailliert statt, da gibt es auch diverse Vereinfachungen. Aber, das Ist versuchen wir dann schon auf einem gewissen aggregierten Level nur abzuholen, dass wir dort nicht too much am Ende haben.

Do you make use of any cloud solutions these days and will you in the time to come?

Zumindest unser SAP-System was wir nutzen ist, soweit ich weiß, komplett irgendwie in einer Art von privater Cloud, also das ist, soweit ich weiß, nicht mehr im direkten Biotronik Rechenzentrum, sondern irgendwo, bei IBM glaube ich, ausgelagert. Unser TM1, das weiß ich, ist direkt in-House, also das ist direkt von uns ein Server, aber das SAP ist quasi outsourct in einer privaten Cloud. Also Cloud ist ja auch immer ein relativ mit Datenschutzbedenken behafteter Begriff, also das ist in dem Fall dann wirklich auch nur eine für uns existierende direkte Verbindung, keine Internet Cloud, das jeder weltweit drauf zugreifen kann, sondern getunnelt, dass man nur von Biotronik aus auf die SAP-Systeme drauf zugreifen kann.

Okay, also, um auf diese Art die Sicherheit zu erhöhen.

Genau.

Is robotic process automation currently utilised in your MA and will it be in the future?

Was ist so richtig mit Robotic Process gemeint? Also da verstehe ich im ersten Sinne irgendwie einen Roboter.

Robotic Process Automation bedeutet in dem Fall nicht mehr diese Roboter in der Produktion, sondern es gibt auch solche Software-Roboter, Bots, die systemübergreifend Vorgänge

automatisieren können. Das heißt, die können zum Beispiel aus Mails irgendwelche Daten ziehen und die dann in Excel oder sowas einbauen und damit irgendwelche Grafiken erstellen. Viel was so standardisierte monatliche Prozesse sind, immer wieder irgendwelche Sachen vielleicht einfach nur zu refreshen und Slides zu aktualisieren und befüllen, das können solche Bots dann machen.

Na gut, im Prinzip haben wir sowas zum Teil schon. Also wir haben ja zum einen, wenn wir uns zum Beispiel die erwähnten Ist-Zahlen aus dem SAP uns irgendwo holen, haben wir dort eine PI Schnittstelle. Das heißt, das wird regelmäßig von SAP nur eine Datenbanktafel gefüllt und wir holen uns das dann zum Beispiel für das Ist-Reporting auch direkt per TM1 ab. Und wir haben auch – also das geht dann wahrscheinlich noch mehr in Richtung – gewisse zum Beispiel Berichtsaktualisierungen, einfach in Standardberichten die aktuellen Zahlen zu finden. Da gibt es zum Teil sehr viele Tabellenblätter und sehr große, komplexe Sachen, da haben wir auch zum Teil, im einfachsten Fall irgendwelche VBA Makros, die das automatisch durchlaufen und dann die aktuellen Daten darstellen, einspielen in die entsprechende beispielsweise Excel oder andere Dateien, die wir da auch liefern. Da haben wir schon gewisse – ich weiß nicht ob das Hightech Robotic Processing ist, aber mit einfachen Methoden – so einfache ETL also Extract, Transform, Load-Logiken, aber auch solche Berichtsaktualisierungen gerade bei Excel-Dateien, haben wir da recht viele Makros, die uns da die Fleißarbeit abnehmen. Oder zum Teil, also bei einem Bericht weiß ich das, machen wir das auch, da verschicken wir jede Woche elf Mails und die Mails schreiben wir auch nicht mehr selber, sondern da haben wir eine Art Excel-Liste und die wird dann mit aktueller Woche – also ein paar Sachen sind dann wie Platzhalter und die werden dann einfach aktualisiert und da kriegen die Leute wöchentlich ihre aktuellen Daten automatisiert per Mail. Also da klicken wir noch einmal auf den Knopf, dass dann diese Mails rausgesendet werden, dass wir zumindest prüfen können vorher ob die Daten, die wir da verschicken, korrekt sind, aber ansonsten geht das dann auch schon voll automatisch. Also da sind wir glaube ich schon relativ, würde ich sagen, gut durch automatisiert. Wir haben aber, wie gesagt, immer noch so manuelle, meistens Anstarter, dass wir vorher nochmal prüfen, dass die Zahlenberichte, die wir da rauschicken, nicht vielleicht irgendwo einen Excel Formel-fehler oder so haben, sondern das dann alles vorher nochmal korrekt ausschaut.

Du hast irgendwas von einer PI Schnittstelle oder so erzählt?

Genau, das ist die Prozessintegration. Das ist vom SAP, da werden in beide Richtungen, sowohl von unserer Seite aus, also von der TM1-Seite aus, Tabellen gefüllt, die dann wieder vom SAP eingelesen werden und auch von der anderen Seite. Bei größeren Stammdaten, Kostenstellen und Materialien, die legen wir auch nicht in TM1 händisch an, sondern die werden dann über eine standardisierte Tabelle uns zugeliefert aus dem SAP – ich weiß nicht ob das nächtlich aktualisiert wird oder ob jemand noch auf einen Knopf drücken muss, – aber auf jeden Fall landet es dann am Ende in einer Art Tabelle und die lesen wir dann ein. Ansonsten auch für zum Beispiel Materialien, die zum Teil fast hunderttausend Einzelstücke, die wir da haben, die pflegen wir nicht mehr manuell, sondern das ist dann alles automatisiert schon.

Could you give some examples of software and what they are used for in your MA?

Ich hatte es jetzt ja schon genannt, der vollständige Name ist IBM Cognos TM1, verwenden wir als In-Memory Datenbank für diverse Reporting-, Planungszwecke. Ansonsten haben wir das SAP BW für die großen Standardreports, gerade jetzt auch Detaildaten, die dann too much zum Beispiel für das TM1 wären. Ansonsten durchaus auch klassische Standardtools wie man sie jetzt kennt wie Microsoft Access, Datenbanken für gewisse überschaubare Datenmengen oder auch, wie gesagt, Excel so als Standard, sag ich mal, Schweizer Taschenmesser für alle möglichen – gerade auch ad-hoc Reporting – Zwecke. Zum Beispiel auch gerade das TM1 ist sehr direkt mit dem Excel angebunden mit einem eigenen Add-in, da kann man sehr schnell eine Datenbankauswertung erstellen und die dann direkt in eine Excel Datei einfach übertragen und die dann an die entsprechenden Leute – gerade wenn es spezielle ad-hoc Auswertungen sind – schicken. Also das sind so die Haupttools, SAP BW, TM1 und ansonsten quasi die ganze Office Suite.

Das heißt, dieses SAP BW ist dann das was mehr Daten hat, das größere dahinterstehende.

Genau, also zum Teil auch für Detaildaten. Also zum Beispiel den MSPR gibt's in TM1 auf Monatsebene und wenn man gewisse Teilaspekte auf zum Beispiel Tagesebene oder auf Point-of-Sales – also gewisse andere, nochmal spezielle Aspekte – dann findet man die dann im BW genau wieder. Berichte haben wir in beiden Systemen, aber im TM1 machen wir das Standard Reporting drüber, aber gewisse spezielle, detailliertere Analysen kann man dann nur im BW machen.

Which software changes/implementations are currently planned in your MA department?

Zum Beispiel das TM1, das nennt sich zukünftig IBM Planning Analytics, das ist die große Version 2.0. Das ist mehr wie ein Upgrade was wir da durchführen wollen. Ansonsten sind wir jetzt gerade auch dabei – also meistens eher größtenteils noch als Zulieferer – ein Kollege erstellt auch schon Berichte mit dem Qlik Sense, das ist auch ein neues Tool – also ist eigentlich schon im Einsatz – und wir liefern da zum einen Daten zu und erstellen zum Teil aber auch schon die ersten Berichte und Analysen im Qlik Sense. Also für mich eher ein Thema, das gerade neu dazukommt und generell aber Biotronik-weit – gerade [von dem einen Geschäftsbereich] schon ein bisschen früher – gibt es das an sich eigentlich schon länger. Aber da sind wir gerade auch zum Teil am Implementieren, wie gesagt, aus meiner Perspektive jetzt, größtenteils am Daten, zum Beispiel Planungsdaten, zu liefern aus dem TM1 für Qlik Sense Reports.

Und was genau können die dann?

Also das ist grafisch stärker. Man kann dort für ad-hoc oder generell für Self-Service ad-hoc Analysen sehr einfach, User-freundlich, Übersichten, gerade auch Dashboards mit dieser Metrik, diesen Ampeln, diesen Tacho Diagrammen und so weiter – also das ist ein bisschen optisch ein Dashboarding, schnelle Übersicht über relevante KPIs, also Kennzahlen. Das ist dafür gedacht. Zum Teil auch, um Daten einfach aus mehreren Systemen zusammenzusammeln und zu visualisieren. Also kommen dann vielleicht gewisse Daten, die es nur im SAP gibt und welche, die es im TM1 gibt, die werden dann vielleicht auch nochmal zusammengeführt in einem Dashboarding-/Reporting-System.

Where do you see potentials to apply more new tools in the time to come?

Also da habe ich zumindest gerade nichts direkt auf dem Plan. Was ich mir irgendwie IT-seitig / Von unserer Seite wäre vielleicht manchmal eine praktikablere Brücke zwischen dem SAP und dem TM1, da gibt es da nochmal spezielle ETL Tools, die dann zum Teil direkt aufs SAP zugreifen können oder gerade auf das SAP BW, um Daten / Da machen wir mal manchmal noch gewisse Sachen relativ händisch, weil zum Teil ist es dann auch zu aufwendig, so eine Tabelle, so eine Schnittstelle zu bauen. Also das würde wahrscheinlich, zumindest bei uns, ein bisschen diese regelmäßigen Sachen erleichtern. Also es gibt da noch ein

paar manuelle Sachen, wo man einfach keine Schnittstelle geschaffen hat, weil es zum Teil zu aufwendig ist, die in SAP zu bauen. Und da gibt es dann, wie gesagt, zum Teil Tools, wo wir dann von unserer Seite aus sagen können, hier Query x und die Daten möchte ich bitte haben und das wäre aus unserer Perspektive wahrscheinlich noch so ein Ding, was uns das Leben erleichtern könnte, weiter automatisieren könnte das Ganze.

Processes

In which processes are technologies related to Big Data and business analytics being used in your MA?

Also, da ist immer die Frage, wo fängt Big Data zum Beispiel an. Wir haben da durchaus, also grade auch in unserem Reporting, zum Beispiel wenn ich jetzt ans Inventory denke, da haben wir zum Teil auch Bestände und Bewegungen auf Seriennummerenebene, dass man wirklich jeden einzelnen zum Beispiel Schrittmacher wirklich eindeutig identifizieren kann, ob der jetzt zum Beispiel noch bei einer gewissen Gesellschaft auf Lager liegt oder nicht. Und das wird zum Beispiel auch sehr detailliert analysiert. Da braucht man es seriennummerngenau, um solche Themen wie UBD, also Haltbarkeitsthemen auch zu analysieren – also Haltbarkeit in dem Sinne, die Sachen sind sterilisiert und die Sterilisierung hält, zumindest rein theoretisch, nur eine gewisse Zeit – und, dass man sowas zum Beispiel monitoren kann, dass man wirklich jeden einzelnen Schrittmacher theoretisch weltweit nachverfolgen kann, wo liegt er gerade und viele Tage – oder da gibt es dann auch so gewisse Zeitbereiche, also noch ein halbes Jahr oder ein ganzes Jahr zum Beispiel – also wie lange hält zum Beispiel so ein einzelnes sterilisiertes Gerät, die Sterilisierung noch. Also das ist zum Beispiel schon relativ, würde ich sagen, Big Data, dass man da sehr, sehr viele, wie gesagt, für jeden Einzelnen – also wir produzieren durchaus einige 100.000, glaub ich, Geräte im Jahr – und das sind dann glaube ich schon recht große Datenmengen.

Und im Sinne von externen Daten? Also das sind ja eher unternehmensinterne Daten. Werden auch externe Daten genutzt?

Also wir nutzen zum Beispiel im Rahmen des Three Year Regional Business Plans, auch Five Year Sales Plans, zum Beispiel Marktdaten. Die bekommen wir glaube ich auch zum Teil von externen Institutionen, dass man einfach dann sich errechnen kann, wenn ich jetzt meine

nächsten fünf Jahre plane, wie entwickle ich mich, zum Beispiel im Verhältnis prozentual zum Gesamtmarkt, was Stückzahlen oder Umsätze und so weiter angeht. Also da nutzen wir, das sind quasi schon externe Daten, diese Marktdaten.

Und Business Analytics irgendwie konkret?

Da sind wir meistens immer eher von der technischen Seite. Also wir betreuen größtenteils dieses Thema und beraten zum Teil fachlich, da fehlt mir manchmal so ein bisschen der Gesamtüberblick, was dann jemand mit unseren Daten wirklich anstellt oder dann im Detail macht. Das hängt ja dann auch immer davon ab.

Also du hast jetzt keine direkte Business Analytics Software oder so. Also ich weiß nicht, ob man das Planning Analytics dann ja /

Ja, das geht schon so in die Richtung. Also es soll dann glaube ich auch zukünftig irgendwann dieses Watson, das ist auch so eine Art KI, dazukommen. Das ist glaube ich da auch geplant. Also momentan glaube ich ist das jetzt noch nicht direkt, soweit ich zumindest weiß, im Einsatz.

Eher sehr langfristig geplant dann.

Ja.

In which processes will digital tools be used increasingly?

Also das ist jetzt auch diese Frage konkret nach den Prozessen, wofür das genutzt werden kann. Wir hatten ja vorhin Reporting und so ein bisschen Planning auch.

Ja, das sind ja im Prinzip diese Bereiche. Also soweit ich weiß, ist es jetzt geplant, zum Beispiel die Kostenstellenplanung – gut das ist theoretisch auch digital – findet glaube ich momentan noch größtenteils in Excel statt und da ist es zukünftig auch geplant, dass über ein System auch weiter zu automatisieren, zu digitalisieren, dass das Ganze eben in einer zentralen Datenbank landet und jetzt weniger in irgendwelchen Excel Files per Mail rumgeschickt werden muss. Also gerade die Planung, da ist glaube ich immer noch so einiges an Potential, dass man das weiter – es ist vielleicht zum Teil schon digitalisiert, - aber trotzdem weiter systematisiert und weiter das Ganze automatisiert, in einem zentralen System auch wirklich alles ausführt und Excel-Workarounds dann zukünftig abschalten, auch vermeiden, kann.

Considering the ongoing digitalisation, how will the time spent on specific processes be impacted in the future?

Das geht glaube ich immer mehr in die Richtung, dass man jetzt, finde ich zumindest, mehr Zeit zum generell Konzeptionieren und Nachdenken hat, dadurch, dass man, wie gesagt, durch Automatisierung Zeit gewinnt und dadurch dann wieder für andere zum Beispiel fachliche Aspekte mehr Zeit hat als vorher, wo man vorher vielleicht eher mit Fleißarbeiten, mit irgendwelchen manuellen Verarbeitungsschritten sich beschäftigt hat. Dass man dort dann das Doing auf den Rechner überträgt und selber dann mehr Zeit und den Kopf frei bekommt für inhaltliche oder für weitergehende Qualitätsverbesserungsthemen. Dass man dann eher zum Beispiel Zeit bekommt die Systeme weiter zu verbessern und weniger Zeit in das stumpfe Abarbeiten von Standard manuellen Schritten reinsteckt.

Roles

What is the most prominent role you take, e.g. that of a business partner, consultant, controller, facilitator, innovator, navigator, pathfinder, reporter or service provider?

Ich sehe uns, also zumindest unsere Abteilung vom Corporate Reporting Services, eigentlich als Service Provider, also, dass wir für diverse Abteilungs[systeme?] unsere Dienste anbieten.

How does the digitalisation impact your current role and which impact on it do you expect in the future?

Wie gesagt, wir werden, denke ich mal zumindest, das Ganze weiter systematisieren und automatisieren. Und von daher vom Doing weggehen und mehr konzeptionell zum Beispiel die Systeme und Automatisierungen weiterentwickeln. Also, für mich konkret jetzt als Controller.

Currently, is there another role you perceive as relevant in the MA and will there be another crucial role?

Ja wahrscheinlich schon so diese Pathfinder und Innovator. Also, dass man mehr in diese Richtung geht, dass man weniger zum reinen ausführenden Wesen wird, sondern das Ganze auch inhaltlich oder generell technologisch zum Beispiel auch weiter treibt, dass

man dort weniger zum reinen Doing sondern auch, wie gesagt, konzeptionell und technisch das Ganze weiter entwickeln kann.

Sucht ihr da auch irgendwie, schlagt ihr da aktiv auch irgendwelche neue Software vor, die auf dem Markt ist und dann nützlich wäre?

Wenn Bedarf da ist, also wie gesagt, irgendwann wurde ja zum Beispiel auch dieses TM1 eingeführt und das kam glaube ich auch von unserer Abteilung. Also momentan ist da jetzt glaube ich kein aktiver Prozess, aber generell haben wir das auch schon in der Vergangenheit gemacht, soweit ich weiß.

Also hast du jetzt persönlich den Eindruck, dass du ein bisschen den Überblick hast über das, was an Technologien verfügbar ist?

Da versuche ich mich auch schon, soweit es geht, immer ein bisschen up-to-date zu halten über so BARC und so weiter Studien. Also versucht man schon. Man ist natürlich trotzdem irgendwo immer in seiner Umgebung. Man ist ja auch mit der Zeit drauf spezialisiert und ein bisschen darauf eingeschossen, aber generell schauen wir uns da zum Teil auch um – zum Beispiel Kostenstellplanung hatten wir uns jetzt glaub ich gegen das TM1 und gegen ein anderes System entschieden – und generell versuchen wir da eigentlich schon immer den Überblick zu wahren oder den Blick offen zu halten und auch immer zu schauen, was ist das optimale Tool für den jeweiligen Einsatzzweck.

Skills

Did you perceive a shift in the skill sets required in MA in the past years?

Aus meiner Perspektive wird es zum Teil immer IT-technischer. Also, dass man früher irgendwo das ganze Management Accounting/Controlling größtenteils auf Zetteln oder vielleicht, wie gesagt, in irgendwelchen Exceldateien gerechnet und realisiert hat generell. Und, dass das auf Grund der gestiegenen Komplexität, Datenmengen und so weiter da auch immer mehr in die Richtung IT geht, dass man sich dort immer weitere Systeme anschafft oder mit den Systemen weiter auseinander setzt, um auch mit der Entwicklung Schritt halten zu können; dass man dort computeraffiner oder generell IT-lastiger ein Stück weit wird.

Do employees in MA have the skills to use new software applications?

Ich denke schon. Also wir haben auch immer wieder diverse Themen, gerade ist glaube ich dieses Qlik im Kommen. Also, ich denke schon, dass da die Leute recht fit sind. Wie gesagt, heutzutage sind Computer, Excel und so weiter schon Standardwerkzeug und ja, ich denke schon, dass wir da gewappnet sind.

In your opinion, will there be different skills asked for in the future?

Ja, ich denke schon, dass es dann auch immer weiter so in Richtung dieser Business Analysis geht, dass man dort immer weiter – desto mehr Daten man hat und desto qualitativer und detaillierter, – dass man dort auch immer weiter einsteigen kann in die inhaltliche Ebene und das Ganze vielleicht auch abteilungsübergreifend, – weil wir haben jetzt zum Beispiel immer mehr den Fokus auf diesem SCM, Supply Chain Management, dass man das Ganze end-to-end sieht; das ist glaube ich im Controlling bei uns noch relativ jung. Und, dass man das Ganze auch immer globaler betrachtet, von der Produktion bis zum Verkauf, dass man das ganzheitlicher sieht und analysiert und es dann auch entsprechend planen und berichten und so weiter, kann.

Also da dieses Big Picture zu haben.

Genau, dass man da auch wirklich übergreifender das Ganze betrachtet.

Do you perceive an enhanced focus on analytical skills and communication skills in MA and do you think there will be a focus on them in the future?

Ja, ich denke definitiv – also wir sind, wie gesagt, zum Beispiel auch von den Communication Skills schon alleine durch die weltweite Aufstellung eh gefordert, dass man dann auf Englisch und generell dann vielleicht auch kulturelle Besonderheiten oder lokale Besonderheiten und so weiter lernen muss und generell dort immer gefordert ist und – dass es auch immer mehr ein Thema wird. Wie gesagt, allein schon durch die Globalisierung, durch unsere weltweiten Produktions- und Vertriebsgesellschaften.

Und Analytical Skills hast du vorhin eigentlich auch schon ein bisschen gesagt.

Genau, auch wir als eher Serviceprovider – für mich war es eh erstmal so eine Kurve, von der technischen Seite jetzt bisschen tiefer ins Inhaltliche einzusteigen – und das wächst auch an der Stelle natürlich, desto weiter man in die Themen – und sei es nur für

irgendwelche Realisierungszwecke – einsteigt, dann merkt man es sich trotzdem und bekommt dann auch immer besser einen Gesamtüberblick und besseres Verständnis grundsätzlich auch für die /

Das heißt, du musstest dir eigentlich eher diese Businessperspektive noch aneignen?

Genau, auch insbesondere Spezifika. Also generell diese Businessperspektive – also wir haben größtenteils Planungssysteme gemacht – kannte ich schon mit, man verkauft was, hat dann irgendwo einen ASP, einen Preis und Umsätze und so weiter. Also das Grobe hatte ich schon, aber die Spezifika, wie zum Beispiel, dass ein Schrittmacher einen UBD hat oder generelle Geschäftseigenheiten, die ich dann wieder lernen muss. Diese technischen Skills zumindest vom TM1, generell Computer, Excel und so hatte ich schon und den Rest hatte ich mir dann aneignen müssen.

To your mind, are skills related to data scientists such as statistical, programming, and IT skills currently required in MA and will they be in the future?

Genau, das hatte ich ja schon gesagt, das sind wir ja quasi grad, also zumindest die zwei letzten Punkte mit dem Programming und IT, das machen wir ja im Prinzip als Reporting Services, dass wir dort zum Teil gewisse Sachen programmieren, Datenbanken modellieren, zum Teil uns auch ein Stückweit um die Server, zumindest von unserer Applikationssicht her, kümmern. Also da sind wir eigentlich schon sehr programmierungs- und IT-lastig. Ja und Statistik, wie gesagt, hatten wir zumindest von unserer Realisierungsseite her schon einfache Methoden angewandt. Da gibt es, denke ich mal, noch Luft nach oben, aber ich glaube das wird auch, wie gesagt, in der Zukunft mehr gefordert werden, dass man dort weiter sich entwickelt.

Kannst du da Beispiele für Programmiersprachen oder irgendetwas nennen?

Ja, wie gesagt, im einfachsten Falle ist es zum Beispiel das VBA, um irgendwelche einfachen Sachen im Excel oder so zu automatisieren oder im Access. Ansonsten machen wir – gut, das ist keine direkte Programmiersprache – SQL-Abfragen oder zum Beispiel sehr viel programmiere ich in dieser TM1 internen Skriptsprache, Turbointegrator, das ist ein sehr, sehr spezifischer Dialekt oder eine sehr spezifische Programmiersprache für ETL, also für Datenverarbeitungsaufgaben im TM1 selber.

Wie heißt die?

Turbointegrator, oder kurz TI – viele Tools haben auch nochmal ihre eigenen internen Sprachen, um da einfach Daten zu verarbeiten, zu berechnen – und das ist die TM1-interne Sprache.

Und denkst du, das wird auch zunehmen?

Ich denke schon, also wie gesagt, wir merken es auch von den Anforderungen was die Berichte und so weiter angeht, dass man da auch weiter gefordert ist, sich weiter zu entwickeln.

Outlook

What is your perception on whether the occupation of a management accountant is at risk or not? [Also answered: Will the MA department be minimised in terms of employees?]

Das denke ich eben eher nicht, dass es jetzt weniger Leute werden. Man automatisiert und spart sich dann vielleicht an der einen Stelle Arbeit ein, aber auf der anderen Seite wachsen dann einfach die Anforderungen und Aufgaben zukünftig. Genau, substituted – also das geht dann denke ich weg von dem man baut nur Daten irgendwo im Excel zusammen und sammelt sie zusammen und tippt viel ein, zu dass man mehr automatisierte Systeme hat und sich dann eher inhaltlich drum kümmern kann. Da wachsen dann auch zukünftig die Anforderungen, das ganze Verständnis, was bedeutet jetzt die Zahl, was muss man jetzt vielleicht hier und dort beachten. Also ich denke, dass es eine Transformation ist, aber das es jetzt nicht – also inhaltlich wird die Arbeit mehr und von der technischen Fleißarbeit denke ich manuelle Datenverarbeitung wird dann potentiell eher weniger. Aber ich denke nicht, dass es irgendwie aussterben wird oder dass es weniger Leute werden, sondern, dass es sich einfach verlagert von der einen zur anderen Tätigkeit.

Finally, do you have any further issues you would like to address?

Da fällt mir jetzt gerade nichts ein.

Interview 4

Interview with a Finance Controller at a medium-sized IT company

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Technologies & Methods

Welche technologischen Innovationen in Verbindung mit der digitalen Transformation haben einen erheblichen Einfluss auf das Controlling?

Ich denke, dass sich viele Kollegen aktuell auch die Frage stellen, inwieweit es den klassischen Controller in einigen Jahren noch geben wird. Denn es sollen ja nun viele Prozesse automatisiert ablaufen. Das merke ich auch selber, dass entsprechend BI Analysen erstellt werden, die dann für alle Mitarbeiter verfügbar sind. Und es ist nicht mehr so, dass der Controller im stillen Kämmerlein sitzt und die Ad-hoc Analysen macht, sondern, dass er eher Werkzeuge baut, die dann allen Mitarbeitern zur Verfügung stehen. Auf jeden Fall ist auch die Situation, dass der Controller heute – sehe ich auch jetzt in meinem Job – definitiv viel IT-affiner sein muss als früher. Das ist sicherlich auch ein Grund dafür, dass in der Abteilung Rechnungswesen der Fortschritt jetzt noch nicht so weit ist, weil wir doch viele Mitarbeiter haben, die schon sehr viele Jahre im Unternehmen sind und von denen klassische Buchhaltung und Teile der Kosten- und Leistungsrechnung erwartet wurden. Und eben nicht diese Gesamtheit an Unternehmensprozessen. Mehr sollten sie damals auch nicht liefern. Jetzt ist das anders. Was ich aber auf jeden Fall hoffe und denke, dass die Rolle des Controllers auch als zwischenmenschlicher Vermittler, was ein System nicht abbilden kann, dass diese Rolle dann eher noch wichtiger werden wird in der Zukunft.

Und wie wirken sich Technologien, also Sie haben jetzt ein bisschen Automatisierung erwähnt, wie wirkt sich das auf das Controlling aus?

Ich merke gerade in unserem Unternehmen, dass die Datenpflege immer wichtiger wird. Also das was bisher zum Teil versickert ist, weil es nicht so im Detail ausgewertet werden konnte, das muss wirklich alles sauberer gepflegt werden als vorher, weil die Geschäftsführung tiefergehende Fragen stellt. Ein Controller muss also mehr Daten – breit und tief – auswerten können. Das ist was, was mir persönlich auch auffällt, gerade wenn ich

Auswertungen fahre, dass ich oftmals die Auswertung gar nicht bis zum Ziel bringen kann, weil ich dann erstmal mich wieder auf den Weg gebe und an den entsprechenden Schnittstellen dafür sorgen muss – und das wieder in dieser kommunikativen Rolle – die Daten, die notwendig sind, die vorher in der Form einfach gar nicht vorlagen, dass wir die jetzt auch erheben und gut pflegen, um sie auswerten zu können.

Nutzen Sie Business Analytics, insbesondere vorhersagende und vorschreibende Analytik und wenn ja, in welchem Kontext?

Haben Sie ein Beispiel für Business Analytics?

Entsprechende Software wäre zum Beispiel Power BI oder KNIME.

Unsere Firma hat ja nun die Technologie eines großen Players im Bereich der Softwarehersteller als Grundlage für die ganzen Auswertungen. Und da nutzen wir die aktuelle Version von dem BI. Ich lasse die entsprechenden Daten aus den verschiedenen Systemen, dem CRM-System, aus der Stundenerfassung und so weiter, ins Data Warehouse einspielen und kann dann die Daten über BI auswerten. Das ist das Tool, was ich für 90 Prozent meiner Auswertungen nutze.

Denken Sie, dass das in der Zukunft immer noch genauso benutzt wird oder, dass da eine Veränderung stattfindet?

Bei uns ist der Trend auf jeden Fall da, dass dort mit diesem Tool noch viel, viel mehr gemacht wird. Ich habe jetzt aktuell keine Vorstellung davon, ob wir andere Tools oder gegebenenfalls noch Tools, die mehr Funktionalitäten bieten, nutzen werden. Ich denke mal, der Fokus bleibt bei uns erstmal dort drauf, aber eben mit noch mehr Daten und vor allem mit einer tieferen Granularität der Daten.

Wird In-Memory Computing in Ihrem Controlling momentan benutzt oder wird es in der Zukunft?

Ich kenne mich leider nicht damit aus, was In-Memory Computing ist.

In-Memory Computing bedeutet, dass die Daten auf dem Arbeitsspeicher gespeichert werden und nicht mehr nur auf der Festplatte und dadurch die Verarbeitungsgeschwindigkeit viel höher ist und man Abfragen viel schneller tätigen kann.

Ich muss ganz ehrlich sagen, dass ich da mehr Betriebswirt als Informatiker bin. Ich habe keine Vorstellung, wie Daten bei uns liegen. Ich bin froh, wenn sie verfügbar sind. Ich habe da einen Informatiker als Ansprechpartner, der mir zugeordnet ist für diese ganzen Abfragen. Und ihn lasse ich die Daten einspielen.

Nutzen Sie heutzutage Cloud Lösungen oder werden Sie in der Zukunft?

Generell im Unternehmen werden Cloud Lösungen genutzt – wir sind ja nun auch Anbieter von Cloud Lösungen für andere Bereiche, – aber im Controlling selber eher nicht.

Und nutzen Sie roboterbasierte Prozessautomatisierung momentan im Controlling oder werden Sie das in der Zukunft nutzen?

Ich denke, dass wir das nicht nutzen. Wie gesagt, dadurch dass ich ja vorrangig auf Finanzbuchhaltungsdaten zugreife und die Daten aus dem CRM-System über das BI, das ist wirklich meine einzige Schnittstelle. Inwieweit da [Robotics genutzt wird?], ist mir leider unklar.

Ok, weil am Anfang meinten Sie auch, dass Automatisierung genutzt wird.

Da meinte ich dann eher solche Sachen in der Buchhaltung, dass man den Zahlungsverkehr entsprechend abwickelt, dass man das Mahnwesen zukünftig auf Knopfdruck automatisiert durchlaufen lässt und dass dort keiner mehr sitzt und dort jedes einzelne durchklickt. Das war eher so in die Richtung gemeint. Aber das sind ja dann auch wieder Möglichkeiten, die die Finanzbuchhaltungsprogramme anbieten. Aber in wie weit da solche Prozesse dahinter liegen, da bin ich wirklich nicht die richtige Ansprechperson.

Können Sie mir noch irgendwelche Beispiele von Software nennen, die Sie im Controlling benutzen?

Also wir haben unser Finanzbuchhaltungsprogramm, da die entsprechenden Lizenzen von einer Firma, die das für kleine und mittelständische Unternehmen anbietet. Dann haben wir ein eigens erstelltes CRM, weil wir doch sehr spezifische Anforderungen an ein CRM hatten, haben wir uns dort gegen SAP oder einen anderen Anbieter entschieden. All diese Daten werden mittels BI-Technologie ausgewertet. Und sonst behilft man sich an der ein oder anderen Stelle mit der alteingesessenen Excel-Tabelle.

Sind momentan irgendwelche Softwareveränderungen, irgendwelche neuen Einführungen, im Controlling geplant?

Wir haben kürzlich überlegt, ob wir einige unserer Programme mit solchen Add-ons dann erweitern. Weil wir dort auch gern weg wollen von einer Listenführung – also da habe ich beispielsweise das Thema der Abgrenzungen im Erlösbereich. Wenn unser Unternehmen Wartungsverträge mit Kunden schließt, die einmal im Jahr den Zahlungseingang generieren, muss das natürlich auf die entsprechende Laufzeit gleichmäßig verteilt werden, um die Periodenzugehörigkeit entsprechend abzubilden. Und dort wird es natürlich immer mehr, je mehr das Geschäft wächst, desto mehr Vorgänge haben wir auch und da wird es, kurz oder lang, in einer Excel Tabelle natürlich recht unübersichtlich. Und da sind wir am überlegen, ob wir dort noch Erweiterungen machen. Aber im Moment eher dafür, die Daten jetzt weiter pflegen und entsprechend Abgrenzungen buchen zu können, eher weniger, um Auswertungen auf die bereits vorhandenen Daten aufzusetzen.

Ok, also erstmal die Basis zu schaffen, quasi.

Genau, das ist eher noch dafür gedacht, um diese Ausgangslage zu verbessern.

Und wo sehen Sie noch Potenziale in der Zukunft mehr neue Tools zu verwenden?

Ein ganz großes Ziel ist, dass die ganzen Schnittstellen – ich hatte ja dann schon angedeutet, dass wir da mit einem gekauften FiBu-System und einem selbst erstellten CRM-System arbeiten – dann dort diese ganzen Schnittstellen optimiert werden. Dass auch Abfragen, die jetzt entweder auf das eine System oder das andere System laufen, dass die besser miteinander verknüpft werden können. Also, dass ich da letztendlich nicht auf den S-Verweis zurückgreifen muss, um über eine Kundennummer oder eine Rechnungsnummer die Daten zusammenzuführen. Sondern das ist das, worauf jetzt aktuell der Fokus liegt. Dass die Systeme kompatibler gemacht werden und dass vor allem auch das eine System aktiv in ein anderes System eingreifen kann. Dass wir wegkommen von dieser losgelösten Betrachtung. Das ist aktuell unser Fokus.

Processes

In welchen Prozessen werden Technologien in Bezug auf Big Data und Business Analytics im Controlling genutzt?

Ich sage mal so, es gibt keinen Tag, an dem ich das BI-Tool nicht aufmache. Das ist eigentlich das Erste, noch bevor ich das Buchhaltungsprogramm starte, ist bei mir schon das BI-Tool an, dass ich wirklich einen aktuellen Blick auf die Erlöse, die es stundengenau einspielt – die da im Forecast sind, die abgerechnet sind – werfen kann. Und eigentlich brauche ich für Auswertungen, die sich um Umsatz- und Kostendaten kümmern, immer das BI. Ich gehe maximal, wenn mir eine Granularitätsstufe fehlt und ich speziell in Buchungstexte oder so was gehen muss, dann – aufgrund dieser vielen Schnittstellen, die ich schon ansprach – muss ich vielleicht nochmal in die Finanzbuchhaltung reingehen, aber mein erster Blick geht grundsätzlich, mit wenigen Ausnahmen, über die BI Auswertungen. Es ist auch so, dass ich mich wirklich dort auch drauf verlasse – ab und an natürlich auch Stichproben mache, ob denn auch die Auswertungen und so weiter stimmen, es ist natürlich auch die Frage, ob ich die richtigen Daten abgreife, – aber das ist wirklich mein Tool für meine klassische Controlling Arbeit.

Und nutzen Sie da, in Bezug auf Big Data, nur interne Daten oder auch externe Daten wie jetzt Marktdaten oder so was, um Analysen zu machen?

Also dadurch, dass der Fokus bei mir auf den Finanzdaten liegt, nutze ich da eher die internen Daten. Also auch wirklich nur Kunden mit denen wir Geschäfte machen. Kunden, mit denen wir noch keine Geschäfte machen, die sozusagen in der Verantwortung vom Vertrieb liegen, die Werte ich jetzt nicht aus und da kann ich auch keine Aussage dazu treffen, inwieweit andere – zum Beispiel der Vertrieb – das System nutzen.

In welchen Prozessen werden digitale Tools in Zukunft zunehmend verwendet?

Einfache Antwort, aber ich hoffe, in allen Prozessen, in denen es möglich ist. Also ich bin da wirklich ein großer Fan weg von manueller Arbeit – natürlich immer mit entsprechender Plausibilitätsprüfung. Mein Ziel ist es hier aktuell, dass wir – wie ich schon angesprochen habe – die Ausgangslage verbessern und dann kann ich ganz andere Auswertungen auch fahren als ich das jetzt mache. Im Moment ist mein Schwerpunkt – da beantworte ich jetzt wahrscheinlich schon die Frage bei Roles eins – zunächst, dass ich wirklich erstmal wie eine grüne Wiese schaffe; die ganzen Maulwurfshügel entfernen muss, bevor ich dann anfangen kann dort entsprechend zu säen. Der Fokus Auswertungen zu machen, ist der eine, aber es geht nun oftmals noch nicht in der Form wie ich mir das vorstelle und wie das auch die

Geschäftsführung dann entsprechend braucht. Also ich gehe davon aus, dass ich viel Zeit auch wirklich in diese Prozessorganisation stecken muss.

Wie wird sich angesichts der fortschreitenden Digitalisierung die Zeit verändern, die Sie für bestimmte Prozesse aufbringen?

Aktuell erstelle ich einige Dashboards, wobei ich viel Zeit investiere, das einmal entsprechend zu bauen, die Daten auswertbar zu machen. Ich gehe davon aus, dass ich mich in zwei/drei Jahren weniger mit solchen Dingen beschäftige, einfach, weil ich dann auf Knopfdruck vieles bekomme und mich dann auch mehr ins Tagesgeschäft einbringen kann als ich das jetzt kann. Und dass ich das als Erleichterung für meine tagtägliche Arbeit nutzen kann, aber da ich jetzt erst damit beschäftigt bin, das zu bauen, geht dort im Moment sehr viel Zeit drauf. Weil ich viel Plausibilisieren muss und eben ganz, ganz viele Absprachen auch an den Schnittstellen nötig und sinnvoll sind.

Roles

Zu den Rollen haben Sie ja schon etwas erwähnt. Würden Sie sich selbst eine bestimmte Rollenbezeichnung geben, also Geschäftspartner, Berater, Controller, Vermittler, Innovator, Navigator, Wegbereiter, Reporter oder eher Dienstleister?

Also wahrscheinlich ist es aktuell wirklich die Position eines Wegbereiters. Dass ich das, was die Geschäftsführung von mir erwartet und das was auch die Geschäftsbereiche an Auswertungen brauchen, dass ich dort die Ausgangslage jetzt schaffe, dass wir zukünftig auch mit den Ergebnissen der Auswertungen auch zu Handlungsempfehlungen kommen und dass bei der Entscheidungsfindung grundsätzlich auf bestmöglich aufbereitete Daten zugegriffen werden kann.

Ich möchte gern, in absehbarer Zeit, weg vom Wegbereiter sein, hin zu der Rolle Business Partner und als interner „Geschäftspartner“ agieren. Und ich denke, wenn der Weg entsprechend bereitet wird, geht damit auch einher, dass ich da die Prozesse auch für ganz viele Abteilungen, vorrangig den Vertrieb, auch erleichtern kann; dass das eine Win-Win-Situation auch für die anderen administrativen Geschäftsbereiche darstellen kann.

Ok, damit haben Sie auch schon die zweite Frage beantwortet, dass Sie in Zukunft der Business Partner sein wollen.

Sehen Sie momentan noch eine andere Rolle als besonders wichtig im Controlling an oder für die Zukunft noch als besonders wichtig?

Also ich würde mich schon gern zukünftig auch mit anderen Themen, mit übergeordneten Themen, beschäftigen. Ich bin ja jetzt aktuell noch im klein-klein. Und das ermöglicht es mir einfach nicht. Ich würde gern zukünftig mehr den Blick auf wirklich die gesamte Firma haben. Es hängt sicherlich aber auch damit zusammen, dass ich erst ein dreiviertel Jahr da bin. Und die Einarbeitung in dem Sinne gab es nicht, weil es gibt nun mal keinen Controller bisher hier. Das heißt, dort musst ich mir viel zurechtsuchen. Jetzt bin ich froh, wenn ich einzelne Anfragen bearbeiten kann, verwende darauf sehr viel Zeit, aber irgendwann hoffe ich, dass ich dieses Set an Dashboards habe und dass ich dann übergeordnete Fragen, also auch wirklich Konzepte, die jetzt zahlenbasiert erstellt werden – beispielsweise Überlegungen zu Provisionssystemen, zu Veränderungen von Lieferantenbeziehungen, Implementierung einer Einkaufsabteilung, solche Sachen, – dass ich mich dann um solche übergeordneten Themen – auch auf Basis von Zahlen, aber eben nicht nur – kümmern kann. Ich möchte sozusagen als Controller zukünftig dann auch etwas größer, breiter, tiefer denken als jetzt.

Skills

Haben Sie in den letzten Jahren eine Veränderung der im Controlling geforderten Fähigkeiten bemerkt?

Auf jeden Fall. Ich habe in den ersten zwei Monaten meiner Tätigkeit hier zwei Schulungen machen können, die sich gerade auch auf SQL Statements bezogen haben und vor allem auch auf diese Auswertungen mit BI. Und ohne diese Schulungen – da es auch nicht viele administrative Kolleginnen gibt, die das bisher machen – hätte ich hier viele, viele Dinge jetzt noch gar nicht bewirken können. Also das ist auf jeden Fall etwas, IT-Affinität, wie ich auch Eingangs schon erwähnt hatte, was heute unerlässlich ist, gerade wenn man auch in der IT Branche, wie ich jetzt, arbeitet. Und ohne das geht's kaum. Ich habe, wie gesagt, die Möglichkeit, mich dort auch kurzzuschließen, aber die Person, die mir dort zugeordnet ist, ist wirklich ein reiner Informatiker und mit dem kann ich mich inhaltlich ja gar nicht

abstimmen, ob die Werte plausibel sind, was noch sinnvoll wäre auszuwerten; der ist da natürlich der harte Datenbereiter und dann ist seine Tätigkeit aber auch beendet. Und das jetzt so in Einklang zu bringen, also wie kann ich das jetzt für die betriebswirtschaftlichen Aspekte nutzbar machen, da musste ich mir dann über diese Schulungen die Verbindung selbst herstellen.

Da fehlt quasi ein bisschen das gemeinsame Sprachlevel mit den IT-Leuten.

Man redet ja dann doch als Betriebswirt gern mal von anderen Dingen als ITler, und dennoch hofft man dasselbe zu meinen.

Und haben die Mitarbeiter im Controlling die Fähigkeiten, neue Software zu benutzen?

Also wir sind nun, wie gesagt, gerade mit dem Generationswechsel hier beschäftigt. Das Durchschnittsalter der Abteilung Finanzen ist in meinen Augen überdurchschnittlich, gerade für die IT Branche. Ich habe ja jetzt nun nicht erst einen Arbeitgeber gehabt, deswegen kann ich das, denk ich mal, auch ganz gut bestimmen. Ich habe bisher die Erfahrung gemacht, dass das Controlling eher eine jüngere Abteilung ist – die Controlling-Abteilung wird ja hier nur durch mich gestellt sozusagen – und die Finanzbuchhaltung dann deutlich älter als das Controlling, aber auch durchmischt und so ist es bei uns aktuell eher nicht. Aber es werden dort auch Kollegen entsprechend nachgezogen, auch unter Einbeziehung von Werkstudenten. Auf jeden Fall gibt es auch Nachwuchs und bei dem Nachwuchs wird auch ein ganz anderer Fokus gesetzt. Also es wird vorausgesetzt, dass man auch mit den Systemen, wie beispielsweise mit denen des Vertriebs, vertraut ist; was jetzt bei den Kolleginnen, die das seit vielen, vielen Jahren, gar Jahrzehnten machen, jetzt nicht so ausgeprägt ist, weil es auch einfach bisher nicht nötig war – das muss man auch immer wieder sagen, bisher wurden viele Fragen einfach nicht gestellt – und weil es immer wichtiger wird, der Markt auch immer umkämpfter wird, müssen jetzt Antworten kommen und dafür müssen eben auch erstmal die Voraussetzungen geschaffen werden.

Und nochmal, um auf die Frage zurückzukommen. Es gibt auch die jüngeren Kollegen und dort ist es auch so, dass bei diesen reges Interesse auch an Weiterbildungen besteht und auch an den Anbietern der beispielsweise Lohnabrechnungssoftware oder der Buchhaltungssoftware – ich war selbst jetzt eine Woche auf Schulung bei unserem Anbieter direkt, um ganz spezifisch Fragen zu stellen, die sich auch auf unser Unternehmen beziehen und

das wird denk ich mal auch immer wichtiger. Also ich wollte mich mit einer Online-Schulung oder so etwas nicht zufriedengeben und das hat sich dann auch vor Ort gezeigt, dass das eine sehr, sehr gute Entscheidung war.

Werden Ihrer Meinung nach in Zukunft andere Fähigkeiten verlangt? Also es ist jetzt ja viel so, dass IT Skills wahrscheinlich eher benötigt werden.

Das auf jeden Fall, aber ich gehe davon aus, dass die Personen, die sich dann in solchen Positionen befinden, sich auch mehr öffnen müssen als früher, einfach weil dieser Gesamtblick auf die Firma – also der Trend ja dahin geht, dass nicht jeder in seinem Kämmerlein sitzt und dort die Produkte entwickelt, Beratung und Co. anbietet, sondern, dass wirklich das als gesamter Service, bei dem alle im Unternehmen da ihren Anteil haben, an den Kunden gegeben wird. Und dann ist es natürlich auch so, dass im Unternehmen, durch dieses stärkere Verlangen nach Transparenz, die Mitarbeiter einfach stärker mit einbezogen werden, dass man dann mehr – also das ist jetzt meine Erfahrung – beziehungsweise häufiger ins Gespräch kommt und über ganz andere Themen ins Gespräch kommt als es vielleicht noch vor ein paar Jahren war.

Das heißt, eigentlich auch noch so ein bisschen dieser Mindset Change – was Sie meinten mit den Generationen, – dass da jetzt ein anderer Fokus liegt und jetzt wirklich dieser Blick nicht von dem einen Bereich nur, sondern auf das gesamte Unternehmen geht.

Genau, ich kenne es noch aus früheren Unternehmen, da saß die Finanzbuchhaltung recht separat und hat dort, sag ich mal, eine Woche keinen Kontakt zur Außenwelt – also zur „internen Außenwelt“, das heißt außerhalb der eigenen Abteilung im Unternehmen – aufnehmen müssen. Und ich denke jetzt, auch aufgrund der Marktsituation – ich meine hier hat niemand mehr etwas zu verschenken – müssen dort einfach viel engere Abstimmungen stattfinden. Also es gibt definitiv über 60-jährige Kollegen, die dort super, super fit in der IT sind und unter 40-jährige Kollegen, die schon Schwierigkeiten mit einer Excel-Tabelle haben. Ich will das auch gar nicht am Alter festmachen. Aber einfach was jetzt die neue Zeit im Unternehmen ist, weniger die Generation der Mitarbeiter, sondern eben wirklich, was jetzt die, in meinen Augen, neuen Anforderungen sind als wenn man 20 Jahre zurückdenkt.

Und haben Sie einen veränderten Fokus auf analytische Fähigkeiten und Kommunikationsfähigkeiten im Controlling bemerkt und denken Sie, dass in Zukunft auch ein Fokus darauf liegen wird?

Also ich denke, dass ich die Frage definitiv mit ja beantworte. Ich hatte das an einigen Punkten ja auch angesprochen. Ich habe beispielsweise jede Woche einen Jour fixe mit meinem Geschäftsführer. Da geht es aktuell nicht darum, dass wir uns jede Woche ein Set von Auswertungen anschauen, sondern, dass wir wirklich brainstormen, was könnten denn Themen sein, was steht jetzt an – Jahresabschluss, Planungsprozesse, Anfragen an die Geschäftsführung von Leitern, die eine Ebene darunter sind, mit denen wir uns dann beschäftigen. Das sind so Sachen. Aber die Absprachen denke ich mal werden auch eher noch zunehmen.

Und die analytischen Fähigkeiten, wie schätzen Sie die ein?

Ich denke auch dadurch, dass – das ist jetzt nur mein persönlicher Eindruck – dass viele Geschäftsführer – auch in den Unternehmen, in denen ich vorher war – einfach so viele Themen auf dem Tisch haben, dass sie sich nicht mehr eindenken können wie früher in einer überschaubaren, kleinen 15-Mann Firma, ist es umso wichtiger, dass wirklich die Controlling-Abteilung dort breitest und tiefst aufgestellt ist und eben, was Analysen angeht, breit und groß denken, auf jeden Fall.

Werden Ihrer Meinung nach Fähigkeiten, die einem Data Scientist zugeordnet werden, wie Statistik-, Programmier- und IT-Kenntnisse, momentan benötigt und werden sie in der Zukunft benötigt?

Ich denke, dadurch, dass ich ja jetzt im Controlling die einzige Person bin – je nachdem wie sich auch das Unternehmen entwickelt und welche Ansprüche die Geschäftsführung hat, wo also auch der Fokus gesetzt wird, – dass es sicherlich nötig ist, dann auch über eine Unterstützung nachzudenken und, dass dort dann andere Schwerpunkte liegen. Dass wirklich nicht einer alles macht, sondern, dass wir dann sagen, der eine ist beispielsweise geeigneter diese ganzen Analysen zu erstellen, der nächste ist dann aber damit beschäftigt, die Auswertungen vorzunehmen und dort entsprechende Verläufe – beispielsweise Hochrechnungen, Trends – zu gestalten, Risikobewertungen zu machen; weil das, wenn man alleine ist, schwierig ist – je nachdem wie groß natürlich die Firma ist, aber wir sind ja nun

doch ein mittelständisches Unternehmen – sollte es zukünftig wirklich so sein, dass dort das ein bisschen verteilt wird. Also ich mache es jetzt so, mein Tag hat acht Stunden, manchmal zehn, dass ich dann sage: Jetzt machst du die ersten drei Stunden eine Auswertung, dann schaust du dir nochmal die Anleitungen für dein Dashboard an und dann beantwortest du noch eine Stunde Mitarbeiterfragen. Das versuche ich mir schon so zu strukturieren. Aber so tief wie ich es gern in allen Bereichen hätte, kann ich es selbst aktuell einfach nicht leisten. Dazu bräuchte es dann wirklich mehr Personen.

Outlook

Ist der Beruf des Controllers Ihrer Meinung nach gefährdet oder nicht?

Ich muss schmunzeln, ich habe die Controlling Zeitschrift, also die Zeitschrift heißt richtig „Controlling“, abonniert. „Zeitschrift für erfolgsorientierte Unternehmenssteuerung“ – ich habe sie auf meinem Arbeitsplatz liegen – und da war kürzlich die Überschrift „Controlling ohne Controller?: Die Zukunft des Controllers“. Dort wird natürlich auch sorgenvoll betrachtet, in wie weit der Computer und die Fähigkeiten der Programme den Controller ablösen. Ich denke, dass es ihn wirklich auch für eine Art Unternehmensberatung, die einfach auch auf zwischenmenschliche Komponenten abzielt, weiter geben wird. Das Programm wird sicherlich Algorithmen ausspucken, aber so ein individuelles Set an Marktlösungen wie wir es haben und auch die speziellen Kunden, das wird sich, in meinen Augen, kaum durch irgendwelche Algorithmen erfassen lassen. Also es wird auf jeden Fall eine Veränderung geben. Ich bin jetzt auch selbst dabei, mich beispielsweise im Bereich der Buchhaltung weiter zu schulen, dass ich auch, was Jahresabschlüsse auswerten und so weiter angeht, dass ich dort besser werde. Aber ich gehe davon aus, dass ich mir doch noch andere Fragen stelle, als das System sich stellt.

Und denken Sie, dass die Controlling-Abteilung personenmäßig minimiert wird?

Also wenn sich bei uns die Controlling-Abteilung minimiert, dann ist sie nicht mehr vorhanden. Es gab lange das Bestreben einen Controller einzustellen, wobei auch die Definition von Controlling ich dann selbst erstmal klarstellen musste, also vorgestellt habe, was ich dann unter Controlling verstehe; weil doch viele, die damit kaum Erfahrung hatten, sag ich mal bei Controlling einfach Kontrolleur hören und entsprechend dem Ganzen eher

skeptisch gegenüberstehen. Aber nicht umsonst ist erkannt worden, dass das absolut notwendig ist und deswegen kann ich mir eine Minimierung kaum vorstellen. Also ich kann mir vorstellen, dass die Controlling-Abteilung sich reduziert, wenn im gesamten Unternehmen entsprechend abgebaut wird, aber unter den jetzigen Bedingungen denke ich eher, dass das konstant bis zunehmend sein wird.

Sie haben das jetzt nicht als risikobehaftet gesehen, deswegen kann ich die Frage überspringen. Und haben Sie sonst noch irgendwelche anderen Sachen, die Sie gerne ansprechen würden?

Also risikobehaftet sicherlich für die Leute, die dort an ihrer starren Controlling Ausbildung festhalten. Ich kann mir auch kein Urteil erlauben, was ein Mitfünfziger Controller jetzt als die Notwendigkeiten im Controlling erachtet; der wird sich sicherlich von einigen Dingen verabschieden müssen und neue Dinge implementieren müssen. Das ist bei meinem doch recht jungen Alter nicht der Fall – ich gebe ja in dem Sinne nichts auf, ich lerne ja aktuell noch dazu. Ich bin guter Dinge, dass es Controller weiterhin benötigt. Wie gesagt, mit zusätzlichen Aufgaben, aber auf jeden Fall.

Haben Sie sonst noch irgendetwas, das Sie ansprechen möchten?

Weiter möchte ich noch ergänzen, dass ich natürlich auch aufgrund meines Studiums doch auch sehr viele Freunde habe, die im Controlling tätig sind, auch in ganz unterschiedlichen Unternehmen – privatwirtschaftlich, in der öffentlichen Verwaltung, in Ämtern, überall – und auch dort geht der Trend dazu – ich habe natürlich auch viele Freundinnen, die jetzt in Elternzeit gegangen sind – und dort wird die Stelle händeringend nachbesetzt, dort wird keine Stelle unbesetzt gelassen. Man nutzt diese Chance, wenn dann eine Elternzeitvertretung da war oder ein Elternzeitvertretender, dass man dann beide behält. Also das ist aktuell mein Eindruck, dass man dort eher nicht kürzt. Da wird eher in der Buchhaltung vielleicht mal eine halbe Stelle abgebaut und dann macht das der Controller sozusagen als Biltrroller, Bilanz-Controller, wie auch immer, noch mit. Also deswegen mache ich mir da aktuell noch nicht die Sorgen. Ich bin gespannt, das gebe ich zu, ich bin gespannt was in fünf Jahren sein wird. Das wollte ich gerne noch ergänzen. Außerdem bin ich gewiss, dass ich meinen derzeitigen Job nicht machen könnte, wenn ich nicht so kommunikativ wäre. Diese Kommunikationsfähigkeit ist eine gewisse Grundvoraussetzung für einen Controller.

Summary of Each Interview

Question	1 – Henkel AG & Co. KGaA	2 – Biotronik Corporate Services SE	3 – Biotronik Corporate Services SE	4 – IT company
Technologies & Methods				
1. Which technological innovations related to the digital transformation have a significant impact on MA?	<ul style="list-style-type: none"> • Robotics • Power BI – “a tool that sources from various data pools” 	<ul style="list-style-type: none"> • In-memory computing = enabler technology, enables to handle Big Data; = basis for all other things • Artificial intelligence (in the next 20 years) 	<ul style="list-style-type: none"> • In-memory-technology – multidimensional in-memory-database used, allows for flexible performance, self-service orientation • Hardware developments also beneficial – main memory capacity 	<ul style="list-style-type: none"> • Automation • BI analyses
2. How do the technologies you just mentioned impact the MA?	<ul style="list-style-type: none"> • It is “moving in the direction of self-service and automated reporting” • Power BI “gives people access to data, to information without the need for a classical reporting team” • Transformation of SSCs with robotics 	<p>In-memory computing:</p> <ul style="list-style-type: none"> • Dramatic time reduction in terms of spending time spent to collect and prepare data, from 80 % to 20 % • Time to analyse data changes from 20 % to 80 %; • Enables real-time reporting; 	<ul style="list-style-type: none"> • Powerful tools enable flexible planning – e.g. quick high-level data spreading possible • Partly also used in reporting • Allow for extremely fast reactions 	<ul style="list-style-type: none"> • Enhanced importance of data management and collection • Communication at interfaces to get data and keep it organised • Data needs to be analysed deeper and wider

	<ul style="list-style-type: none"> • Move over to people who are “data scientists or data analysts, rather than a controller or a management accountant” 	<ul style="list-style-type: none"> • Bring MA back to origin – advisor of CEO and for the people who lead the company <p>AI:</p> <ul style="list-style-type: none"> • Helps analysing the past and deviations • Enables interactions – cobot as artificial partner who can be asked questions 		
<p>3. Do you apply business analytics, especially predictive and prescriptive analytics, and if so in which context?</p>	<ul style="list-style-type: none"> • Not systematically • But experimental, e.g. predictive indicators in the forecast to take out human biases • (Supply chain as example for advanced digitalisation processes) 	<ul style="list-style-type: none"> • BA yes, but not advanced analytics, due to medium firm size • Some departments apply mathematical schemes and statistics 	<ul style="list-style-type: none"> • Predictive not really used • Statistical programming language R used by one department • Basic linear extrapolation e.g. of actuals for planning; basic algorithms used sometimes, but only for plausibility checks 	<ul style="list-style-type: none"> • BI solution of a big software provider is used for 90 % of analyses • Data comes from various systems such as CRM-system, is transferred to data warehouse and then analysed in BI tool
<p>4. In the future, do you expect predictive and prescriptive analytics to be</p>	<ul style="list-style-type: none"> • Should be applied • Predictive forecast, e.g. connect it with 	<ul style="list-style-type: none"> • MA must focus on such analytics 	<ul style="list-style-type: none"> • Potentially more linear projections, depending 	<ul style="list-style-type: none"> • BI tool will be used even more in the

<p>applied in the MA at your company, and if so for what?</p>	<p>supply chain demand planning</p> <ul style="list-style-type: none"> • (Problem of cultural shift, taking control from people) 	<ul style="list-style-type: none"> • For budgeting, strategic planning, strategic controlling, long-term planning 	<p>on requests from other departments</p> <ul style="list-style-type: none"> • For reference but mostly not as leading planning value • What-if-scenarios 	<p>future with more data and deeper granularity</p> <ul style="list-style-type: none"> • Not aware of other tools
<p>5. Is in-memory computing used in your MA presently and will it be prospectively?</p>	<ul style="list-style-type: none"> • Unfamiliar with term • Move to SAP HANA planned 	<ul style="list-style-type: none"> • Not yet, will be used prospectively • Currently only used in BI department • Rest of IT infrastructure will change in 2025 	<ul style="list-style-type: none"> • Yes, in TM1-System • Also planned for SAP BW with SAP S/4HANA 	<ul style="list-style-type: none"> • Unfamiliar with term • As management accountant with business background not familiar with more specific informatics aspects • IT contact person available for that matter
<p>6. Do you make use of any cloud solutions these days and will you in the time to come?</p>	<ul style="list-style-type: none"> • Yes, but cannot tell which ones • Example of HR, One-Note 	<ul style="list-style-type: none"> • Yes, but not everywhere (HR uses cloud, but not MA) due to restrictions in medial branch • Mainly on-premise solutions • Change expected if regulations change 	<ul style="list-style-type: none"> • SAP-system in a kind of private cloud with a special direct connection to minimise data security concerns • TM1 in-house 	<ul style="list-style-type: none"> • In general, in the company, yes, but not in the MA

<p>7. Is robotic process automation currently utilised in your MA and will it be in the future?</p>	<ul style="list-style-type: none"> • Yes, mostly in the SCCs • Choice between building something themselves or using externals • (Example of accelerated HR process) 	<ul style="list-style-type: none"> • Currently not • Maybe in the next ten years • First, focus on in-memory computing • Then possibly intelligent or artificial RPAs 	<ul style="list-style-type: none"> • Initially, uncertainty about term – robotics? • Partly used – process integration between SAP and TM1 – data transferred in both directions • Report refreshing with VBA macros and basic ETL methods • Automatized send out of report via mail after initial manual check and trigger 	<ul style="list-style-type: none"> • Unaware of usage
<p>8. Could you give some examples of software and what they are used for in your MA?</p>	<ul style="list-style-type: none"> • “Power BI is the big one” • Alea, SAP and SAP HANA, (RYDOO for HR) • A lot of internally developed tools 	<ul style="list-style-type: none"> • Most important software = ERP: SAP ECC with all relevant modules, including finance and controlling • SAP BW solutions (BI solution) • Some third-party products 	<ul style="list-style-type: none"> • IBM Cognos TM1 for reporting and planning • SAP BW for big standard reports and detailed data • Standard tools like Microsoft Access, databases for smaller amounts of data, and Excel, particularly for ad-hoc reporting 	<ul style="list-style-type: none"> • Financial accounting system from external provider for small and medium-sized enterprises • Self-built CRM-system due to very specific requirements to it • Excel

			<ul style="list-style-type: none"> • TM1 and Excel connected with add-in 	
<p>a. Which software changes/implementations are currently planned in your MA department?</p>	<ul style="list-style-type: none"> • SAP HANA • BI team knows more – interviewee is “more on the receiving side” and does not “always know what is on the developing side” 	<ul style="list-style-type: none"> • Short-term: in-memory computing for BI department • Mid-term: SAP S/4HANA transformation project, planned to be implemented in 2025; will be foundation for new technologies 	<ul style="list-style-type: none"> • TM1 will be upgraded to IBM Planning Analytics • Qlik Sense – partly already in use – graphically strong tool for user-friendly self-service ad-hoc analyses and dashboards, visualisation based on data from different systems possible 	<ul style="list-style-type: none"> • Amendment of programs with add-ons, e.g. for accrual postings and general data management but currently not for analyses based on existing data
<p>b. Where do you see potentials to apply more new tools in the time to come?</p>	<ul style="list-style-type: none"> • Usage of too many subsystems – make this easier 	<ul style="list-style-type: none"> • In the area of planning, especially of mid- and long-term strategic planning • Bring other tools to the next level 	<ul style="list-style-type: none"> • Nowhere specific • Tools enabling a more practical bridge between TM1 and SAP would be desirable, currently partly manual because of difficulty of creating a proper interface 	<ul style="list-style-type: none"> • Optimisation of interfaces between financial accounting system and CRM-system to avoid excel formulas → increase compatibility of systems to allow for active interference

Processes				
<p>1. In which processes are technologies related to Big Data and business analytics being used in your MA?</p>	<ul style="list-style-type: none"> • Everywhere?! 	<ul style="list-style-type: none"> • Reporting, planning and analysis processes • Statistical methods used in sales planning processes • Currently only basic Big Data approach – focus on data in ERP, rarely link to external sources 	<ul style="list-style-type: none"> • Depends on definition of Big Data • In terms of volume of data – e.g. for inventory tracking of each single product • In terms of external data market data are used for planning • Uncertain how BA is used, probably will be used in standard TM1 tools as Planning Analytics • Watson as AI potentially will be implemented in the future (long-term) 	<ul style="list-style-type: none"> • BI tool for reporting and forecasting • Financial accounting system for more detailed information on specific bookings etc. • Focus on financial data and thus internal data
<p>2. In which processes will digital tools be used increasingly?</p>	<ul style="list-style-type: none"> • There is no process without digital tools because a “controller without the tools cannot do his job” 	<ul style="list-style-type: none"> • Business analytic processes • Must develop predictive analytics • Invest to be competitive 	<ul style="list-style-type: none"> • Mainly in planning a lot of potential and in reporting • E.g. in cost centre planning aim to have 	<ul style="list-style-type: none"> • Hopefully in all processes where it is possible • Move away from manual work as long as plausibility is checked

	<ul style="list-style-type: none"> • A lot of potential in planning processes (because of manual tasks and gut feelings) • In terms of automation: forecast updates, closing processes, reporting 		<p>central database to limit usage of Excel</p>	<ul style="list-style-type: none"> • first, starting situation has to be improved before analyses can be conducted properly and as desired by management • This process organisation takes a lot of time
<p>3. Considering the ongoing digitalisation, how will the time spent on specific processes be impacted in the future?</p>	<ul style="list-style-type: none"> • Can save time by automating report construction which currently still takes some time • Especially big potential in standardised processes • (Good to need less management accountants who just spend time on non-value adding updates of reports) 	<ul style="list-style-type: none"> • Time spent on standard reporting very high • In the next ten years, these reports will rarely be created manually • Explanations are needed = analytic task, supported by new tools, first proposal for reasons, later commenting increasingly done by machines • → Spend less time on repetitive tasks and more on analytic tasks 	<ul style="list-style-type: none"> • More time for thinking, making concepts, specialised aspects and content-related or further quality improvement issues as time is gained thanks to the automation of manual tasks requiring great diligence • E.g. more time to further improve systems instead of investing it in the processing of standard manual tasks 	<ul style="list-style-type: none"> • Initially a lot of time spent with tools like BI to build dashboards and getting analysable data because of necessity for plausibility checks and a lot of interactions at interfaces • In 2-3 years, this needs to be done less as it will be automated → more time to take part in daily business as day-to-day tasks are facilitated

		<ul style="list-style-type: none"> • Focus on consulting and advising the business = high value task, can hardly be replaced by a machine • Become business partner to business for a more profitable company 		
Roles				
1. What is the most prominent role you take, e.g. that of a business partner, consultant, controller, facilitator, innovator, navigator, pathfinder, reporter or service provider?	<ul style="list-style-type: none"> • Classic management accountant = reporter and controller • Own role = facilitator and navigator • MA positioned at the crossroad of many departments – interacting with them • Important to change things and get things done 	<ul style="list-style-type: none"> • At first, controller • Involved in digital transformation projects • → Navigate and consult department to make the right decisions 	<ul style="list-style-type: none"> • Service provider – for other departments and their systems 	<ul style="list-style-type: none"> • Current aim to level the playing field, remove obstacles before starting with more value adding tasks • Pathfinder – develop an initial situation to prospectively use results of analyses for guidance and decision-making
2. How does the digitalisation impact your current role and which impact on	<ul style="list-style-type: none"> • Digitalisation should make life easier 	<ul style="list-style-type: none"> • Not directly impacted, but leading digitalisation 	<ul style="list-style-type: none"> • Further systemise and automate processes in 	<ul style="list-style-type: none"> • Hope to handle more higher-level issues with dashboards in

<p>it do you expect in the future?</p>	<ul style="list-style-type: none"> • Not many pure controllers needed 	<ul style="list-style-type: none"> • Working on it to change colleagues' (sales or production controllers') work 	<p>a conceptional way instead of manually</p>	<p>future – like concepts that are only partly based on numbers</p> <ul style="list-style-type: none"> • Currently very small scale which does not allow for a view on whole company • Prospectively think bigger, wider and deeper than now
<p>3. Currently, is there another role you perceive as relevant in the MA and will there be another crucial role?</p>	<ul style="list-style-type: none"> • Change agent 	<ul style="list-style-type: none"> • Cross-functional knowledge • Project manager • In future role to moderate and consult the business 	<ul style="list-style-type: none"> • Pathfinder and innovator – to increasingly develop systems conceptionally, technological and contentual • Partly new software is suggested • Try to stay up to date with studies concerning available technologies to keep an overview which tool is best suited for a specific purpose 	<ul style="list-style-type: none"> • Desire to move away from pathfinder to internal business partner in the near future • Once path is levelled, processes can be simplified for many departments, particularly the sales department

Skills				
<p>1. Did you perceive a shift in the skill sets required in MA in the past years?</p>	<ul style="list-style-type: none"> • Yes, especially in SSC, more people considered as BI specialists, data analysts and data scientists • In MA support are BI experts not MA experts 	<ul style="list-style-type: none"> • Yes, very much • In the last 10 years shift from bookkeeping and standard MA tools to IT skills – programming, ERP-system understanding, ability to automate processes and handle new technologies • “When you want to make something better, you need to know how the IT is working” 	<ul style="list-style-type: none"> • More IT and computer-affinity • Less paper based, more complex, more data • New systems that need to be handled 	<ul style="list-style-type: none"> • Definitely • IT-affinity is a must • In the beginning, trainings on SQL statements and BI analyses were done • Additionally, IT contact person is available, but bridge between business and IT has to be built by oneself as common language is not necessarily given
<p>2. Do employees in MA have the skills to use new software applications?</p>	<ul style="list-style-type: none"> • If you do not have these skills, you are likely losing the job • Depends on the level though – head of department has someone else doing it for him/her while at entry to medium level it is 	<ul style="list-style-type: none"> • In general, yes, because of typically quite high level of education • Handling “new software applications always means life-long learning” • “Mindset change that you have never finished learning” 	<ul style="list-style-type: none"> • Supposed that people can handle new tools, e.g. Qlik is currently introduced • Computers and Excel are standard tools that can be handled 	<ul style="list-style-type: none"> • Depends, as different focus was set in the past, those already working for longer might not have these skills highly developed • Different focus set for new employees, they need to be familiar with systems

	really difficult without these skills			<ul style="list-style-type: none"> • Strong interest for trainings, also offered by software providers themselves, to ask specific questions
3. In your opinion, will there be different skills asked for in the future?	<ul style="list-style-type: none"> • Probably, but uncertain which ones exactly 	<ul style="list-style-type: none"> • Of course • “Most important skill is a cross-functional understanding or an interdisciplinary knowledge of different areas” • Currently focus on finance and MA processes • In future “deeper IT knowledge” required • “Engineering and project management skills” needed when working on projects 	<ul style="list-style-type: none"> • Yes, moving more towards BA – get deeper into content level and obtain cross-departmental view, e.g. on supply chain management • More global perspective to get holistic view and analyses 	<ul style="list-style-type: none"> • Definitely (IT) • But people need to open up more, cannot just stay in their department but need to get an overview of the firm to offer a holistic service → mindset change as more agreements are necessary • Desire for more transparency, employees are more integrated and communicate more, also about new topics
4. Do you perceive an enhanced focus on analytical skills and communication skills in MA and do you	<ul style="list-style-type: none"> • Analytical skills for sure, but management accountants generally 	<ul style="list-style-type: none"> • Yes, of course • “More time for analytical skills” as machines 	<ul style="list-style-type: none"> • Yes, definitely • Communication skills because of global positioning with global 	<ul style="list-style-type: none"> • Yes, definitely • Communication for e.g. weekly jour fixe with CEO

<p>think there will be a focus on them in the future?</p>	<p>have good analytical skills</p> <ul style="list-style-type: none"> • Most need for communication skills • Typical controller = “fairly poor communicator” – space for improvement • “Art of communication” very important – presentation, verbally, way of presenting information, “reaction to words, do not overwhelm, focus on what is relevant in terms for the decision making” 	<p>take over repetitive tasks</p> <ul style="list-style-type: none"> • High value added for firm • Ability to understand, analyse and consult business required • “communication skills to work in an international company” – English used across countries, alignments with other regions • In future, focus on both 	<p>production and sales companies and globalisation in general – communicate in English and learn cultural and local peculiarities</p> <ul style="list-style-type: none"> • Analytical skills to get deeper into topics • Business perspective to have an overview and an understanding of specifics • Had to learn the latter because of originally technical orientation 	<ul style="list-style-type: none"> • Arrangements will increase in the future • As management has to deal with so many issues it is increasingly important for MA to be positioned widely and deeply to provide respective analyses
<p>5. To your mind, are skills related to data scientists such as statistical, programming, and IT skills currently required in MA and will they be in the future?</p>	<ul style="list-style-type: none"> • Depends on setup – if business process organisations and BI experts grouped in teams, MA does not need to know how to program just how to 	<ul style="list-style-type: none"> • Programming and IT skills already required by everyone in MA and even more so in future • Statistical and scientific skills not generally required but only for a 	<ul style="list-style-type: none"> • Yes, programming and IT basically daily work as well as modelling of databases • Currently simple statistical methods, probably required more advanced in the future 	<ul style="list-style-type: none"> • In future, necessary to think about support in MA who has a different focus, e.g. one for developing analyses, the other for conducting analyses and

	<p>use provided tools, information and reports</p> <ul style="list-style-type: none"> • Simply helpful if you know it to do little changes on reports etc. • “But it is important these people exist in the organisation and that they somehow get the freedom to work together and come up with things that drive things forward.” 	<p>few working in strategic planning</p>	<ul style="list-style-type: none"> • Programming with VBA to automate things in Excel and Access, SQL-queries and TM1-internal scripting language (Turbointegrator) applied • Required to further develop in future 	<p>visualise developments, make risk assessments</p> <ul style="list-style-type: none"> • To enable deeper analyses
Outlook				
<p>1. What is your perception on whether the occupation of a management accountant is at risk or not?</p>	<ul style="list-style-type: none"> • “The classical one, yes. And he should not be there.” – someone who just makes reports and sends them out • Someone who “is the financial interface between many 	<ul style="list-style-type: none"> • Not at risk, but it will change dramatically • Expectation that in 20 years 60-70 % of workload can be done by machines • Option 1: basic MA set enough; MA 	<ul style="list-style-type: none"> • No, unlikely • Automation means some tasks no longer need to be done but elsewhere requirements and tasks are growing • Focus on content and increased need for 	<ul style="list-style-type: none"> • No, management accountant needed for business consulting based on interpersonal components • Programs can use algorithms, but hardly can consider all specifics of firm

	<p>departments” is absolutely critical and probably always going to be needed – solves and changes things for the better</p>	<p>department is reduced by 70 %</p> <ul style="list-style-type: none"> • Option 2 – more likely: changed “focus on advising and consulting tasks, on business partnering tasks, to provide a high value to the company” 	<p>understanding of values and business</p> <ul style="list-style-type: none"> • Transformation from technical, manual processes to content-related work 	<ul style="list-style-type: none"> • Changes will happen though, training is necessary • But person still asks different questions than a system • People sticking to a rigid MA qualification are at risk, they have to get rid of old habits and implement new tools • MA still needed but with different tasks
<p>a. Will the MA department be minimised in terms of employees?</p>	<ul style="list-style-type: none"> • “In general, we can work with less controllers, yes. Definitely. And that is fine.” • Team building reports will be substituted • Team who is financial business partner, “the interface and the financial perspective or brains of an 	<ul style="list-style-type: none"> • Some companies producing basic products might “try to work with a very lean administrative department” • For other companies Big Data is a treasure with the possibility to create a high value added and a 	<ul style="list-style-type: none"> • No, unlikely • Tasks are simply changing 	<ul style="list-style-type: none"> • Since there currently is only one management accountants it is very unlikely to be reduced • Under current circumstances, it is more likely remain constant or increase

	<p>organisation” will continue to be needed</p> <ul style="list-style-type: none"> • “In the end, the organisation is never going to be completely automated.” • People taking care of smart BI tools, robotics etc. are needed 	<p>competitive advantage – here MA department remains at same number of people but will focus in advising and consulting tasks</p>		
b. If the MA is at risk, how will the department be substituted?	•	• (Partly by machines)	• (By automated systems)	•
2. Finally, do you have any further issues you would like to address?	<ul style="list-style-type: none"> • “Keep bureaucracy out of the digitalisation advancements of” MA 	<ul style="list-style-type: none"> • Not only technology important • Processes behind need to be lean or best practice – efficient processes important as well 	•	<ul style="list-style-type: none"> • Current impression of more positions in MA opening, instead of reductions; “Biltroller”, Balance management accountant possible • Current job would not be possible without strong communication skills, they are a basic requirement

Table 3: Summary of each interview (Appendix, Interviews 1 – 4)

Eidesstattliche Erklärung

Hiermit erkläre ich an Eides Statt, dass ich die vorliegende Abschlussarbeit selbständig und ohne fremde Hilfe verfasst und andere als die angegebenen Quellen und Hilfsmittel nicht benutzt habe. Die den benutzten Quellen wörtlich oder inhaltlich entnommenen Stellen (direkte oder indirekte Zitate) habe ich unter Benennung des Autors/der Autorin und der Fundstelle als solche kenntlich gemacht. Sollte ich die Arbeit anderweitig zu Prüfungszwecken eingereicht haben, sei es vollständig oder in Teilen, habe ich die Prüfer/innen und den Prüfungsausschuss hierüber informiert.

Ort, Datum

Unterschrift