



**BRITISH ACADEMY
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BAM
CONFERENCE

3RD-5TH SEPTEMBER

ASTON UNIVERSITY BIRMINGHAM UNITED KINGDOM

This paper is from the BAM2019 Conference Proceedings

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Disruptive Digitisation – The Changing Role of CFOs and the Finance Function

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ABSTRACT

The finance function and role of the Chief Financial Officer (CFO) is changing due to digitisation. The literature reveals these changes, but offers only a superficial picture. This paper pays special attention to differences in these changes between different individual finance organisations and to the different manifestations of the CFO role. For this purpose, in-depth interviews were conducted to develop a comprehensive case study with local CFOs of a multi-national pharmaceutical company. It is concluded that certain digital trends could lead to the complete disintegration of local finance organisations, whereas the Group Finance Function seems to be maintained. As for the CFO, it is expected the Group CFO is to gain in strategic relevance. By contrast, local CFOs may face the complete dissolution of their role.

(6592 words)

Key words: Chief Financial Officer, Finance Function, Digitisation, Data Analytics, Robotic Process Automation, Artificial Intelligence

1 INTRODUCTION

The finance function of companies has always been subject to constant change over the past decades (Abouayoub, 2018). Whereas the finance function in the past was described by Moag et al. (1967) as controlling the basic system, today this view on the finance function changed towards a trusted advisor for businesses (Taylor, 2017). Beyond that, as head of the finance function, the Chief Financial Officer (CFO) has also been affected by this change (Gattenio, 2002). *“Whereas CFOs of the past predominantly focused on their role as scorekeepers or accountants, dealing with transactions, the CFOs of today are regarded as business leaders and strategists, focusing on creation of wealth”* (Voogt, 2010, p. 76).

The evolution of these roles can be attributed to the changing environment in which the finance function and CFOs operate (Voogt, 2010). The most significant part of this environment is digitisation (CPA Vision Project, 2011; Enofe, et al., 2012), which is fundamentally changing companies and their finance functions (Schmidt, et al., 2016). The effects of these developments are actively discussed in the literature (Dehning, 2002; Ratcliff & Munter, 2002; Hiller, 2013). Nevertheless, the existing body of knowledge only makes generalised statements, not only about the different finance functions; the Group Finance Function and the local finance functions, but also about the variations of the role of the CFO; the Group CFO and local CFOs. This paper takes up these grievances and looks at these important issues in a more differentiated context from an international perspective.

The research objectives are to consider the digitisation-related changes in the finance function and the role of the CFO, considering: 1) differences between different functions in different countries and 2) variations in the role of the CFO. To this end, experiences and insights drawn from qualitative interviews with eight CFOs, two Senior Finance Executives and two Assistants to CFOs working across the world for a German pharmaceutical company listed in the German Stock Exchange (DAX) are pooled and presented in this paper.

2 LITERATURE REVIEW

2.1 Digital Trends

The literature review outlines the key digital trends that impact the finance function and role of the CFO.

2.1.1 Harmonisation of ERP Systems & Cloud Computing

Enterprise resource planning (ERP) systems are important elements of the digitisation of the finance function (Maccarone, 2000; Hiller, 2013; Owens, 2013). Today, most companies use a variety of different systems, which makes central data storage, maintenance and retrieval complicated (Botta-Genoulaz, et al., 2005; Axson, 2015). However, in both the scientific and the practice-oriented literature, there is a much-discussed trend that ERP systems within companies will increasingly be harmonised (Tenkathe, 2006; Axson, 2015). The goals of this harmonisation are a reduction of complexity by means of the construction of a single source of truth from which other

applications can comfortably draw data (Botta-Genoulaz, et al., 2005; Tenkathe, 2006; Owens, 2013; Chandra, et al., 2018). In contrast, a few sources indicate a replacement for the harmonisation of ERP systems is already being considered using “Cloud Computing” (Vehlow & Golkowsky, 2010; Axson, 2015; Ewing, et al., 2017; Latha & Jayprakash, 2017), which would make it possible to store data centrally and make it accessible to all business functions at any time and at any location (Cohen, 2013; Owens, 2013; The Economist, 2014).

2.1.2 Robotic Process Automation (RPA) & Artificial Intelligence (AI)

Robotic process automation (RPA) and artificial intelligence (AI) are considered to be important trends in terms of changing the finance function and the role of the CFO. RPA serves as a generic term for all software applications that operate a computer system in the same way that a human could (van der Aalst, et al., 2018). Unlike regular software, robots are independent of the systems they operate in which means that when systems change, the robots can be adapted to the new circumstances. Hence, by using robots no prior modification of systems or data is necessary for successful processing (Le Clair, 2017; van der Aalst, et al., 2018).

AI is also discussed in terms of automation potential particularly in the recent literature (Vasarhelyi, et al. 2015; Corson, 2016; Huerta & Jensen, 2017). According to McCann (2016, p. 1), publicist of the online trade magazine “CFO Magazine”, states that “*as promising as basic RPA is, the most interesting business applications for robotic technologies increasingly will be more sophisticated. These applications will apply machine learning, artificial intelligence, (...), or some combination of them*”. AI automation will likely carry well beyond the previously possible level of structured accounting (Vasarhelyi, et al., 2015; Corson, 2016; Seasongood, 2016; Huerta & Jensen, 2017).

2.1.3 Big Data and Analytics

Another much talked about trend with regard to the changes in the finance function and the role of the CFO is big data and analytics (Manyika, et al., 2011; Willcocks & Lacity, 2012; Zikopoulos, et al., 2012; Bhimani & Willcocks, 2014; Chen, et al., 2014; Cokins, 2014; Huerta & Jensen, 2017). Big data refers to enormous datasets and their maintenance that have emerged due to exponential data growth (Mayer-Schoenberger & Cukier, 2013; Chen, et al., 2014). Compared to traditional datasets, big data contains a large amount of unstructured data that needs to be stored and analysed in a special way (Willcocks & Lacity, 2012; Zikopoulos, et al., 2012; Bhimani & Willcocks, 2014; Chua, 2014). In terms of data storage, the literature relates to the already described trend of ERP systems and in this context postulates that traditional ERP systems are often not designed for the use of big data and are incapable of processing it (Willcocks & Lacity, 2012; Zikopoulos, et al., 2012; Bhimani & Willcocks, 2014; Chua, 2014).

2.2 Expected Changes in the Finance Function

Following the model of Knight (1967), which allows to structure innovative intra-firm transformation according to its areas of influence, the identified changes in the finance function are subdivided into the categories: processes, organisational structures and people, as illustrated in Figure 1.

Figure 1 Focus Areas for Business Transformation



Source adapted from Knight (1967)

2.2.1 Changes Regarding Processes

With regard to the relevant changes to existing processes in the finance function, automation of features prominently (Roland, 2007; Hiller, 2013; Vanmali, 2017). The aim of this automation is to reduce costs and to enhance efficiency and accuracy in the finance function by reducing human error (Ratcliff & Munter, 2002; Marshall & Heffes, 2006; Roland, 2007; Seasongood, 2016). The digital technology which is primarily discussed in the literature enabling this automation is RPA (Fisher & Holt, 2011; Bax, et al., 2016; Seasongood, 2016; Vanmali, 2017). However, some authors also identify an association between RPA and the harmonisation of ERP systems. Robots work particularly efficiently if they are integrated into harmonised ERP systems. In this way, they can quickly access the necessary data and analyse it without having to bridge the gap between different systems (Roland, 2007; Seasongood, 2016).

Experts agree, in the short- to mid-term transactional finance processes will be affected by the RPA automation (Scapens & Jazayeri, 2003; Dhar, 2017). However, more advanced automation of processes can be reached by AI (Abouayoub, 2018). So far, there is little scientific literature on the impact of AI on the finance function. Nevertheless, experts agree on the point that developments in the field of AI point to that even the most complex tasks within the finance function can be automated (Vasarhelyi, et al., 2015; Corson, 2016; Seasongood, 2016; Huerta & Jensen, 2017).

2.2.2 Changes Regarding Organisational Structures

The most extensively described impact in the literature on changing organisational structures of the finance function as a result of digitisation is the current ubiquitous pooling and centralisation of processes in Shared Service Centres (SSCs) to increase efficiency and costs (Enofe, et al., 2012; Bout, et al., 2013; Hiller, 2013). SSCs in the finance function are primarily used to eliminate redundant processes (Singh & Craike, 2008; Becker, et al., 2009; Schulz, et al., 2009). Although the creation of SSCs is not a digital trend in a narrow sense of the term, digitisation is considered a driving force for

this change and serves as an enabler (Bout, et al., 2013; Hiller, 2013). The increasing harmonisation of ERP systems also indirectly contributes to the development of SSCs. The existence of many different systems and the various underlying processes have made it difficult to centralise processes. In turn, increasing harmonisation of systems removes this hurdle and paves the way for SSCs (Deloitte MCS Limited, 2011; Bout, et al., 2013).

2.2.3 Changes Regarding People

It is undisputed in the literature that increasing digitisation will result in a massive reduction in the number of employees working in the finance function mainly due to harmonised ERP systems, RPA and AI (Monterio, 2015; Seasongood, 2016; Dhar, 2017). Since mainly transactional tasks in the finance function will be affected experts from both science and practice assume that up to 40% of the workforce in transaction accounting can be saved in the coming years (Scapens & Jazayeri, 2003; Axson, 2015; Agnew, 2016; Seasongood, 2016; Dhar, 2017).

The reduction in headcount seems to be accompanied by the need for changing profiles. Due to the automation of transactional processes, up to 75% of the time previously spent on transactional accounting tasks can be spent on more value-added activities, such as decision support for other business units or predictive analytics further enabled by big data (Brand, 2010; Bout, et al., 2013; Bhimani & Willcocks, 2014; Axson, 2015; Agnew, 2016; Seasongood, 2016). Since big data's upsurge is accompanied by the emergence of more unstructured data, the interpretation of which requires an advanced skillset (PricewaterhouseCoopers, 2015; Agnew, 2016; Huerta & Jensen, 2017). Against this background, although accountants are accustomed to handling numeric data, hiring is no longer done only with a focus on finance skills and knowledge but rather statistics, behavioural research, as well as data analysis (Scapens & Jazayeri, 2003; Axson, 2015). These new profiles cannot be found exclusively through new hires. Rather, all employees will look forward to new tasks which requires training measures regarding the handling of analytical tools and big data (Siebdrat, et al., 2009; Bhimani & Willcocks, 2014; Cokins, 2014; Bax, et al., 2016; Davenport & Kirby, 2016; Tschakert, et al., 2016).

2.3 Expected Changes Regarding the Role of the CFO

Changes in the role of the CFO are often driven by changes in the finance function (Marshall & Heffes, 2006; Owens, 2013; Cokins, 2014). The progress in digitisation will provide the finance function with real-time information on the financial status of the company in the medium to long-term (Marshall & Heffes, 2006; Cokins, 2014). Experts believe this real-time information will, in the long-run, give the CFO the opportunity to report less historical data, but rather to make forward-looking forecasts and thus move from a reactive to a proactive leader (Weisel, 2004; Tenkathe, 2006; Amato, 2013; Owens, 2013; Cokins, 2014; O'Halloran, 2016).

These digital opportunities allow for an increasingly rapid decision-making process while improving the quality of the CFO's decision, which is also confirmed by experts, primarily, but not exclusively in practice (Ratcliff & Munter, 2002; Marshall & Heffes, 2006; Owens, 2013). It is particularly noticeable that no practice-oriented source, but rather scientific sources report possible practical concerns about this development (Shim, et al., 2015; Huerta & Jensen, 2017). In practice, it turns out to be extremely

difficult to argue the return of big data investments, which can be considered the basis for the improved decision making (Willcocks & Lacity, 2012; Whitney & Juras, 2017). Consequently, it is difficult to justify budgets for initiatives of this kind (Shim, et al., 2015; Huerta & Jensen, 2017).

As a result of the ability to gain insights from advanced analytics and to make forward-looking forecasts, an even more profound change in the role of the CFO comes to the fore (Birns, 2010; Hiller, 2013; Bax, et al., 2016). Experts see the role of the CFO as being further shifted towards a business enabler or business partner role (Scapens & Jazayeri, 2003; Hiller, 2013; Takoordeen, 2015; O'Halloran, 2016). Although the role as business partner is not foreign to the CFO, the further shift from a reporting role, to a proactive, forward-looking role with advanced analytical capabilities will lead to a significant gain in influence and relevance of the CFO (Birns, 2010; Corson & Miyagawa, 2012; Amato, 2013; Bax, et al., 2016; O'Halloran, 2016; Huerta & Jensen, 2017).

2.4 Development of Research Question

The insights drawn from the literature provide a foundation to understand the evolution of the finance function and the CFO's role in the wake of digitisation. Regarding the important trends, as well as the expected changes in the finance function and the role of the CFO, there are hardly any contradictions in the literature.

However, a closer look at the literature on a meta level provides food for thought. For example, the literature on centralisation of organisational structures within the finance function (Singh & Craike, 2008; Becker, et al., 2009; Schulz, et al., 2009) implies the existence of non-centralised finance organisations. With regard to the identified changes in the finance function due to digitisation, it raises the question of whether these changes are fundamentally the same in the centralised function as well as the non-centralised local finance functions. Against this background, it is remarkable that although there are large-scale studies that have been carried out worldwide (see: IBM Institute for Business Value, 2010; BearingPoint, 2013; Accenture, 2015; Ernst & Young, 2016; McKinsey&Company, 2016; Siemens, 2016) and those that have been carried out specifically in one region (see: Voogt, 2010) the results are presented in a generalised manner and the factor of location is not considered specifically. However, studies occasionally suggest that differences may exist between different local functions in terms of changes due to digitisation (Bax, et al., 2016). Against this background, it is the more important to create a more sophisticated picture.

Beyond that, the literature describes the role of the CFO without discussing potential variations regarding this role. However, the following quote by Claude Changarnier, Vice President of International Finance at Microsoft International, gives reason to question this simplified picture: *"I have 85 CFOs around the world. What's my job? I have to hire good people and make sure they are doing the right things"* (Claude Changarnier 2010 cited in Brand, 2010, p. 5). Since there is only one Group CFO per company at the same time (Khan & Jain, 2007), a second variation of the CFO role becomes apparent from this quote. Claude Changarnier notes these CFOs operate in different parts of the world and have their own local areas of responsibility (Brand, 2010). The second role in addition to the Group CFO could be referred to as Country or Regional CFO, hereafter referred to as Local CFO.

In summary, the methodological approach of those studies, which aim for generalisation (International Federation of Accountants, 2002; Brand, 2010; IBM Institute for Business Value, 2010; Voogt, 2010), can be criticised because the full potential of the partly world-wide collected data has not been exhausted, and for the purposes of generalisation potential differences between several finance functions existing within the respective company as well as the different manifestations of the role of CFOs have been ignored. This paper aims to extend the literature by exploring these essential aspects. The resulting research question is:

“What changes will the finance function, including local finance functions, and the role of the CFO, including Local CFOs, undergo in the wake of digitisation, from an international perspective?”

3 METHODOLOGY

This paper aims to counteract the generalisation of previous studies and a new, richer understanding of the changes of the finance function and the role of the CFO, as well as their context should be developed. The data has been collected through semi-structured, in-depth interviews. The research strategy is a single case study, which is appropriate to use for an in-depth inquiry (Yin, 2014), and affords the opportunity to draw more differentiated conclusions than the extant literature.

The main method to collect primary data is the research interview. The sampling was based on a purposive approach to ensure the selected interview participants are particularly informative (Neumann, 2005). Therefore, selected local CFOs, high-level finance executives, and executive assistants of the Group CFO of the respective DAX company, located in Europe, Asia, Africa, and LATAM were interviewed.

The interview request was deliberately spread via the senior and top management of the company, to which the local CFOs report, which ensured a response rate of 100%. The interviews were conducted via telephone due to advantages in terms of international access, speed, and lower costs which are associated with this kind of interviews (Heyl, 2005; Holt, 2010). The questions were asked according to the categories found in the literature and adjusted according to the interview situation.

3.1 Data Preparation and Analysis

All interview audio files were stored, under the protection of privacy provided with names that allow a clear identification of the individual interview (Saunders, et al., 2016). Subsequently, transcript summaries of the interviews were created, which include all core messages of the interviews in short form, without, however, changing the meaning of the individual statements.

A thematic analysis approach was chosen to analyse the interview transcripts since it is a systematic, yet flexible approach, which allows for an analysis of small data sets (Braun & Clarke, 2006). According to this analysis approach, all units of data were labelled with a specific code within each data item (i.e., interview), which allows for the proper categorisation of the identified themes and the relationships between them (Saunders, et al., 2016).

3.2 Validity and Transparency

The clear display of methods of data collection and analysis allows the reader to judge whether the conclusions drawn in this paper are supported by the data (Mays & Pope, 2000). Moreover, it ensures the transparency of this research and makes it possible to replicate the conducted research in a similar way (Kumar, 2014; Saunders, et al., 2016).

Due to the qualitative nature of the study, the researcher is required to understand and interpret subjective statements (Myers, 1997), which in this case comes from different national contexts (Humphreys, 2005). Consequently, the data could be influenced by the researcher (Caetano, 2015). Therefore, during the evaluation of the data, attention was paid to clear boundaries between data and personal influence in order to ensure the quality of the findings (Greatrex-White, 2008).

3.3 Relevance and Generalisability

Although the findings of this study cannot be generalised, particular care was taken to enhance their relevance by ensuring that the full sample contained all the settings needed to adequately answer the research question (Mays & Pope, 2000). The full sample includes different perspectives both from the Group Function and local finance organisations. Moreover, the relevance is reinforced by the different nationalities and the large international reach (Boulton & Fitzpatrick, 1994; Mays & Pope, 2000), which is demonstrated in Figure 2. In addition, the strict selection of interviewees ensured that they were directly related to the research question, both in terms of their internationality and the different variations of the CFO role (Denzin, 2001; Saunders, et al., 2016). Hence, both local CFOs and direct representatives of the Group CFO were interviewed.

Figure 2 Reach of the Study by Represented Countries



4 FINDINGS

The main findings which result from a total of 522 statements are presented. An exact assignment of statements to individual interviews or nations does not take place for data protection reasons.

Standardisation of Data Structures	
The survey has produced a hitherto unobserved trend. Respondents, both local CFOs and representatives of the Group Function, consider the standardisation of data structures and the establishment of rules for data entry in ERP systems as important.	<i>“All the best tools are useless without the right and correct data.” “The (...) trend, therefore, is to ensure the quality of the data.” “However, as a basis for harmonising ERP systems, it is also important to standardise processes with regard to data entry.”</i>
Harmonisation of ERP Systems	
The harmonisation of the ERP systems was seen by all respondents as a decisive trend as well as the foundation of the digitisation.	<i>“The harmonisation of ERP systems is another significant trend in the financial function.” “ERP systems are a basic requirement. One could consider them as the foundation of the pyramid of digitisation.” “All new digital technologies must be connected to existing ERPs.”</i>
Nevertheless, alternatives are already being discussed in the Group Function, such as cloud computing or RPA, which potentially reduce or eliminate the need for harmonisation.	<i>“Although harmonising ERP systems is still up-to-date, it can almost be described as an old step. As part of this harmonisation, cloud computing is the next step, as you only have to upload data and no longer need to harmonise interfaces.” “With regard to the harmonisation of the ERP system, only certain basic structures (...) need to be harmonised to ensure that all the same data is entered.” “Robotics largely eliminates the need to harmonise ERP systems as robots are used to bridge the fragmentation gap.”</i>
Some regions outside Europe must first receive new ERP systems before they can even start harmonising them.	<i>“It will take more than five years to complete the system harmonisation.” “In (Country), we are not yet talking about the harmonisation of ERP systems, because we still have an outdated system that is not suitable for harmonisation.”</i>
Robotics & Artificial Intelligence (AI)	
At the process level, robotics is seen as the most important trend in digitising the finance function.	<i>With regards to the process level, the main focus is on the identification of automation potential as an essential trend of digitisation with an impact on the financial function.”</i>

RPA is already partially used in the Group Function and local finance organisations in Central Europe. Nevertheless, one sees its use as being still in the initial stage.	<i>“Some robots are already in use today.” “We are not ready yet, that all processes are automated. We will not be there in two to three years.”</i>
In other regions, at least first RPA initiatives to explore the technology's potential have been set up.	<i>“We already have set up initiatives to explore the potentials of robotics.”</i>
By contrast, some regions are far behind and still see RPA as a distant future.	<i>“I don’t see automation coming to (Country) in the next future. That will take quite some time.”</i>
According to the respondents from the Group Function, AI is to be classified as an extension of robotics, however, it is not yet in use. Once the development is far enough, AI could replace all analyst activities of employees in the finance function.	<i>“Based on the automation, robots can be developed which develop themselves or other robots. Only then we talk about AI.” “Ultimately, all human analytical work is likely to be done by machines.”</i>
Big Data and Analytics	
Big data was considered potentially interesting by the majority of respondents, but there is currently no need to analyse the relatively small amounts of data in the pharmaceutical industry using big data. Moreover, the current ERP systems do not offer the possibility to integrate external data.	<i>“Big Data & Predictive Analytics are not as important to the financial function of the pharmaceutical industry as there is little Big Data in the pharmaceutical industry.” “It is not possible to integrate external data, such as the pollen index into our systems, since the basic structures have not yet been expanded. If this is possible, big data will be worthwhile to pursue.” “Nevertheless, Big Data & Analytics is a trend to which we attribute potential and which we will pursue.”</i>
Changes Regarding Processes	
Robotics turns out to be by far the most important trend in changing processes in the finance function. In effect, RPA will result in many of the processes being automated, both in the Group Function and of local finance organisations. Particularly transactional processes are affected by automation. Therefore, not many processes are left behind in the local organisations.	<i>“Every transactional activity of the finance function can be automated.” “We already take all processes from the country organisations of the financial organisation, which can be automated. There is not much left.” “Right now, the people in the SSC do manual work. In the future this will be automated as well.”</i>
Changes Regarding Organisational Structures	
With regard to changes in organisational structures in the finance function, the formation of Shared Service Centres (SSCs) is the most important trend.	<i>“Digitisation place a major role in the shift of the local finance functions to the SSC.” “SSC can be regarded the necessary requirement for digitisation.”</i>

Although SSCs are not a digital trend, their formation is massively influenced by digitisation.	<i>Otherwise digitisation would be too expensive.”</i>
A completely new idea in this context was voiced by several respondents. It may be that RPA makes the formation of SSCs completely redundant, as automated processes no longer need to be relocated to low-cost countries for cost reasons.	<i>“However, digitisation also offers the opportunity to reverse this trend of the SSC formation. Out of the low-wage countries, into European countries, to ensure data protection. A robot is not paid, so the benefit of SSC’s in low-wage countries will be lower in the future.”</i>
Changes Regarding People	
According to the respondents, both in the local organisations and in the central function, e.g. SSCs there will be a dramatic reduction in headcount due to automation by robotics.	<i>“There will be a big reduction in headcount due to robotics in the local finance functions.” “I think that the statistics that predict that 70% of accountants lose their jobs are realistic.”</i>
Moreover, according to the respondents, classic accounting skills take a back seat as employees learn to act in the human-machine interface.	<i>“Due to automation and digitisation we need people with different profiles. People don’t need to have a classic profession like our accountants have these days.” “Future employees need to have skills to work together with robots.”</i>
The results show that two main profiles are expected to develop. First, analysts are needed who can handle analytical models and interpret the data.	<i>“Completely new profiles, such as the Data Engineer, will be created.” “We need people who are extremely well acquainted with data and models for analysing data in order to understand what data the robots produce.”</i>
Secondly, the knowledge about the businesses becomes more important and the ability to advise them.	<i>“In the wake of digitisation, we will need more knowledgeable people who support the businesses and fulfil a business partner role.” “The new profiles should focus more on project management.” “In addition, the newly hired people need a good process orientation.”</i>
Consequently, the training needs also reflect these new profiles. However, some respondents are concerned that accountants do not have the right mindset for such training and foresee greater potential in new hires.	<i>“In terms of training, skills must also be trained with analytical models.” “In terms of internal training of existing employees, methodological skills and project management skills are increasingly needed.” “Due to the difficulty to change the mindsets of the traditional employee of the finance function, I see greater potential in new hires.”</i>

Changes Regarding the Role of the CFO	
<p>In general, the role of the CFO will, according to respondents, increasingly focus on business partnering and value-adding activities. All in all, the changes will lead to the role of the Group CFO to surge in strategic importance.</p>	<p><i>“In the future, business partnering will increasingly come to the fore.” “After the changes made possible digitisation, I could focus more on value creating activities.” “In my view the role of the CFO is expanding and getting strategically more important.”</i></p>
<p>In contrast, the importance of the local CFO will be greatly reduced, at least in industrialised countries, driven primarily by automation. However, in less developed regions, CFOs are harder to replace, as centralisation and automation have not progressed so far.</p>	<p><i>“I think the importance of the local CFO, at least in the industrialised countries, will decrease sharply, since automation of tasks is far more progressed here.” “However, in (Region), as well as in (Region), or (Region), for example, it is very difficult to replace the role of the local CFO because the compliance requirements and regulations of these countries are so complex that the SSC cannot take them over easily.”</i></p>
<p>In the long term, however, from the point of view of respondents, the few remaining tasks might not be enough to ensure the existence of the local CFO.</p>	<p><i>“Of course, the things that will remain in the local financial organisations (...) Are only very few tasks. As a result, local CFOs losing importance.” “It raises the question of whether they are needed all.” “The few remaining tasks of the local CFO will continue; the role is no longer called CFO.”</i></p>

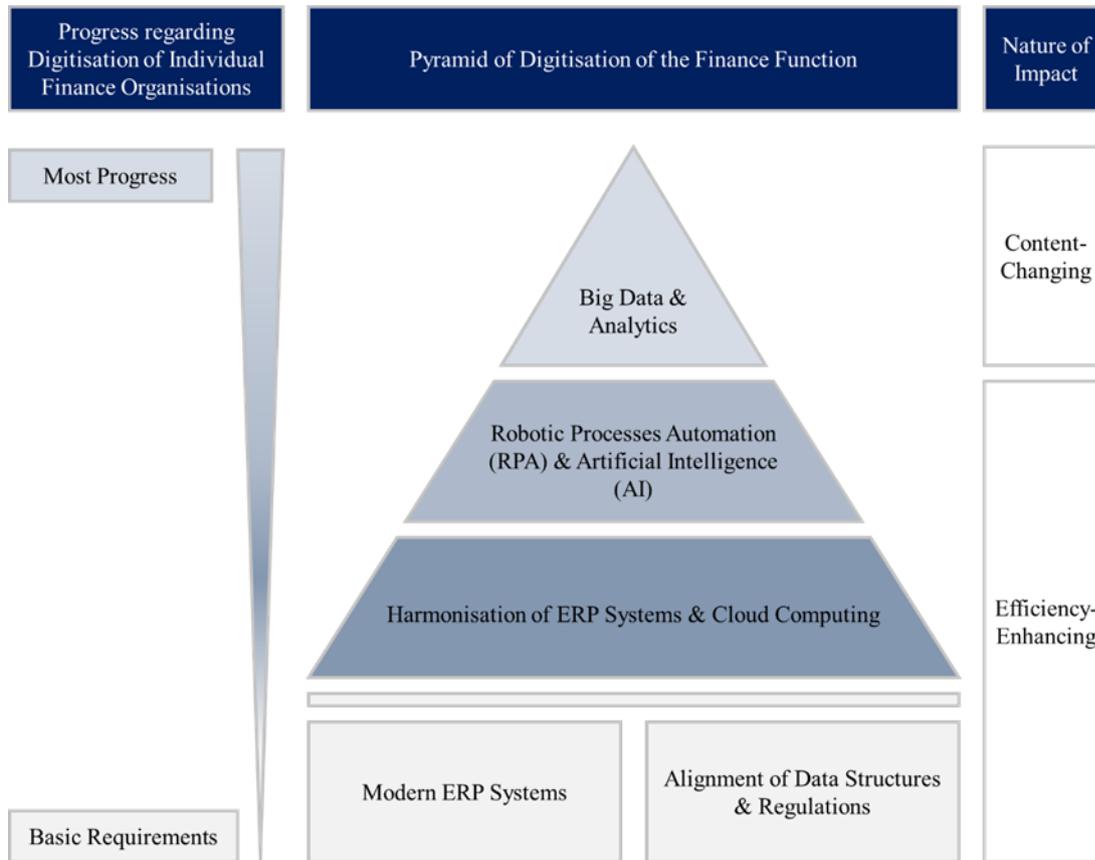
5 DISCUSSION

The aim of this paper was to investigate the changes the finance function and the role of the CFO will undergo in the wake of digitisation. The focus was on identifying differences between individual finance functions, as well as differences between the Group CFO and the local CFOs from an international perspective.

5.1 Digital Trends Changing the Finance Function & the Role of the CFO

Overall, the literature draws a similar picture as the findings of this work with regard to the operationalisation of digitisation. There is widespread agreement on which digital trends matter and how these trends will affect the finance function and role of the CFO. Nevertheless, a closer look at the results reveals a hierarchy in the relationship between digital trends which is not yet evident in the literature. An interviewee has called this hierarchy “pyramid of digitisation”, which is depicted in Figure 3.

Figure 3 Pyramid of Digitisation of the Finance Function Level 3



This continuum of progress in terms of digitisation could be categorised further as “basic requirements” (foundation of the pyramid) up to “great progress” with regard to digitisation (top of the pyramid). A further meaningful categorisation of trends emerges from the interpretation of findings, which is not yet evident in the literature. Based on the findings of the present study, the trends of “harmonisation of ERP systems & Cloud Computing” and “robotic process automation (RPA) and artificial intelligence (AI)” represent “efficiency-enhancing” trends, while “big data and analytics” represents the only “content-changing” aspect of digitisation.

Based on this simplified model, it is possible to draw valuable conclusions about the progress made by individual finance organisations in terms of digitisation and thus on upcoming changes as well as their extent. Moreover, it can be used to discuss possible differences in the changes of individual finance organisations and the role of the CFO.

5.2 Expected Changes in the Finance Function

The results of this study indicate that the changes in the finance function in “processes”, “organisational structures”, and “people” may vary according to the progress of each finance organisation in terms of digitisation.

In finance organisations that do not yet have modern ERP systems, and cannot show consistent data structures, and thus do not even meet the “basic requirements” along the continuum of digitisation, no major changes in regard to processes, organisational

structures, or people could be expected. Among the participating finance organisations of the survey, such organisations could only be identified outside of Europe.

However, the reverse conclusion does not seem to be that all finance organisations outside Europe do not meet the basic requirements for digitisation. There are also those who already have modern ERP systems and largely uniform data structures. These organisations work to harmonise the existing ERP systems. However, despite smaller efficiency gains, no major changes in terms of processes, organisational structures and people are evident in this stage based on the findings of this study.

By contrast, local finance organisations, which already have largely harmonised ERP systems, appear to be on the verge of a huge breakthrough. Based on the findings of this research, one could consider this stage along the continuum of digitisation as a preparatory phase for the introduction of RPA, since the first, predominantly transactional processes can already be transferred into the SSC and into the Group Function. Looking at these findings, the progress in terms of digitisation can be seen as the beginning of a massive centralisation of the local finance organisation towards the Group Function. For the first time, at this stage of progress, similarities with the literature become apparent. As described in many sources (Monterio, 2015; Seasongood, 2016; Dhar, 2017), the predicted changes are likely to lead to a massive reduction in headcount in the respective local finance organisation.

Against this background, it is worth examining further the changes within the Group Function and the SSC. The results can be interpreted as suggesting that the Group Function is also affected by the effects of increasing centralisation. The more local finance organisations, at the same time, achieve the far-reaching harmonisation of their ERP systems, the more of the local processes must be taken over by the SSC. Based on the results of this paper, at this stage within the SCC, it is revealed whether all the required basic requirements have been correctly fulfilled by the individual local organisations. If the data structures, for example, were not properly unified before, it could lead to the level of heterogeneity within the SSC becoming too massive, which could eventually shatter the SSC from within. It is all the more astonishing that judging by the results of the work, little value seems to be attached to this unification of data structures in some local organisations.

Similar to cloud computing, RPA reduces the required level of harmonisation of ERP systems, thus favouring early centralisation of the processes of local finance organisations in the SSC. The ability of robots to operate independently of systems, as described in the literature, and thus to bridge possible gaps between ERP systems (Le Clair, 2017; van der Aalst, et al., 2018), gives reason to believe the harmonisation of existing systems in preparation for centralisation would no longer be necessary in the future, with corresponding progress in RPA. This independence would mean RPA could allow local finance organisations to make a huge leap forward along the digitisation path. Affected organisations could thus move directly from the simple existence of modern ERP systems to an introduction of RPA, without having to harmonise their systems or data structures beforehand.

As summarised in Figure 3 Pyramid of Digitisation, there are finance organisations, including the Group Function, which already have made progress on RPA. However, these organisations are located in Central Europe. It is remarkable that at this level, almost the full extent of digitisation becomes evident, as processes can be automated. The beginning of this automation seems exclusively to affect the Group Function, which

is logical because the processes of local organisations that can be automated by RPA have already been relocated to SSCs at an earlier stage of digitisation. For the Group Function, the automation could mean an enormous administrative effort, which has to be carefully planned and well-coordinated. Moreover, the automation will lead to a huge reduction in the headcount, which has already occurred much earlier in local organisations. Another conclusion, not evident in the literature, is that the Group Function in reaching this level of progress should consider whether SSCs, primarily located in low-wage countries, can be justified. In light of the fact that virtually all processes can be automated at this level of digital progress, the question arises as to whether, in terms of data security, the servers on which the RPA software operates should potentially be relocated to countries that require strict privacy policies. Conversely, the cost advantages that low-wage countries offer regarding manually executed activities should not, on the basis of these findings, be used as a crucial location choice criterion, as they probably would be rendered null and void anyway.

Beyond that, the completion of the automation stage in digitisation and the associated introduction of AI, which can automate complex, non-transactional activities (Vasarhelyi, et al., 2015; Corson, 2016; Seasongood, 2016; Huerta & Jensen, 2017), could impact dramatically local finance organisations. The introduction of AI could mean its complete resolution since the remaining country-specific tasks and those activities that require a high degree of decision-making authority could also be automated by AI. Reflecting on these findings, one could conclude that in the future, exclusively one central finance function could exist incorporating the greatest possible digital advances, and that gathers all its automation expertise in countries with high privacy standards.

It is remarkable that unlike the progress regarding big data and analytics postulated in the literature (Bout, et al., 2013; Bhimani & Willcocks, 2014; Agnew, 2016), no significant progress has been made in this area of digitisation. Speculation suggests that existing ERP systems are unable to process external unstructured data and the amount of existing data in the pharmaceutical industry is insufficient to justify investments in big data and analytics. However, based on the results of this work, these developments cannot be confirmed.

5.3 Expected Changes Regarding the Role of the CFO

First, it should be noted that uncovering the blind spot of literature in terms of the various manifestations of the role of the CFO has certainly paid off, as the changes in the roles of the local CFO and the Group CFO appear to be significantly different based on the findings of this work.

The change in the role of the local CFO depends on the progress of the respective finance organisation regarding digitisation. However, the change in the role of local CFOs does not begin until thorough harmonisation of the ERP systems has been completed. Due to centralisation, which is made possible by this progress, it can be assumed that initially smaller teams are to be lead and fewer processes are to be looked after. Considering all available results, this could lead to a short- to medium-term shift in the balance of current tasks towards a stronger support of the business due to more available time, which is described in a similar form in the literature (Corson & Miyagawa, 2012; O'Halloran, 2016). However, it is only with the introduction of AI that changes of tremendous scope for the role of the local CFO can be expected, which

are completely ignored in the literature. The above-mentioned AI-induced possible dissolution of the respective local finance organisation could probably also lead to the complete dissolution of the role of the local CFO.

In contrast to the local CFO, the change in the role of the Group CFO seems to be influenced only by the greatest possible progress in terms of digitisation. As also described in the literature, the respondents of the study see the role of the Group CFO exposed to major changes primarily through “content-changing” trends such as big data and analytics. These would make it possible to improve decision-making and thus better advise the businesses and ultimately lead to an increased strategic relevance of the Group CFO. However, in the case of the company under investigation, which, according to the respondents, has no backlog with regard to digitisation compared to other companies in the pharmaceutical industry, such progress is not yet in sight. Thus, contrary to the literature (Corson & Miyagawa, 2012; O’Halloran, 2016), no major changes regarding the role of the Group CFO are expected in the near future.

6 CONCLUSION AND IMPLICATIONS

The essential findings of this work were shown and discussed in detail against the background of the research question. The most relevant conclusions of the paper are summarised in Figure 4.

Figure 4 Key Conclusions



“What Changes Will the Finance Function, Including Local Finance Functions, and the Role of the CFO, Including Local CFOs, Undergo in the Wake of Digitisation, from an International Perspective?”

Digital Trends Changing the Finance Function & the CFO’s Role	Expected Changes in the Finance Function	Expected Changes regarding the CFO’s Role
<p>The most important digital trends are the “Harmonisation of ERP Systems & Cloud Computing”, “Robotic Process Automation (RPA) & Artificial Intelligence (AI)”, and “Big Data & Analytics”.</p>	<p>Differences can be noted between individual finance functions regarding their progress in digitisation. Based on the results of this survey, the greatest progress has been made by finance functions in Central Europe.</p>	<p>The Group CFO is expected to gain strategic relevance, provided it is possible to make progress in Big Data & Analytics.</p>
<p>Based on the results, a hierarchy of digital trends could be developed, giving a rough guide to the order in which the digital trends seem to be implemented in practice.</p>	<p>In the long term, the process of centralising and automating processes could completely disrupt local finance functions.</p>	<p>By contrast, local CFOs are likely to be affected by a completely different fate.</p>
<p>It cannot be ruled out that progress in digitisation and, therefore, in implementing these digital trends is industry-specific.</p>	<p>The Group Function will most likely be maintained. However, the increasing automation could lead to a dramatic reduction in headcount.</p>	<p>The dissolution of the role of the local CFO seems to be strongly linked to the progress of the respective local financial organisation. CFOs of such organisations that have progressed far in terms of digitisation are likely to experience this development earlier.</p>
<p>It seems that further categorisation of the digital trends in "efficiency-enhancing" and "content-changing" trends could be meaningful.</p>	<p>It seems that changes in profiles of employees of the finance function and the resulting changing training needs are unlikely to occur until there is more progress in Big Data & Analytics.</p>	

In conclusion, the literature presents a broadly similar picture regarding digital trends which seem to have an impact on the finance function and the role of the CFO, yet with regard to changes in the finance function, it can be concluded that, contrary to the literature, there does not seem to be “one change”, but rather the extent of change expands, the greater the advances in digitisation made by individual financial organisations.

Progress in terms of digitisation, seems to lead to the complete dissolution of individual finance functions in the long term, as digitisation drives centralisation and automation. The Group Function appears to be sustained over the long term. However, like in other local finance organisations automation could lead to a massive headcount reduction. Beyond that, changes in employee profiles and training needs announced in the literature do not appear to be happening for the time being due to backlogs in big data and analytics. It cannot be ruled out that these backlogs are industry specific.

The fate of the CFO also seems to be more differentiated than it is currently described in the literature. The role of the Group CFO seems to be largely evolving, as suggested in the literature, with the goal of increased strategic relevance. Nevertheless, backlogs in the area of big data and analytics appear to threaten this development. By contrast, local CFOs seem to be facing a completely different fate in the long-run. Due to the dissolution of local finance organisations due to digital progress, they could also face the complete dissolution of their role.

Against this background, it should be noted the findings and conclusions of this study are not generalisable. Rather, they provide an indication that the change in finance function, as well as the changing role of the CFO, maybe more differentiated than the literature suggests, but also the practice-oriented sources currently suggest.

6.1 Implications for Theory, Practitioners and Future Research

There may well be differences in the digital progress of individual finance functions including both local functions and the Group Function. In addition, this research raises legitimate doubts that the changes in the role of the CFO are represented appropriately regarding its different manifestations in the literature. In fact, the perspective of local CFOs is lacking. These identified grievances should receive more attention in the future from both scientific and practical literature including the reports of private companies.

This paper encourages companies to become aware of the differences regarding the progress in digitisation within an organisation. Even if no concrete consequences are evident in the current state of knowledge, possible negative consequences of such heterogeneous systems within finance functions should be beard in mind by companies in order to remain able to act at all times.

Regarding the role of the Group CFO one obstacle for the development could be inadequate progress in the area of big data and analytics. Despite the current focus on increasing the efficiency of the finance function, big data and analytics should not be neglected. Otherwise, it is conceivable that despite all positive predictions, the positive change in the role of the Group CFO does not actually occur. Although the role of local CFOs might, in the short- to medium-term, evolve similar to that of the Group CFO, local CFOs should be prepared for the long-term disappearance of their role. Nevertheless, there is no reason to panic, as the trend AI, which could be seen as a major driver of this development, seems to be still in its infancy.

In order to counteract the methodological limitations of this work, the extension of research to a larger group of people and other countries within the company, as well as other companies in the pharmaceutical industry, would be meaningful. Moreover, an industry comparison of finance organisations appears to be particularly interesting in order to allow to generate generalisable results in the future.

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