

Role of CDOs in the Digital Transformation of SMEs and LSEs. An Empirical Analysis.

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Abstract

In recent years, the economy and companies of all sizes operating within it have undergone a progressive transformation that implied increased market complexity and dominance of the buyer market. This development is the result of the “third industrial revolution” and has been fostered during the last 40 years by major innovations in digital computer technology. This first “digital revolution” resulted in the development of the first computers and the associated entry of new electronics and information and communication technology (ICT) in companies being able to automate production processes and make them more efficient. Digitalization means not only the change of individual processes rather the fundamental transformation of entire business areas or the entire business model. In order not only to master, but also to cope with, the challenges of digital transformation, companies need a member in the management board that provides specific expertise and encourages these digital changes. In the process, the position of Chief Digital Officer (CDO) has been created precisely to meet these challenges of the digital transformation of a business model. The present work is based on various case studies analyzing what role the CDO plays in the framework of digital transformation in various company sizes (SMEs and LSEs). In particular, the responsibility, specific obligations and rights and the role – namely, functions and tasks – and the change in the role have been examined since taking over the position.

1. Introduction

The importance of digitalization is increasing continuously. During the years 2013 and 2015 more than 90 percent of all the existing and available worldwide data was generated [21, 25]. Furthermore, [20] predicted in their contribution that in 2020 more than 50 billion devices will be connected to the Internet and [8] even forecasts that over 100 billion devices will

be linked by the year 2025. This digital development is leading to a data revolution and permanent changes in customer needs, resulting in changes to the entire economy and society [8, 32].

These changes are also reflected in the entire global supply chain of companies, as the nature of value creation has shifted away from classical physical products to “smart” products and data [23]. Implementation of these products and data “in combination with other ‘mega-trends’ of digitalization (...), are expected to shape the (digital) supply chain of the future” ([23], p.4210). For every company these rapid technologies enable the creation of new opportunities and threats – regardless of whether they are a start-up or an established company [18, 27]. This means that for every company the integration and exploitation of new digital technologies will lead to the disruption of whole business models as a result of structural and organizational challenges [19]. Ultimately, companies need to adapt their respective digital strategies and require a suitable organizational and management structure [24], because these new technologies require “different mindsets and skill sets than previous waves of transformative technology” ([14], p.6). These tactical or strategic changes in business models enable companies to create completely new ways of adding value [18]. In order to respond to the opportunities and challenges associated with digital transformation, many companies have adapted their organizational structure by integrating a Chief Digital Officer (CDO) into their top management [7, 18].

Originally, the CDO was often the person who was responsible for digital marketing in the company because of his or her deep understanding of social media (Digital Marketing Executive) by expanding traditional marketing areas into the digital world [36]. In the meantime, the CDO is regarded as the top digitalization officer and functions as a digital champion in the company. He or she has to take over the responsibility and thus the (digital) management of the digital transformation by creating a completely new digital ecosystem to remain competitive in today's

markets [30, 36]. As a catalyst or enabler of these changes, the CDO pursues the central goal of integrating digital competencies within the company to develop it into a digital company [30, 34].

The CDO research represents a still under-researched area, but notwithstanding the number of studies on the role of the CDO in the digital transformation, few studies in the scientific literature have addressed how the role of the CDO influences the digital transformation of companies. The focus of the empirical studies is primarily on the related tasks of a CDO and the responsibilities assigned to the CDO by the company in order to fulfill these tasks [35, 38]. The study of [38] shows that the tasks and responsibilities of the CDO are dependent on the respective company, because “firms bundle a variety of responsibilities under this role [...]; everyone defines the CDO role and its scope differently” ([18], p.9). In scientific research, however, the existing studies on the role of the CDO focus primarily on studies based on mixed samples and large companies [18]. A study from the year 2015 by [16] also revealed that it tends to be larger companies (large-scale enterprises (LSEs)) that have CDOs, but now more and more small and medium-sized enterprises (SMEs) install a CDO. SMEs are considered as engine of economic growth and employment and become more important [26]. However, SMEs differ from LSEs because SMEs have greater financial constraints, have often insufficient or inadequately qualified personnel and so they have finally relatively fewer resources than larger organizations while still facing the same competitive challenges as LSEs [5, 31]. Nevertheless, the

increasing number of CDOs in SMEs and the special characteristics of SMEs rise to the question of the role of the CDO in the digital transformation of SMEs and whether there are any essential differences between the role of the CDO in LSEs. The present paper aims to close these research gaps and is thus an essential contribution to current CDO research.

2. Theoretical framework

Especially in business economics, scientists speak in the context of a role of mostly functions or tasks [3, 6]. In this case, a person (role-bearer) has a certain position in a company or organization and at the same time embodies a whole role set, which is dependent on the respective situation and other persons [29]. Various internal and external role transmitters and role receivers interact with one another and can have different expectations [22]. These expectations determine the whole role set, and thus the overall behavior of the persons acting, since they perceive the expectations of other persons and act accordingly, or not (role behavior) [17, 29]. These actions of the persons can be linked with the factual behavior within social groups or institutions [13].

Roles are always related to one another, because specific tasks and duties determine the execution of the respective role. The behavior of persons is additionally determined by the mutual assignment of different roles [17]. This assignment is based on the model created by [22] and represents the sending and receiving of roles as a process.

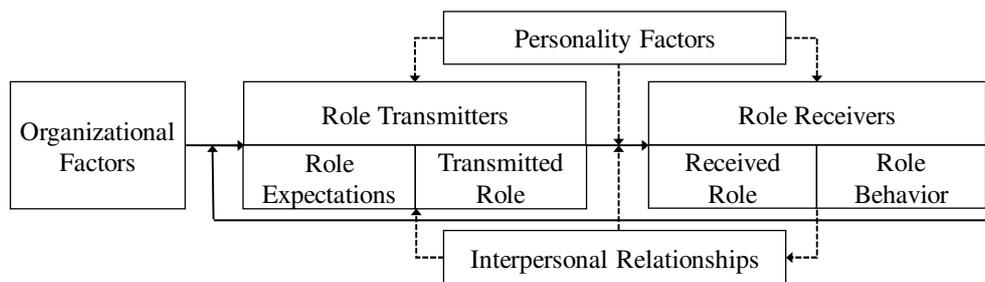


Figure 1: Role theory according to Katz/Kahn [22]

The role transmitter communicates certain role expectations to the role receiver. At this point, the process is already halfway through [22]. The role transmitter then assesses the behavior of the recipient and reiterates the respective expectations of his/her behavior by means of instructions. The role receiver finally interprets this information and behaves according to the interpretation of this information and the respective power of the role transmitter [22]. Thus, the interpersonal relationship between the role

transmitter and role receiver determines both the sent role and the role behavior.

With regard to the role of the CDO, this means that the top management (role-transmitter) expects to drive the digital transformation in the company from the CDO (role receiver). For this purpose, responsibilities and certain obligations and rights are transferred to the CDO, so that the CDO can carry out and fulfill the functions and tasks assigned to him within the scope of the digitalization. The role of top management, and

ultimately the role of the CDO, is determined by organizational and personal factors as well as by interpersonal relations within the organization.

3. Methodology and data analysis

The following chapter describes the methodology and data analysis. First, the case study research is described and then the sampling, data collection and analysis are presented.

3.1. Case study research

Because the subject matter of the CDO is a young, largely unexplored area of investigation, a qualitative and empirical research design with the aim of compiling case studies was applied in this paper [39]. This research methodology is, on the one hand, particularly suitable in an early stage of research on the topic CDO and on the other hand for investigating companies and other social forms of organization, because questions like “how”, “who” and “why” are considered. Qualitative research methodology presents verbalized real-world experiences and facts using a small amount of high quality and diverse data. Often, these data is preferred to data from quantitative research, because it is more substantial [15]. The qualitative research methodology is based on open procedures, as it is expected to be able to describe

relatively unknown research fields more holistically [12]. Based on the description of the research fields, conclusions can ultimately be derived [39].

Referring to [2, 10], case study research is appropriate in the context of information systems. Thereby, this research methodology makes it possible to open the “black box” about the CDO role in SMEs and LSEs by giving a more profound understanding of his contribution to the company’s digital transformation to both science and practice [1, 2, 9].

3.2. Sampling

For reasons of complexity, [11] recommends the implementation of between 4 and 10 interviews. However, in this case this number was deliberately exceeded because the goal of this paper is to obtain a holistic view of the role of the CDO.

Table 1 shows the companies with the corresponding CDOs who participated in the study. In line with [33], the categories of the companies are based on the SME definition of the European Competence Center for Applied SME Research [4, 33, 37]. This definition is characterized by increased practicability and relevance for application-oriented research. The definition classifies manager-led enterprises as SMEs as long as they do not employ more than 3,000 employees and/or as long as their annual turnover does not exceed 600 million euros [4].

Table 1: Companies and participants of the study

Case	Company				Study Participant	
	Industry	Legal form	Employees	Revenues (EUR Million)	Position	CDO since (Months)
A	Software	Partnership	< 300	< 100	CDO	8
B	Wholesale	Ltd.	< 300	< 100	CDO and COO	17
C	Financial Service Provider	Registered Company	< 300	100 ≤ x < 1,000	CDO	14
D	Packaging	Stock Company	300 ≤ x < 3,000	not specified	CDO	11
E	Media	Ltd.	300 ≤ x < 3,000	100 ≤ x < 1,000	CDO	16
F	Real Estate	Ltd.	300 ≤ x < 3,000	100 ≤ x < 1,000	CDO, CTO, CIO and CMO	29
G	Marketing	Ltd.	300 ≤ x < 3,000	100 ≤ x < 1,000	CDO	12
H	Media	Ltd.	300 ≤ x < 3,000	not specified	CDO	5
I	Publishing	Foundation	300 ≤ x < 3,000	not specified	CDO	12
J	Publishing	Ltd.	300 ≤ x < 3,000	100 ≤ x < 1,000	CDO	17
K	Financial Service Provider	Stock Company	300 ≤ x < 3,000	≥ 1,000	CDO	15
L	Chemical Sector	Ltd.	≥ 3,000	≥ 1,000	CDO and CIO	14
M	Industrial and Engineering	Limited Partnership	≥ 3,000	not specified	CDO and CIO	17
N	Tourism	Ltd.	≥ 3,000	≥ 1,000	CDO	29
O	Automotive	Ltd.	≥ 3,000	100 ≤ x < 1,000	CDO	10
P	Heating Technology	Ltd. & Limited Partnership	≥ 3,000	≥ 1,000	CDO	7

The participants of the study themselves indicated the industry in which their company operates, the legal form, the number of employees and sales.

Three companies (A, B, C) can be allocated to small companies because they have fewer than 300 employees. Eight companies (D, E, F, G, H, I, J, K) can be allocated to medium-sized companies because

they have more than 300 employees and fewer than 3,000 employees. The remaining companies (L, M, N, O, P) have more than 3,000 employees and therefore have characteristics of LSEs. In summary, the companies of case studies A to K represent SMEs and those from L to P represent LSEs. It can be seen that the companies that participated in the study have a

wide range of industries and a different number of employees. The average number of employees is 2,244 and the arithmetic mean of the turnover is 2,021 million euros. Three companies (D, E, N) have an exchange listing.

Furthermore, it shows the different characteristics of the CDOs who participated in the study. In order to ensure the anonymity of the participants, the names of the subjects were made unrecognizable. This also led to gender neutrality, because every CDO of the study could be either a male or a female interview partner. For reasons of simplification, the CDO is considered to be masculine in this paper.

All participants were active in the company as a CDO during their career. It also shows how long the CDOs had been working in their respective CDO positions (as of May 2017). On average, the CDOs have, or had, their positions for approximately 15 months. However, two of the subjects (N, O) were no longer active as CDOs at the time of the interview, because both had already left their companies in December 2016. While twelve subjects have, or had, “only” the position or function of the CDO in the company, another subject (B) has the function of Chief Operating Officer (COO) in addition to the CDO positioning. In case study F, the respondent stated that, in addition to the CDO activity, he also carries the functions of Chief Technology Officer (CTO), Chief Information Officer (CIO) and Chief Marketing Officer (CMO) within the company. In the companies of the case studies L and M, the subjects have the positions of both CDO and CIO.

3.3. Data collection and analysis

Finally, 16 CDOs were interviewed during the period from 30.01.2017 to 21.03.2017. The interviews lasted an average of 72 minutes. The data collection and data analysis often ran in parallel, as the interviewer had already “analyzed” the answers in his head during the interviews in order to be able to ask for adequate supplementary questions. Therefore, the data collection of the work took place by means of problem-centered and guideline-based interviews.

To get detailed information about the person of the CDO, the CDO area in the company and especially the role of the CDO, the interview guide includes, in addition to basic questions concerning the interview partner and the company, in which the CDO operates, in particular questions regarding the role of the CDO. In the context of the role of the CDO, the responsibility of the digital transformation, certain obligations and rights and functions and tasks of the CDO are fulfilled. The study also examines the extent to which the

respective role of the CDOs has changed in the context of the CDO activity since taking over the position.

By communicative validation of the data by the participant of the study himself returning his individual case study report for review, various perspectives of data collection could be taken into account. The analysis of the data was based on the computer program *MAXQDA Plus 12* developed for qualitative data analysis. As a result of the design of the study, the study does not claim to be representative.

4. Challenges for SMEs and LSEs and motivations for the integration of CDOs

In order to achieve a better understanding of the results of the study on the role of CDO in SMEs and LSEs, the challenges that companies had to face in the course of digitalization and the underlying motivation for the integration of CDOs are presented in this section.

In the course of digitalization, SMEs must primarily optimize and digitalize their business processes (B, F), because even market leaders are permanently challenged by new competitors (G). This means that companies must initiate a long-term change process in order to develop and improve (G). Against the backdrop of digitalization, certain industries (e.g. the publishing industry) would have rested on functioning business models and slept through the first wave of digital business (I). For this reason, SMEs have installed a CDO as the head of digital transformation, as the overall corporate strategy depends on the company’s digitalization (D). The “*CDO acts as a technical translator and lever of digitalization*” (statement of study participant J), because he is intended to accelerate the digital transformation (F). The aim of the CDO is to achieve the goal of making the entire company more efficient by marketing highly qualified analogue and digital products and increasing customer focus (K, F).

In the case of LSEs, however, the challenge in the context of digitalization is primarily the fact that new (partially pure online) players are constantly penetrating the markets at a much higher rate and end customer focus (N). In order to survive in the pure digital business (P), LSEs want to develop worldwide strategies for customer and uniform structures (M). For this purpose, LSEs install a CDO, who aims to optimize the networking with customers and increase the efficiency of processes over the entire product life cycle (M). Furthermore, the CDO is to design products as well as all processes up to the entire supply chain more digitally (L, O). In addition to the increased focus on the marketing of these products and services,

resistance is also to be broken and the company is to be made more agile (M, N, O).

5. Results and cross-case analysis

The following chapter presents the results of the individual case studies in relation to the role of the respective CDOs to be fulfilled. In particular, the responsibilities, obligations and rights and the managerial functions and tasks of a CDO within the framework of the digital transformation are discussed.

It also describes the extent to which the role has already changed since the takeover of the company.

5.1. Responsibilities

The CDO as a new member of the top management team in the company also needs the explicit responsibility of digital transformation for his role as a digital transformation specialist [28]. Table 2 shows the responsibility for digitalization in the company.

Table 2: Responsibility

	SMEs	Percentage	LSEs	Percentage
CDO has exclusive primary responsibility	A, E, F, H	36%	O	20%
CDO has exclusive primary responsibility and receives support from other C-levels	B, D, G, I, J, K	55%	L, N, P	60%
Board and/or Managing Director has exclusive primary responsibility	C	9%	M	20%
Total	11	100%	5	100%

In a third of SMEs in the study, the CDOs have exclusive primary responsibility in the context of digitalization. More than half of the companies have installed a CDO, who bears exclusive primary responsibility and is supported by other C-levels in the company's digitalization. In just under 10 percent of companies, the board or managing director has primary responsibility instead of the CDO.

On the other hand, in LSEs 20 percent of the companies give the CDO exclusive primary responsibility, while the majority of the companies that participated in the study support the CDO in digital transformation by other C-levels (60 percent). In only one-fifth of the companies, the board or managing director is responsible for digital transformation. The fact that the board or managing director has exclusive primary responsibility for digitalization is confirmed by the fact that the owner is the "voice of the company" (M) and acts as a "representative of the digitalization – also at town hall meetings" (M).

The study shows that the main responsibility for digital transformation in enterprises is transferred to the CDO. Participant of the study K led the statement: "Why else should you have a CDO?" In both SMEs and LSEs, the CDO receives support from other C-levels during digitalization of the company. This was justified in the course of the interviews by the fact that one person alone cannot implement digital transformation – even if it is the CDO. Above all, the interplay in the company as a whole is crucial, because all managers and employees are responsible. The CDO himself ultimately manages the pooling of the ideas of every employee and defines the entire digital strategy based on this.

5.2. Obligations and rights

In the next step, the study examines the obligations and rights conferred on the CDO within the framework of the digital transformation of companies. Table 3 shows the obligations of a CDO.

Table 3: Obligations of the CDO

	SMEs	Percentage	LSEs	Percentage
Reporting (Board)	A, D, E, H, I, J, K	64%	L, M, N	60%
Take responsibility for decision	B	9%	-	0%
Communication obligation throughout the company	C	9%	-	0%
Same duties as other C-levels	G	9%	-	0%
Digitize the company	-	0%	P	20%
No obligations	F	9%	O	20%
Total	11	100%	5	100%

Especially in SMEs, it is clear that a CDO is obliged to report all activities to the supervisory board and the board (in particular the Chief Executive Officer (CEO), Chief Financial Officer (CFO) and CTO) (64 percent). The CDO also has to take responsibility for all decisions and to educate the entire company about his activities. This communication between participants in the company is essential, because the CDO acts as coordinator, motivator and moderator, giving impulses to the employees in the operational area and discussing possible developments with them. On the one hand, he can in part have the same duties as all other C-levels, but on the other hand, there is the possibility that a CDO has no obligations in SMEs.

Even in LSEs, it is shown that a CDO also has a reporting obligation to the board. He also reports to the CEO, CFO and CTO in particular. The main responsibility for digitalization is the obligation to make the company digitally successful in order to achieve the primary goal of surviving in a purely digital business. Nevertheless, there is also the

possibility that CDOs have no obligations in LSEs. In case study O the participant of the study said that the board of directors worked in a very fear-driven way, and therefore the CDO was more or less ignored by them and did not have any obligations – even in the context of digital transformation of the company.

The study makes it clear that, independent of the size of the company, a CDO usually has a reporting obligation to the board. Current studies came to the same conclusion, because they found in their investigations that CDOs have direct reporting lines to their CEOs in the companies and have a seat at the top management team meetings [18, 19, 35]. Moreover, a CDO can also have special obligations such as the general communication of his activities, or he can have similar obligations to other C-levels. Ultimately, he must digitalize the company and take responsibility for his decisions.

In addition to various obligations, certain rights are also attributed to the CDO. Table 4 shows the rights granted to a CDO within the digital transformation.

Table 4: Rights of the CDO

	SMEs	Percentage	LSEs	Percentage
High degree of freedom	D, E, H, I, K	45,5%	-	0%
Same rights as other C-levels	G	9%	-	0%
No rights	A, B, C, F, J	45,5%	L, M, N, O, P	100%
Total	11	100%	5	100%

The study shows that approximately 45 percent of the companies give their respective CDOs high degrees of freedom. In about every tenth company the CDO has the same rights as other C-levels. Moreover, the study also reveals that in approximately 45 percent of SMEs the CDO is largely not granted special rights.

Furthermore, the study shows that even in LSEs the CDO does not have any special rights at all, which considerably limits his scope for action.

The study shows that high levels of freedom are granted to CDOs, especially in SMEs. This means that the rights of a CDO are very far-reaching. On the one hand, this freedom is necessary for the CDO's task of digitalizing the company, because the CDO must focus on the design of the digital targets and activities, which should be coordinated with the management. The study of [35] also shows that CDOs require cross-company authority to be able to introduce digital initiatives so

that digital transformations in companies can progress more rapidly. On the other hand, this freedom is associated with great pressure to succeed. However, the CDO can also be integrated into the company in such a way that he has the same rights as any other member of the top management. Ultimately, a CDO is measured by the success of the company and what contribution he makes by his activities combined with the obligations and privileges of a managing director.

5.3. Role of the CDO

Moreover, the study examines the role of a CDO in the context of the company's digitalization. First, Figure 2 shows the managerial functions and tasks of the CDO in SMEs.

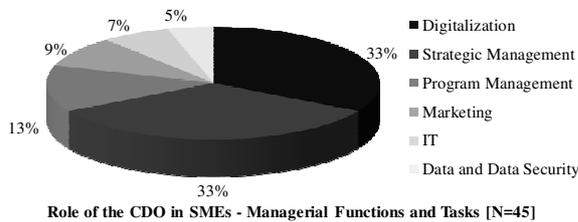


Figure 2: Role of the CDO in SMEs

The study shows that in SMEs the managerial functions and tasks of a CDO can be assigned to the categories of digitalization and strategic management. Within the framework of digitalization (33 percent), the main task here is to manage digital transformation within the company and at the same time to provide consulting services in digital issues. He also develops digital business areas, integrates digital competencies within the whole company and develops (new) digital business models. At the same time, within the framework of the strategic management tasks (33 percent), he ensures that the strategy is implemented, promotes HR and ensures cultural change within the company. As a result, he also manages the entire organization – especially product managers and partnerships. Within the program management (13 percent), he builds new processes and products and accompanies all projects to completion. Marketing activities (9 percent) include, in particular, the development and expansion of new customer segments, as well as the repositioning of the entire company on the market and the advice of customers. Within the IT tasks (7 percent), a CDO organizes and coordinates the website and the entire system architecture of the company.

In LSEs, the managerial functions and tasks of the CDO are the opposite of this (Figure 3).

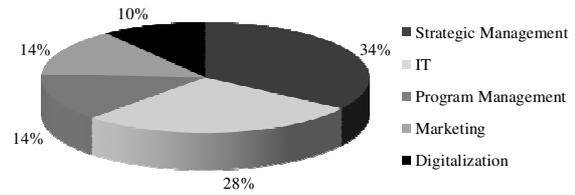


Figure 3: Role of the CDO in LSEs

The study demonstrates that in LSEs the CDO primarily performs tasks in the areas of strategic management (34 percent) and IT (28 percent). In strategic management in particular, the CDO is mainly responsible for the implementation of the strategy and the management of partnerships. He also ensures a cultural change throughout the company, and at the same time he carries out M&A transactions. Other tasks, such as business analysis and the general break-up of resistance are also part of his task spectrum in strategic management. Within the framework of IT (28 percent) tasks, he analyzes and controls IT systems, manages the system architecture and IT projects and supports the IT teams in the company. He also establishes links between offline and online content and organizes and coordinates the corporate website. Within the framework of program management (14 percent), the CDO manages and coordinates all projects, develops new products and carries out general program management within the company. In the area of marketing (14 percent), the CDO is primarily expected to digitalize Customer Relationship Management (CRM), to market products and services and simultaneously to expand new e-commerce platforms. The tasks that can be attributed to the area of digitalization (10 percent) include the management of digital transformation and the related consulting in the company, the development of digital strategies and, ultimately, the transformation of certain business areas.

It is noticeable that there are differences in the task areas of a CDO depending on the size of the company. While CDOs in SMEs carry out tasks in the area of digitalization alongside the tasks of strategic management, CDOs in LSEs are tasked with strategic management, and especially IT. Here, it is clear that the CDO in SMEs is primarily intended to provide digital transformation in the company by integrating digital competencies or digitalize certain business areas and developing completely new digital business strategies and models. In the case of LSEs, on the other hand, he is, in addition to the tasks of strategic management, primarily responsible for the entire IT architecture and structure in the company. With regard to strategic management tasks, it can be seen that the CDO in SMEs has a similar task group as the CDO in

LSEs (e.g. strategy implementation, management of partnership, ensuring cultural change). Within program management, a CDO also shows similarities within the different company sizes. In LSEs, he is more likely to look at the entire company or production program, whereas in SMEs the CDO tends to focus on processes. Within the framework of marketing tasks, the CDOs of SMEs have to reposition the entire company on the market and thereby acquire new customers. In the case of LSEs, on the other hand, they are merely expected to digitalize the network to the customer by digitalizing CRM, marketing products and services, and

developing new e-commerce platforms. This essential difference is also reflected in the main task areas: digitalizing versus IT. In summary, it can be said that the specific task areas of a CDO depends on the size of the company.

5.4. Role change

The extent to which the role of the CDO has already changed in the respective companies is described below (Table 5).

Table 5: Previous role change of the CDO

	SMEs	Percentage	LSEs	Percentage
Role changes due to other and new tasks (because of high dynamics)	A, D, F, I, J	45,5%	-	0%
Role changes due to new responsibilities	E	9%	M, P	40%
No changes	B, C, G, H, K	45,5%	L, O	40%
Not specified	-	0%	N	20%
Total	11	100%	5	100%

The CDOs who work in SMEs have already sensed changes in their roles within their previous term of office; that is, in their managerial functions and tasks. This change results from the high level of dynamics associated with digitalization. On the one hand, the function and task bundle of CDOs have expanded with new tasks, such as the additional focus on CRM. On the other hand, the importance of some tasks has shifted within the role, and CDOs can thus concentrate more on other areas such as strategy or digitalization of the company. A change in the role of the CDO can also result from new areas of responsibility. One CDO stated in the framework study that he had given away his sales responsibilities, since no CDO would risk his own sales, only to have new and risky disruption thoughts. This ultimately leads to disruptive business models not being realized. Among the remaining CDOs, however, the role has not changed during the term, since the tasks to be completed are clearly defined from the outset and have to be worked through successively. Moreover, in part, the term of office is too short to notice a change in the CDO role.

In contrast, the role of CDOs in LSEs has changed only through new areas of responsibility, since CDOs have taken over the management of new areas in their respective companies during their CDO activities. In other case studies of LSEs, the role has not changed formally. Informally, on the other hand,

one of the CDOs has become familiar with new, short-term tasks when problems arise.

The study shows that SMEs are particularly affected by the high dynamics of digitalization, which has also changed the role of the CDO due to other and new tasks within the companies. But new responsibilities also lead to a change in the role of the CDO in both SMEs and LSEs. Comprehensively, regardless of the size of the company, it can be said that, on the one hand, the dynamism of the role of CDO itself overtakes or has already overtaken, because digitalization requires tremendous agility. On the other hand, the CDO is also a building activity because, depending on the area of responsibility, other or new responsibilities are added either directly or indirectly during the course of the activity. For this reason, the CDO should be more flexible in order to counter both the increased dynamics and the change in responsibilities.

6. Discussion

Companies of different sizes and industries have installed a CDO for their digital transformation. Therefore, the reasons are dependent on the size of the company, as SMEs tend to primarily optimize and digitalize their business processes. The focus of LSEs is primarily on optimizing the network with customers and digitalizing the entire supply chain.

Regardless of the size of the company, the CDO is largely responsible for the digital transformation and is supported by all members of the top management team. From his responsibility regarding the digitalization of the company, his obligations and rights result. Based on the goal of successfully digitalizing the entire company, so that the company can survive in a (purely) digital business, the CDO must always report all activities to the board, regardless of the company size, and must communicate his activities to all stakeholders of the company. In order to be successful in the digital transformation process, a CDO should also work collaboratively on digitalization, since “Winning in digital business will be a team sport” ([32], p.84). A CDO depends on the input of others, because digitalization affects everyone in the company. In order to initiate the necessary changes with regard to digital transformation, CDOs are mainly given high degrees of freedom in SMEs. This freedom ultimately leads to a CDO who has a high degree of freedom to design digital objectives and activities, whereby his activities should always be coordinated with the top management. However, it is clear in LSEs (and partially in SMEs) that these specific degrees of freedom are not necessarily made available to every CDO. This restriction is also reflected in the functions and tasks, because in contrast to CDOs in SMEs, who partially digitalize the entire company and “*turn it to the left*” (I), this “global” power is not transferred to CDOs in LSEs. Here, the primary focus is on strategically oriented tasks and functions and the optimization of the entire IT in the company. The present work also shows that the role of the CDOs in both SMEs and LSEs has not changed. Only in SMEs, it is shown that these companies are strongly dependent on the dynamics associated with digitalization, because “*digitalization always leads to new processes and tasks that have to be digitalized again*” (B).

With these results, the present work represents a further contribution to the CDO research. The existing publications on the role of the CDO are extended by the new findings by the comparison of SMEs and LSEs and thus contribute to the exposure of the “black box” around the CDO [18, 35, 38]. In these publications, the role of the CDO is also examined by mixed samples, although there is no explicit reference to SMEs. Therefore, the focus of the present work is on SMEs, which is becoming increasingly important as an engine for economic growth and employment [26] and thus, the paper represents a new perspective within the scope of CDO research.

7. Conclusion and future research

In summary, the present paper demonstrates that there are some obvious differences in the role of the CDO in both SMEs and LSEs. The changes that will be accompanied by digitalization can be orchestrated under the guidance of a suitable CDO. However, this requires the support of the entire company, since digitalization is not an isolated process, but rather affects many parts of the business. This means that every member of the top management team must be integrated into the company’s digital restructuring processes so that everyone can make their own contribution to digital transformation in the company. Furthermore, it must be clearly clarified which responsibilities and resulting obligations and rights a CDO in the company receives. Based on this, the special managerial functions and tasks of a CDO can finally be clearly defined within the framework of the digital transformation. It is ultimately decisive how the company wants to digitalize and whether it wants to perform a complete or “only” partial digital transformation.

The empirical findings generated in the present study are relevant not only for science but also practice, because, on the one hand, the CDO research field is enriched by further research and, on the other hand, companies and their top managers can acknowledge the influence of the CDO on the digital transformation of companies. At this point, there is the indication that the “black box” around the CDO still requires further research because the findings of the present paper must be supplemented or validated by a quantitative survey. The different roles also allow the assumption that there are differences within the scope of the competences of CDOs in SMEs and LSEs. Therefore, future research could also examine a comparison of the competencies of a CDO in SMEs and LSEs. The fact that digitalization in the company can only function as a team also leads to questions as to how and with what other members of the top management a CDO cooperates in the context of digital transformation.

8. References

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