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The Fractional CIO in SMEs: conceptualization and research agenda

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Abstract

We conceptualize the new phenomenon of the Fractional Chief Information Officer (CIO) as a part-time executive who usually works for more than one primarily small- to medium-sized enterprise (SME) and develop promising avenues for future research on Fractional CIOs. We conduct an empirical study by drawing on semi-structured interviews with 40 individuals from 10 different countries who occupy a Fractional CIO role. We derive a definition for the Fractional CIO, distinguish it from other forms of employment, and compare it with existing research on CIO roles. Further, we find four salient engagement types of Fractional CIOs offering value for SMEs in various situations: Strategic IT management, Restructuring, Rapid scaling, and Hands-on support. The results reveal similarities with existing CIO roles as well as novel insights concerning the different engagement types. Lastly, we propose a research agenda for the Fractional CIO field, based on four research themes derived from existing CIO research and insights from the interviews.

Keywords Fractional CIO · Virtual CIO · IT leadership · Part-time management · SMEs · Small businesses · Interim management

1 Introduction

Oliver is the Chief Financial Officer (CFO) of a small but growing health-care company with 82 employees. As he is the one out of the top management team with at least some IT (information technology) knowledge, he is, on top of that, responsible for the IT department, which consists of four employees. Despite many challenges, he managed to keep the IT running so far. But as

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the company grows, so does complexity. While IT used to cause some problems, but mostly no severe threats to the business, it is now noticeably restricting future growth. To ensure future competitiveness, proper IT management is required that enables the business and prevents IT-driven opportunities from being missed. Unfortunately, having a good overview of the company's finances, Oliver knows very well that they cannot afford a full-time IT executive. Since Oliver needs a line manager, hiring a consultant would also not be a sustainable solution. Therefore, an alternative to traditional approaches is required.

With information systems and technology (IS/IT) becoming increasingly important across all types of organizations, the need for strategic IT management and leadership is higher than ever. Hence many organizations appoint a Chief Information Officer (CIO) to manage their IS/IT from a strategic point of view (Chun and Mooney 2009; Hütter and Riedl 2017). However, as our fabricated opening vignette (Klotz et al. 2021) illustrates, hiring a full-time executive is not always feasible for organizations below a certain size. An alternative approach is needed to provide such organizations access to strategic IT management capabilities to resolve this issue.

Even though IS/IT has been on the agenda of organizations for decades, there is no literature on such alternative approaches, especially for small- to medium-sized enterprises (SMEs) in IS research. This is because traditional IS research is mainly concerned with large organizations, despite the fact that SMEs account for 90% of firms and employ 63% of the workforce in the world (SME User Guide 2016). While there is plenty of literature on the CIO and strategic IT management in large organizations, evidence suggests that it is challenging, if not impossible, to transfer IS theories and practices developed for large organizations to smaller ones (Cragg et al. 2013; Farhoomand and Hrycyk 1985; Premkumar 2003; Raymond 1985). SMEs are different from large organizations in several ways, e.g., concerning decision making, bureaucracy, standardization of processes, planning horizon, and dependence on external expertise (Premkumar 2003).

An increasing number of SMEs relies on IS/IT and proper IS/IT strategy to gain a competitive advantage (Drechsler and Weißschädel 2018). Additionally, even if IS/IT is not at the core of an organization's business, there is a growing risk of operational IS/IT failures and security breaches (Benaroch and Chernobai 2017; Haislip et al. 2021) and, hence, the need to invest in IT security measures (Heidt et al. 2019). The top management responsibility for information security often rests with the CIO. Therefore, as IS/IT becomes more important in SMEs, the necessity for strategic IT management and leadership grows as well (Cragg et al. 2010, 2013; Drechsler and Weißschädel 2018). Since most SMEs exhibit limited resources that do not justify a full-time IT manager or Chief Information Officer (CIO), IT functions in SMEs usually rely on external expertise (Cragg et al. 2013). As illustrated in our opening vignette, responsibility is often assigned to an internal employee with a different functional role and background. Additionally, most SMEs neither have the need nor the appeal for a full-time IT manager or CIO as they usually have a rather small-sized IT department.

To address this gap, a growing number of highly experienced individuals, calling themselves Virtual or Fractional CIO, are holding a CIO position at multiple SMEs, allocating a fraction of their time to each SME (Moise 2021; Pratt 2022). Contracting a Fractional CIO allows SMEs to access experienced IT leadership on a part-time basis despite their limited financial resources. For Fractional CIOs, on the other hand, this role provides variety and flexibility. While the Fractional CIO already exists in practice, there is, to the best of our knowledge, no research yet on such part-time IT executive roles. Therefore, we conduct the first study on the Fractional CIO in SMEs and focus on the following research questions:

- RQ1: How can the field of the Fractional CIO be conceptualized?
- RQ2: What are promising avenues for future research considering different theoretical lenses?

While answering these research questions based on an empirical study, this paper makes several contributions. First, we derive a definition for the Fractional CIO and delimit it from related roles. Second, we illustrate the characteristics of Fractional CIOs by contrasting them with employees and contractors. Third, we embed and compare the Fractional CIO with CIO roles research. Fourth, we detail different value propositions of Fractional CIOs and when organizations should hire them. Lastly, we develop a comprehensive research agenda that builds on existing literature and the novel findings from our study.

The paper is structured as follows: Following the introduction, we provide an overview of existing literature. After that, we detail our methodology and data collection and present our results. Before we conclude the paper and state the limitations, we outline a research agenda including potential future research questions.

2 Background

This paper conceptualizes the role of the Fractional CIO. Although there is no research on this role yet, we look at adjacent research fields in this section. We first analyze existing literature about strategic IT management and fractional management in SMEs. Second, we look at CIO roles research.

2.1 The role of strategic IS/IT and fractional management in SMEs

The influence of strategic IT management on overall IS/IT success in SMEs is subject to several studies. Variables that influence IS/IT success are top management support and involvement (Cragg 2002; Thong et al. 1996) and managerial IS/IT skills (Caldeira and Ward 2002). Further, Cragg et al. (2013) show a strong link between external IS/IT support and IS/IT success in SMEs. While SMEs with IT-enabled business models naturally must spend more on IT investments, topics like cyber security require all SMEs to shift their focus. However, with respect to cyber security, SMEs lag behind larger organizations in terms of budget planning,

workforce, and processes (Heidt et al. 2019). This underlines the need for a solution to manage IS/IT topics more strategically.

There is very little research on fractional management in SMEs, however. Elder published a series of articles about fractional management in the newspaper *Business in Savannah*. The idea of fractional management is to split the cost of ownership among multiple owners, so everyone has access to the expertise and experience, but at a fraction of the cost (Elder 2011a). The fractional manager works flexibly for one organization a few days per week or month (Elder 2011c). As fractional managers' compensation, in slight contrast to that of consultants, does not depend on follow-up work, they are motivated to address problems with a long-term perspective (Elder 2011b).

Some publications analyze related roles such as interim or virtual management. Bruns and Kabst (2005) define interim management as "the temporary transfer of external leadership personnel into an enterprise with the objective to perform selected managerial tasks." This role allows an organization to access specialist skills, expertise, and an outside-in perspective without making a long-term commitment (Inkson et al. 2001). Other researchers such as El-Sofany et al. (2014) analyze what skills are required to manage virtual teams. For instance, communication and trust-building are critical skills for virtual managers (Smith and Sinclair 2003). Both interim and virtual management are full-time commitments. However, most SMEs do not have the resources or need to hire a full-time manager, neither internal nor external. Above a certain organization's size, though, a fractional management role would not be sufficient to satisfy the organization's needs. However, the need for a full-time IT manager depends not only on the organization's size but also on its business model and industry. The definition of SMEs makes use of size parameters, like the number of employees and turnover, as distinguishing criteria between different categories of organizations (SME User Guide 2016). However, such common criteria are often not useful in distinguishing organizations and scoping studies (Anonymous Authors 2022). Hence, although the relevant organizations for fractional management are mostly SMEs following the definition,¹ the cut-off is not precisely the threshold between medium-sized and large enterprises. As a result, we stick to the term SMEs for reasons of simplicity, although "smaller" large enterprises might also hire a fractional manager.

2.2 The role of the CIO in organizations

IS research has been concerned with the role of the CIO in organizations for almost 40 years (Hütter and Riedl 2017; Kratzer et al. 2022; Rockart et al. 1982). As organizations are subject to constant change, so are the requirements of the CIO role. Therefore, a primary research stream of CIO research covers the evolving role of the CIO. In its early years, the CIO's role evolved from that of a technician, only responsible for running the IS/IT, to an executive, often directly reporting to the CEO and

¹ https://ec.europa.eu/growth/smes/sme-definition_en.

Table 1 CIO roles conceptualized by Hütter and Riedl (2017)

CIO role	Description of the CIO role
Technology provider	"The technology provider is an operation and technology-focused CIO whose primary function is to provide cost-effective IT solutions." (p. 8)
Strategic supporter	"The strategic supporter is a mediating CIO who interacts with managers outside the own IT domain in order to align IT with the business." (p. 8)
Business thinker	"The business thinker is a visionary CIO who educates the TMT members and key decision-makers about the potential of IT to transform business processes." (p. 8)
Innovation driver	"The innovation driver is a strategically orientated CIO who uses IT as an integral factor for organizational growth and innovation." (p. 8)
Integration advisor	"The integration advisor is a coordinating CIO who provides leadership in seeking integration opportunities and standardizing the IT infrastructure." (p. 8)
Relationship manager	"The relationship manager is a bridge-building CIO who communicates with the external environment in order to meet a distinct set of IT requirements." (p. 9)

requiring more and more business acumen (Applegate and Elam 1992; Benjamin et al. 1985; Grover et al. 1993; Ives and Olson 1981; Ross and Feeny 1999). The role requirements recently transitioned towards a business visionary, focusing on strategic matters, innovation, role effectiveness, and firm performance (Chun and Mooney 2009; Peppard 2010; Preston et al. 2008).

Peppard et al. (2011) argue that different CIO roles are required depending on an organization's information leadership capabilities and its need for IS/IT supporting competitive differentiation. Other studies find that even within one organization, a CIO comprises multiple roles depending on the organization's needs (Chun and Mooney 2009; Smaltz et al. 2006). Smaltz et al. (2006), for example, identify six key roles of a CIO and split them into supply-side roles, i.e., running the IT, and demand-side roles, i.e., enabling new business opportunities. Hütter and Riedl (2017) provide the most comprehensive and recent description of CIO roles by conceptualizing descriptions of CIO roles from existing literature (i.e., Chen and Wu 2011; Chun and Mooney 2009; Grover et al. 1993; Leidner and Mackay 2007; Li et al. 2012; Peppard et al. 2011; Preston et al. 2008; Ross and Feeny 1999; Smaltz et al. 2006; Weill and Woerner 2013). The six identified CIO roles are technology provider, strategic supporter, business thinker, innovation driver, integration advisor, and relationship manager. Table 1 shows a description of each role.

3 Methodology and data collection

As the Fractional CIO was not subject to any analyses yet, we conducted exploratory interviews. Utilizing interview data from multiple firms across various contexts instead of analyzing a single case allows deriving more general results with a stronger foundation (Eisenhardt 1989b; Yin 2013). Therefore, we make use of semi-structured interviews to conceptualize the Fractional CIO field. First, we developed a set of key questions for the interviews. Second, we approached and acquired

potential interview candidates. Third, we conducted and transcribed semi-structured interviews following Myers and Newman (2007). Fourth, we thoroughly coded and analyzed the interview data following Saldaña (2015). Fifth, we interpreted the results in a meaningful way. We now describe our research activities in each of those steps in greater detail.

As a first step, we developed an initial set of key questions. To ensure that all areas of interest are covered, we used our research questions as well as research and practice papers (e.g., Bruns and Kabst 2005; Elder 2011a, b; Hütter and Riedl 2017; Inkson et al. 2001) as input for our discussions. The first category of questions was about the interviewee's background and the setup of the role (e.g., time in role, employment setup, and number of simultaneous clients). The second category was about the organizations that employ a Fractional CIO (e.g., size of IT department, purpose of hiring a Fractional CIO, and how they continue after a Fractional CIO engagement). The third category of questions addressed how the role of the Fractional CIO is put into practice (e.g., collaborating with clients, working on-site, and balancing strategic and organizational perspective). We included questions about success factors, advantages and disadvantages, and the evolvement of the role in the fourth category.

Second, we acquired potential interview candidates. We reached out to some of them through personal contacts. However, we acquired most through LinkedIn, which considers itself the world's largest professional online social network. We conducted the LinkedIn search on October 8, 2020, and it resulted in a total of 1202 profiles from all over the world, using the search terms "Virtual CIO" (292), "vCIO" (320), "Part-time CIO" (295), and "Fractional CIO" (295). After excluding irrelevant or duplicate profiles, we contacted about 500 individuals. In case the individuals signaled interest, we provided more detailed information on our study and, in case they were willing to participate, scheduled an online meeting.

Third, we conducted semi-structured interviews following the guidelines proposed by Myers and Newman (2007). We used the key questions as conversation starter and structure for the interview. We iteratively refined the set of key questions during the interview process based on insights from the interviews. We stopped scheduling new meetings when we did not encounter any new insights anymore. Overall, we conducted 40 interviews in English by video conference, with an average length of 40 min per interview. We recorded and carefully transcribed all interviews.

Fourth, we coded and analyzed the interview transcripts following Saldaña (2015) and using MAXQDA 2020 (VERBI Software 2019). According to Saldaña (2015), coding allows for bundling and filtering similarly coded data that share specific characteristics into categories. The coding process itself was iterative, where the codes were evaluated and, if needed, refined, re-assigned, re-labeled, or dropped. From the more than 30 coding methods provided by Saldaña (2015), we used grammatical, elemental, and exploratory methods as they best fit the nature and goals of our study. The grammatical methods, i.e., attribute coding, magnitude coding, and sub-coding, allowed us to conduct nuanced qualitative data analysis in terms of descriptive statistics of the interviewees. We used provisional coding, an exploratory method, to derive and iteratively refine an initial set of codes based on the research questions and key questions from the interviews. Lastly, we used elemental methods,

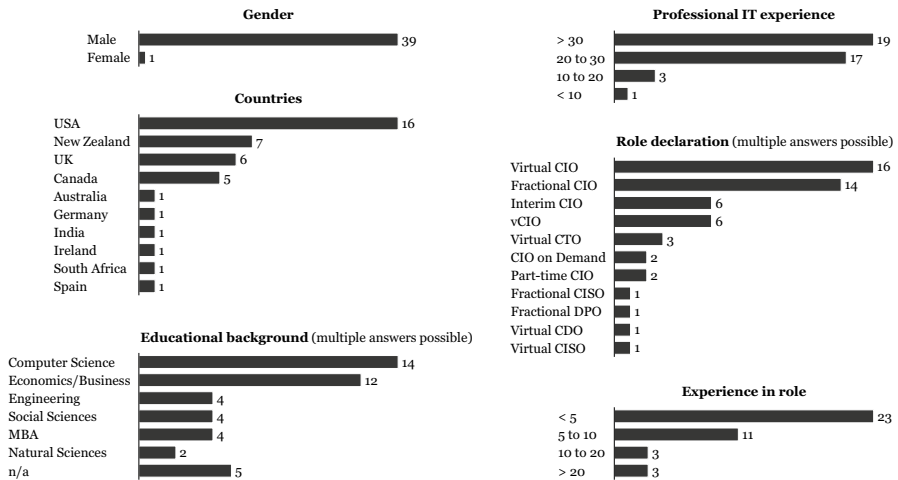


Fig. 1 Descriptive statistics of interviewee panel

i.e., descriptive coding and structural coding, to identify certain topics or answers to specific questions during the interview. The first and third authors conducted the coding. The first author initially conducted the whole coding process of interview transcripts as described above. The third author then reviewed all codes and, where discrepancies were discovered, they were solved in a discussion among the authors.

Fifth, based on the identified categories and codes, we derived concepts by gradually moving from the codes to theory, i.e., from real and particular to abstract and general.

4 Results

In this section, we conceptualize the field of the Fractional CIO. First, we provide descriptive statistics on the interview data. Second, we delimit the Fractional CIO from related roles and derive a definition. Third, we compare the Fractional CIO with full-time CIOs and consultants. Fourth, we compare the role of the Fractional CIO with CIO roles from literature. Fifth, we elaborate on different value propositions of Fractional CIOs.

4.1 Descriptive statistics of interview data

Figure 1 shows the descriptive statistics of the interview data. We interviewed 40 individuals (1 female, 39 male) from 10 different countries. The largest share of interviewees came from North America, with 16 from the U.S. and five from Canada. Most of the interviewees studied computer science (14) or economics/business (12). Other backgrounds include engineering, social and natural sciences, and Master of Business Administration (MBA) programs. Almost all interviewees have

profound IT experience. Nineteen of the interviewees have more than 30 years of professional IT experience, while only four have less than 20 years.

The available role declarations are combinations of a traditional C-level position, i.e., CIO, Chief Technology Officer (CTO), Chief Information Security Officer (CISO), Data Protection Officer (DPO), and Chief Digital Officer (CDO), with an adjective describing the type of the offering, i.e., “fractional,” “virtual” (or “v”), “part-time,” “on-demand.” Some of the interviewees have multiple role declarations, depending on the type of service they offer. While the professional IT experience tends to be greater than 20 years, most interviewees are relatively new in the fractional CIO role, with 23 less than five years and 11, five to 10 years. For more detailed information, please see Table 8 in the “Appendix”.

4.2 Definition and delimitation of the Fractional CIO

As the role of the Fractional CIO is relatively new, people in this role provide different value propositions, and there is no consistent naming (Fig. 1). The interviewees who are already more than 10 years in such a role did not know any other person offering such a service when they started doing it. This fact underlines the dispersed and heterogeneous evolvement of the role and its service model. It further explains the ambiguous role declarations, e.g., Virtual CIO, Fractional CIO, Part-time CIO, CIO on Demand, or vCIO.

While several of the interviewees use multiple role declarations, the majority calls themselves Fractional or Virtual CIO. However, most do not see any difference in the two terms, as two interviewees put it:

I don't think there's really any difference. – CIO#30

I've always personally used the term Fractional CIO, but I'm guessing they're probably the same thing. – CIO#39

Smith and Sinclair (2003) define a virtual manager as “someone who manages people, works at a separate geographical location from their team for at least some of the time, and communicates with their people other than by regular face-to-face contact, for example by e-mail or phone.” According to this definition, a CIO that is “virtual” could also be a full-time employee. To avoid ambiguity and to emphasize the part-time nature of the role, we decide on the term “Fractional CIO” to uniquely label the phenomenon.

By combining core elements of different definitions of a Fractional or Virtual CIO from websites of renowned Fractional CIO partnerships and our interviews, we systematically derived a definition for the Fractional CIO (Table 2).

We define a Fractional CIO as *a highly experienced and competent individual that acts in the capacity of a CIO, but only part-time, depending on the clients' needs. The Fractional CIO serves multiple clients at the same time and often has*

Table 2 Definitions of a Fractional CIO

Core elements for the definition	Illustrative quotes	References
A highly experienced and competent individual	CIO#21: "Organizations [...] get the benefits of a highly experienced and appropriately competent individual. But they've got that capability at a fraction of the cost that they would normally pay."	CIO#01, 02, 03, 04, 08, 09, 11, 12, 13, 14, 16, 20, 22, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 39, 40
Acts in the capacity of a CIO, incl. its authority and responsibility	CIO#25: "A virtual CIO is someone who is acting in the capacity of a chief information officer as in helping between the operations and the strategic side of getting the technology from the business done. A virtual CIO is someone who's just not there all the time." CIO#12: "The virtual CIO [...] has all the authority, has all the responsibility as a full-time CIO. It's simply a matter of the amount of time and effort."	CIO#01, 02, 03, 08, 13, 18, 26, 27, 28, 30, 34, 35, 36, 39, 40
Works part-time hours, depending on company's needs	Fractional CIO partnership ¹ : "Rather than executing a full-time schedule, as a 'traditional' CIO, a Fractional CIO works part-time hours per week or month, depending on your company's needs."	CIO#01, 02, 04, 06, 08, 10, 12, 13, 16, 17, 18, 19, 20, 25, 26, 27, 28, 30, 31, 32, 33, 35, 36, 39, 40
Serves multiple clients at the same time	CIO#02: "I have three different scenarios right at this very moment." CIO#11: "So far the maximum I got was three clients at a time." CIO#32: "I worked with like four or five companies at any given point in time. With varying capacities."	CIO#01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40

Table 2 (continued)

Core elements for the definition	Illustrative quotes	References
(Indirectly) Manages teams and suppliers	<p>Fractional CIO partnership²: “A [Fractional] Chief Information Officer (CIO) has the ultimate responsibility for tech, teams, and suppliers.”</p> <p>CIO#31: “Typically, nobody knows that I’m not a full-time employee. So yes, I have staff, and I always have full hiring and firing capabilities, the same as a real CIO would have.”</p> <p>CIO#17: “It tends to be a dotted line because they can’t report to an outside consultant directly. So, what happens is they’ll be directly reporting to, say, the CFO or COO, dotted line to me. But the reality is that I’m managing most of what they do. And it’s really just more the official reporting structure is to that internal person.”</p>	CIO#01, 04, 06, 07, 08, 09, 12, 13, 20, 21, 24, 25, 28, 33, 34, 35, 37, 39, 40

¹<https://www.crimsonstechpartners.com/fractional-cio/>

²<https://www.freemanclarke.co.uk/fractional-cio/>

Table 3 Roles that are not in the scope of this paper

Role title	Definition
Fractional/Virtual CTO, CISO, DPO, CDO, or CFO	Similar to the definition of “Fractional CIO” above, but with different functional expertise
Interim CIO (full-time)	Inkson et al. (2001): “An interim manager is a management professional, usually with a specific area of expertise, who contracts, often through an agency, to provide a client company with short-term cover, troubleshooting, in an area of expertise, or completion of a pre-defined project.” Bruns and Kabst (2005): “Interim-Management is the temporary transfer of external leadership personnel into an enterprise with the objective to perform selected managerial tasks. Interim-Managers will be equipped with the necessary competence and authority to give instructions for task performance.”
Managed service provider vCIO	Virtual CIOs are [...] a portfolio of IT services delivered by today’s MSPs for small businesses. Virtual CIO is a title—and a service—combining tasks managed and maintained by chief information officers, chief technology officers, and technology consultants. ¹

¹ <https://smallbiztrends.com/2015/04/virtual-cio.html>

*the authority and responsibility of a full-time CIO and (in-)directly manages each of his/her clients’ IT staff and suppliers.*²

This definition does not cover some of the roles we identified in our interviews, i.e., other fractional executive roles, interim CIOs, or vCIOs from a managed service provider (MSP) (Table 3). The Fractional CIO is not the only fractional or virtual executive role that exists in practice. Besides roles like Fractional CISO, DPO, or Virtual CDO that we found in our interviews, there are also fractional executive roles in other functional areas such as finance.³ While the day-to-day tasks of those roles are quite different, their fractional setup is similar. As including those roles would increase the complexity of our study without promising many additional insights, we exclude all other fractional and virtual executive roles from our analysis.

While an Interim CIO role is similar to that of a Fractional CIO, most Interim CIOs work full-time for one organization. Since the part-time aspect is a distinguishing factor of Fractional CIOs, we exclude full-time Interim CIO roles from our analysis. Lastly, we interviewed several individuals that hold a vCIO position at an MSP. An MSP delivers services, such as network, application, infrastructure, and security services. Additionally, several MSPs started to deliver vCIO services, i.e., helping their clients with budgeting, providing some strategic advice, or supporting as project manager. They are often concerned with rather tactical decisions and are often referred to as “better account managers” by other Fractional CIOs.

² We agreed on using the term *client*, although in many cases it is rather an employer/employee relationship between the SME and the Fractional CIO.

³ <https://www.preferredcfo.com/what-is-fractional-cfo/>.

So that's actually the reason why I do not like the term virtual CIO because that's the one that the MSPs use. And what they're doing, you're right, is different. And I don't think it's as valuable. – CIO#17

Totally terrible idea. It's absolutely the wrong thing to do. Because all you're doing really is becoming a glorified account manager for that MSP. You're at the behest of the MSP and not the client. [...] The full power of the offering can only be realized by the client if the Fractional CIO is independent. And I feel very strongly about that. – CIO#24

The quotes demonstrate the emotionality involved in this debate. However, the resentment stems not necessarily from the quality and scope of the offered vCIO services. Depending on the specific needs of the clients, the services of MSP vCIOs can also be valuable. Instead, Fractional CIOs seem to be dissatisfied because a similar terminology can imply a completely different value proposition. Hence, potential clients cannot easily distinguish between them. Based on wrong expectations, they might associate bad experiences with an MSP that provides vCIO services with the service model of an actual Fractional CIO.

I think it would be good to be able to come up with some solid and consistent vocabulary. Like I said at the start, a lot of people call themselves virtual CIO that are really not C-level type individuals. And calling them director-level manager, senior manager, is more appropriate, I think. I think it does a disservice to the rest of the executive staff as well as real CIOs if such people call themselves CIOs. – CIO#31

Since the scope of this study is to conceptualize the Fractional CIO, we exclude the MSP vCIOs and vCTOs from our analysis.

4.3 Fractional CIO versus full-time CIO or consultant

While a full-time CIO's role has different characteristics and incentives compared to a consultant's role, both roles have certain advantages for organizations. On the one hand, a full-time CIO usually stays long-term, is well integrated into the organization, and has only a limited orientation towards follow-up work. On the other hand, a consultant has a flexible arrangement with the organization and provides outside-in perspective and a high degree of experience from a variety of settings.

Table 4 shows this conflict in an indicative way. A Fractional CIO, located between the two roles, combines a full-time CIO's integrity and long-term view with the flexibility, experience, and outside-in perspective of a senior consultant.

A Fractional CIO is similar to a consultant in the sense that the arrangement is flexible, and both roles provide outside-in perspective and a high degree of experience from a variety of settings and from serving multiple clients at the same time (Elder 2011c):

It's flexible, they can dial it up, it's flexible they can dial it down. And they can make choices about longevity. So is it for six months, two years, or whatever. – CIO#21

Table 4 Indicative differentiation of a Fractional CIO from a full-time CIO or a senior consultant

Dimensions	Full-time CIO	Fractional CIO	Senior consultant
# of simultaneous engagements	One	Two to several	One to several
Duration of engagement	Long-term	Mid- to long-term	Short- to mid-term
Integration in organization	High	Medium to high	Low
Orientation towards follow-up work	Low	Low to medium	High
Flexibility of arrangement	Low	Medium to high	High
Degree of outside-in perspective	Low	Medium to high	High
Degree of experience from a variety of settings	Low	Medium to high	High

If you do something as an external, everyone says “OK, the external made the decision and then it’s good.” If you do it as an internal, then you are more involved in the overall political structure. That’s why organizations buy externals. Because they have experience, they bring knowledge, they don’t have blinders on from 15–20 years as employees in the company. For outsiders, it’s no problem to tear down old things, throw them away and make them new.⁴ – CIO#40

On the other hand, consulting engagements are often project-based and, hence, rather short- to mid-term, while Fractional CIOs are often a long-term solution.

The shortest time I’ve been with a client is probably a couple of years and the longest at the moment is right since the first client is still my client, it’s nine years. – CIO#08

Further, the Fractional CIO is usually better integrated into the line organization, and its compensation does not depend on the need to create follow-up work (Elder 2011b):

In a couple of [my engagements] it’s very formalized, like the director of IT reports up to me and the executive committee has oversight onto me. – CIO#39

CIO#12 is very clear about the fact that he is not a consultant but acts in the capacity of a CIO for his clients:

I decided very early on that I did not want to be a consultant. I did not want people to call me a consultant. I’m an employee and I’m on your team. I’m just not full time. So, I’ve got a collection of business cards and on those business cards is my name with the client’s logo. So, I am the CIO of that client and that was an important part of those agreements as well is that I am an employee, I work for you, I’m on your executive team. I’m not a consultant, I’m not an outsider. – CIO#12

⁴ Translated from German.

As the Fractional CIO acts in the capacity of a CIO, the role is only reasonable in case there is no other IT executive present. Quite often, the responsibility for IS/IT within an SME resides with an employee with a different functional background, e.g., the CFO. However, that would not count as an existing IT executive. For an SME with an existing IT department, including an IT executive, a Fractional CIO becomes redundant as there is already leadership present. Therefore, we exclude roles like traditional IT consulting or mentoring and coaching of a full-time CIO from our analysis. In the case of interviewees providing a combination of different services, we only take the insights from their Fractional CIO roles into account:

I've currently got about five clients in different capacities. Ranging from a couple of Fractional CIO roles through to CIO advisory services, where I work for organizations that have a permanent IT guy, like a CIO, and I'm their advisor to give them an external edge and act as a critical friend. And I do some mentoring services as well. So, three different kinds of services in my portfolio. – CIO#22

4.4 Comparison to existing CIO roles research

There are numerous studies on CIO roles available (e.g., Chun and Mooney 2009; Smaltz et al. 2006; Weill and Woerner 2013), with Hütter and Riedl (2017) conceptualizing the previous literature on CIO roles in IS research. Comparing the findings from our interviews with the CIO roles identified in these studies confirms that the responsibilities of the Fractional CIO are very similar to that of a traditional CIO (Table 5). Moreover, we were not able to identify any additional roles. This is not surprising since our definition states that the Fractional CIO “acts in the capacity of a CIO,” meaning that the Fractional CIO follows the roles and responsibilities of a traditional CIO to the degree the client organization requires.

To differentiate a Fractional CIO from a traditional CIO, it is not enough to merely look at the CIO's roles and responsibilities. The key differentiator between the two roles, fractional and traditional, is the external setup and the differing needs of SMEs that enable additional value propositions for Fractional CIOs. Hence, while Fractional CIOs generally follow the roles proposed by Hütter and Riedl (2017), there is a second dimension concerning the engagement type and client situation.

4.5 Value propositions of Fractional CIOs

4.5.1 Overview

As discussed above, a Fractional CIO follows similar roles and responsibilities as a full-time CIO. However, the situations and motivations of SMEs that could profit from a Fractional CIO are often different from larger corporations. SMEs often do not have the need, resources, or appeal to employ a full-time CIO. Nevertheless, also SMEs need IT leaders and experience. With a Fractional CIO, SMEs get the IT leadership and expertise they need while staying flexible and not having to employ a full-time CIO.

Table 5 Related CIO roles from literature

CIO roles from Hütter and Riedl (2017)	Exemplary quotations from Fractional CIOs
<p>Technology provider</p> <p>“The technology provider is an operation and technology-focused CIO whose primary function is to provide cost-effective IT solutions.” (p. 8)</p>	<p>CIO#17: “It’s my responsibility to make sure that service levels are being met. The problems are addressed, and I follow up and follow through to make sure all those things happen. I may not be hands-on fixing every problem, but I’m talking to people who are, and I’m making sure that the needs of the organization are met as best as possible.”</p> <p>CIO#26: “So the first thing I did was implement a branch network so they can control all of their PCs and everything would be centralized. Then I started moving into the cloud. I saw no reason to keep them internally in their own servers.”</p>
<p>Strategic supporter</p> <p>“The strategic supporter is a mediating CIO who interacts with managers outside the own IT domain in order to align IT with the business.” (p. 8)</p>	<p>CIO#03: “Learning about the business by discovery. So, workshops with different types of people in the organization to get a good map of the business.”</p> <p>CIO#10: “I think number one is the ability to build effective working relationships with the non-IT executives. With the executive team, so that you can understand their needs, you can translate those to the IT team and start to build effective working relationships across the IT team.”</p> <p>CIO#35: “Redo the IT strategy and educate the senior executives in the company.”</p>
<p>Business thinker</p> <p>“The business thinker is a visionary CIO who educates the TMT members and key decision-makers about the potential of IT to transform business processes.” (p. 8)</p>	<p>CIO#03: “The art of the possible. Those are things that I did as a CIO as well, where you’re really educating people over what’s possible. Like there’s some new technology that you believe is going to be helpful for the business. People don’t know what they don’t know. And so, they can’t have a constructive conversation about change until they know something about what you’re talking about right. So, lots of education sessions.”</p> <p>CIO#25: “The smaller companies, let’s call it less than five million dollars annually, are so busy with just the tactical keeping the lights on, keeping the business running. They’re not really thinking of what their future is. So more or less, it becomes a conversation with them about what things they need to consider and worry about as they grow bigger and to be more strategic. As we get larger, the responsibilities get more and more.”</p>

Table 5 (continued)

CIO roles from Hütter and Riedl (2017)	Exemplary quotations from Fractional CIOs
<p>Innovation driver</p> <p>“The innovation driver is a strategically orientated CIO who uses IT as an integral factor for organizational growth and innovation.” (p. 8)</p>	<p>CIO#06: “[...] using some new process so that the customer experience improves. So, bringing in the competitive advantage to an organization is also a major factor.”</p> <p>CIO#16: “That’s really where I see a true [Fractional CIO]. It’s one that can recognize those challenges, look at things that provide a competitive advantage that utilize technologies, utilize those digital type services, but they convey that in business language.”</p> <p>CIO#34: “I help the company with innovation and help them provide the technology environment to do the product in the business. [...] the Innovation Officer CIO looks at the entire pie and sees where they can contribute, whether that’s in technology or legal or HR or marketing or sales or whatever. So, I pay attention to all of it to see where technology can have an impact.”</p>
<p>Integration advisor</p> <p>“The integration advisor is a coordinating CIO who provides leadership in seeking integration opportunities and standardizing the IT infrastructure.” (p. 8)</p>	<p>CIO#04: “Making sure that on the technical side they have guidance that is speaking the same language. So, understanding the technical processes of software development, whether it’s methodology or kind of just infrastructure and programming language and kind of architecture of what is being deployed. So, understanding the technical side and the technical people.”</p> <p>CIO#27: “So there may be usually smaller companies that have got a head of IT as the technical person, but they want somebody who can come in and help that person develop the strategy and the business strategy side of things to make use of the data. So that’s really what the role was aimed at.”</p>
<p>Relationship manager</p> <p>“The relationship manager is a bridge-building CIO who communicates with the external environment in order to meet a distinct set of IT requirements.” (p. 9)</p>	<p>CIO#04: “So part of what I’m doing is helping to evaluate what’s going on and decide should these systems still be outsourced. Kind of what is the best way forward.”</p> <p>CIO#16: “The third one [...] would be the supplier/vendor relationship. I’m quite often called because of a lack of perceived performance, a lack of trust, a lack of relationship. So, I end up auditing and using those sorts of environments, and quite often, that is the case. The vendor has become lackluster, is basically already turned off, and is just milking the cows.”</p>

During our interviews, we identified a variety of reasons for SMEs to hire a Fractional CIO. We found that Fractional CIOs specifically tailor their value proposition to their clients’ needs. Synthesizing those value propositions, we identified four different engagement types that Fractional CIOs pursue (Table 6). The engagement types line up on a continuum from strategic and demand-side focused, i.e.,

Table 6 Different engagement types and their value propositions

Engagement type	Description	Typical client situation	Value proposition
Strategic IT management	Fractional CIO with strong communication skills and focus on strategic matters and enabling the business through IT	Missing connection between IT and the business/ board Need for strategic IT management Usually several employees in IT	Establishing good relationship and collaboration between IT and the business/ board Working on strategic IT direction
Restructuring	Fractional CIO with restructuring experience and focus on IT audit and turnaround	Severe problems in IT (regularly over budget, heavily underinvested) Usually several employees in IT	Solving urgent problems and restructuring the IT organization Building up IT capabilities Transitioning into steady-state and handover, e.g., by hiring of a new CIO
Rapid scaling	Fractional CIO with focus on building up an entire IT department	Start-up with no IT yet, expecting rapid growth Usually no IT department in the beginning	Setting up proper structure and architecture Building an IT department and providing IT Leadership Hiring a full-time CIO to take over
Hands-on support	Fractional CIO with technical skills and operational focus	No in-house IT (everything outsourced) Often dependent on MSPs/ vendors	Staying long-term Acting as “protection” between client and vendors Helping to run IT smoothly (“Keeping the lights on”)

enabling new business models, to operational and supply-side focused, i.e., “keeping the lights on.” While the type *strategic IT management* focuses mostly on enabling the business, the engagement type *hands-on support* is an operational position. In between these two types are the types *restructuring* and *rapid scaling*. The engagement types offer value in different client situations, and each one has its own value proposition. The kind of engagement that is most suitable depends on the specific needs of the organization.

In the following sections, we present each engagement type in more detail.

4.5.2 Strategic IT management

The first engagement type is *strategic IT management*. A typical client situation often described in the interviews is an SME with a small IT department, led by an IT manager. However, with the IT manager being rather technical, there is a lack of strategic IT management as well as a missing connection between business and IT:

The typical scenario is that there is a, what I guess you would call a kind of functional head, or head of IT, or head of digital, or head of systems, or something like that. A manager whose job it is to coordinate, manage the service, and perhaps manage the supply. But their connection with the executives is often quite limited. Their connection with the board is often quite limited. Their understanding or interest in, frankly, the strategic direction of the business or the business issues is often quite limited, and, unfortunately, the business leaders are often not very interested in them. So, there is just a big gap.
– CIO#29

The company will have in place some senior IT person, whether it's a director level or nominal vice president level or a senior manager level, someone to handle the day-to-day stuff, but really doesn't have the strategic thinking abilities to help move the company forward. So again, the [Fractional] CIO comes in and helps to bridge that gap between the executives and the on-site leadership. – CIO#31

Having built the bridge between business and IT, the Fractional CIO can work on the strategic IT direction of the organization jointly with the business. Sometimes, organizations neglect the connection between business and IT for too long:

When I landed in that organization, the relationship between the business, the CEO of that division [...] and his team and IT was broken. It was confrontational in the sense that the conversations that were happening were very stiff, very unstructured. [...] The discussions around budgets have broken down to the point where it was literally a stand-up shouting match between the two parts of the [organization], IT and the business, which is very undesirable. I can think of other phrases, but it was bad. My role, therefore, was to start to build bridges. – CIO#21

The goal in such cases is to establish mutual trust and good collaboration between business and IT. To succeed, the Fractional CIO needs strong communication skills

and the ability to build trust and relationships with the staff. Once trust is established, the Fractional CIO can focus on strategic IT management.

4.5.3 Restructuring

The second engagement type, *restructuring*, is beneficial for clients that already have an IT department in place that exhibits severe problems, like not meeting goals, being consistently over budget, or having a heavily underinvested IT department:

And so, I would get hired because their technology was a mess. Things weren't working right. Their systems were broken. They needed to put in new systems, and they didn't have anybody internally. And often these companies what they had prior was somebody who started out just being their IT person who fixed things and grew in the role and basically didn't have the skill set to take them to the next level. – CIO#36

They had a full-time CIO, but they had a mess. Does that make any sense? Like one of the things we did was in replacing the CIO. We were coming in to troubleshoot the fact that they couldn't meet the goals and were always over budget. Nothing ever got done. And so, it was much more of a, you know, the CFO comes in he goes "something is strategically broken with this function, and I need to correct it. Can you help me?" – CIO#07

In restructuring engagements, the Fractional CIO frequently has the power to hire and fire people:

I can think of now four different occasions where I've come in and within the first three months multiple people lose their jobs. Because it just wasn't the right ship. It wasn't working. – CIO#13

Often, the goal is to solve urgent problems, restructure the IT organization, build capabilities, and help to hire a new CIO or head of IT. Therefore, the duration of this engagement is often short:

We did the function for a year and a half while we revamped the entire team. I mean, we revamped the IT Department moved people in and out of spaces, re-organized everything, then helped them select a new CIO. And now we're helping make sure he's going to be successful, and we'll slowly ride off into the sunset as he begins to get his legs underneath him for lack of a better term. – CIO#07

To conduct a successful restructuring engagement, Fractional CIOs need to have restructuring experience and a focus on IT audit and turnaround. These skills help to assess and deal fast with the given situation.

4.5.4 Rapid scaling

In case a company is rapidly growing, there is also a need for IS/IT to support the growth. Therefore, some Fractional CIOs engage in a type which we label *rapid*

scaling. To be able to move forward quickly, frequently, the Fractional CIO has full authority over the IT department, including the power to hire and fire people:

They're struggling because they're ready to grow, but they can't grow because of all the baggage, and they need someone more experienced to kind of get them over that bump. And that happens fairly often, that the company will pull me in after they've started growing. In many cases, I have team meetings with them. In most cases, I hire [...] IT people to fill those roles. Now again, these are small companies, so it's not like big huge IT teams. But I've built a team of 20 or 30 or 40 in a couple of cases, but usually, it's smaller than that, five or six or 10 maybe. And so, because I hire them, I have the power to fire them. That's heavy-handed. I'm managing them. They expect to take instructions from me. – CIO#12

A small organization that is on a growth curve and needs to get to the next level, has very little IT resources, is generally underspent with regards to any IT security, but they know they need to support the organization as it grows. – CIO#17

The final goal in such scenarios is often to support in hiring a full-time CIO or in coaching a junior person from inside the organization into the role:

They'll get big enough, they'll need more and more time from their CIO, and they'll either promote someone internally to replace me, or they'll hire someone because they're ready to hire a full-time person. That's the normal pattern. – CIO#12

Eventually, they get big enough where I actually sometimes help them with this decision of like "OK. Now you need a full-time IT leader, like a director whatever." They try to hire me. I say no. Then I help them find somebody that we put into that role. – CIO#32

4.5.5 Hands-on support

The fourth engagement type, *hands-on support*, is for companies that do not have a comprehensive IT department (or even no IT department at all) but take advantage of vendor or cloud services. Although there is no in-house IT or retained IT organization, someone needs to negotiate contracts with MSPs or vendors, select cloud services and ensure that quality and service-level are met:

I find that a lot of clients need a stepping stone between their own business and the vendor. Purely because the vendor may be working from their own perspective, and they are looking at revenues and licensing and that extra service day and so on. – CIO#05

The IT departments are pretty small. In most cases they don't have in-house IT, they work with IT vendors, MSPs that kind of thing, remote helpdesk. – CIO#17

If there is no IT expertise available in-house, someone representing the client's interest in negotiations with MSPs or vendors is beneficial to get good quality at

reasonable costs. About 1 day per week is often enough for a Fractional CIO to add value in such a scenario. Some Fractional CIOs reported on companies that are not growing at all but want to make sure that everything in IT is running smoothly:

I've got another where actually they're not growing. They're a pretty stable organization. And they are just kind of steady as they go forward. They're never going to get any bigger. – CIO#10

There are the organizations that are small, are probably going to stay small, but they are either required to or just feel it's important to take IT very seriously. And they want to make sure they have good strategic advice in order to do that. They don't have anyone in-house that's technical, and they are afraid that they're just going to do it wrong. – CIO#17

To succeed in this role, the Fractional CIO needs to have technical skills and operational focus. As one Fractional CIO stated, the smaller the company, the more tangible actions they require:

The smaller companies, so far in my test that I'm talking about, don't want to have a PowerPoint plan. [...] They want to have a quick roadmap with an actual implementation that will save time [...]. I would say the lower you go, the more tangible actions they want to see for their money. [...] They're looking for somebody who can help them to kickstart certain things that they have in mind. They think they know where to go. They don't know how to do it. So that's a big difference. – CIO#11

5 The Fractional CIO: a research agenda

In this section, we present a research agenda for the Fractional CIO research field. First, we provide an overview of the developed research agenda including identified research themes and indicative potential research questions. Second, for each research theme, we elaborate in more detail on how we developed the research questions through existing theories and our empirical results.

5.1 Overview

This is the first paper to conceptualize the field of the Fractional CIO. We outline a research agenda to extend our findings and guide future research on this topic. We structure the research agenda using four research themes, two resulting from the interviews with Fractional CIOs and two resulting from existing CIO research (Table 7).

First, we make use of the 40 interviews with Fractional CIOs to derive two research themes. We developed the definition for Fractional CIOs using core elements discovered through the interviews (Table 2). The defining difference to a “normal” CIO is that a Fractional CIO works part-time hours, depending on its clients' needs, and serves multiple clients at the same time. Since such arrangements have not been studied in research yet, we translate it into the research theme *external*

Table 7 Potential future research questions in the Fractional CIO field

Research theme	Indicative potential research questions
External and part-time setup	<p>When to employ a Fractional CIO, and for how long? What are the advantages and disadvantages of the role?</p> <p>How to deal with potential conflicts of interest (e.g., serving competitors)?</p> <p>To what degree should a Fractional CIO be liable and held accountable?</p> <p>How to limit the risk of dependence on external labor?</p> <p>How to manage the transition to a full-time CIO or between Fractional CIOs?</p> <p>How to transfer knowledge and capabilities into the organization?</p>
Level of integration and control	<p>To what degree should a Fractional CIO be integrated into an organization (e.g., regarding the leadership team or sensitive topics)?</p> <p>What level of power can/should the Fractional CIO be granted (e.g., certain budget, power to hire and fire staff)?</p> <p>How to monitor and control the Fractional CIO?</p> <p>What are optimal hiring options (internally employed vs. externally contracted) for Fractional CIOs?</p>
Fractional CIO role effectiveness	<p>What effect do educational and professional background, skills and traits, knowledge, reporting lines, and relationships with TMT members have on the effectiveness of a Fractional CIO?</p> <p>What are further factors that influence the effectiveness of Fractional CIOs?</p> <p>How could effective collaboration models between Fractional CIO and TMT as well as Fractional CIO and IT employees look like?</p> <p>What are the critical success factors and challenges of the Fractional CIO?</p>
Evolution of the Fractional CIO role	<p>What are the benefits of forming Fractional CIO partnerships?</p> <p>How could an extension of the Fractional CIO from self-standing to team look like, and what would be the value?</p> <p>What impact do different types of organizations or regional differences have on adopting the Fractional CIO role?</p> <p>What other Fractional executive roles could add value to organizations?</p> <p>To what extent does the Fractional CIO's introduction require revisiting and adjusting established IS/IT management theories?</p>

and *part-time setup*. The differentiator to other contractors is that the Fractional CIO, while working in an external and part-time setup, acts in the capacity of a CIO and (in-)directly manages teams and suppliers. Since such a deep integration of an external employee into the line organization is new, we label that research theme *level of integration and control*.

Second, the Fractional CIO is closely related to the traditional CIO and, therefore, to existing CIO research. To ensure broad and consistent coverage of research themes, we also consider two of the most prominent research streams in CIO research, *CIO role effectiveness* and *evolution of the CIO role*, and apply them to

the Fractional CIO. The research theme *evolution of the CIO role* was one of the first topics in CIO research and is still relevant (Benjamin et al. 1985; Rockart et al. 1982; Ross and Feeny 1999; Weill and Woerner 2013). On the other hand, *CIO role effectiveness* started around the turn of the millennium, when organizations began taking a closer look at the pay-off of investments in IS/IT (Hütter and Riedl 2017; Peppard 2010; Smaltz et al. 2006). The research theme comprises several aspects of CIO research, including CIO characteristics, position, and relationships.

In the following sections, we elaborate on each research theme in more detail.

5.2 External and part-time setup

First, we have a look at the external and part-time setup research theme. While the Fractional CIO has the potential to benefit many SMEs and individuals with CIO experience, only few SMEs have taken advantage of it. This is partly because the role and its benefits are largely unknown and not very well analyzed yet. Transaction cost theory is about whether a transaction is more efficiently performed by an organization itself or by an autonomous contractor (Williamson 1985). The rationale is that if transaction costs are higher if the transaction is completed within the organization, the transaction would be outsourced. Following this rationale, we propose to study when and for how long to employ a Fractional CIO. Additionally, one should analyze the advantages and disadvantages of such an engagement for both the organization and the Fractional CIO. Future research should also address how to deal with a potential conflict of interest and to what degree a Fractional CIO should be liable or held accountable in case of mistakes. Moreover, compared to IT consulting, which is rather project-based, Fractional CIOs are contracted for rather longer-term engagements lasting several years on average. Hence, Fractional CIOs do not need to acquire new projects or clients constantly. As this would result in a more competitive price for clients, it could lower the transaction costs for clients. However, there is still the question of how to minimize the risk of dependence on external labor and whether Fractional CIOs will make themselves redundant.

As Fractional CIOs are externally contracted, they are probably more often transitioning than full-time CIOs. Therefore, the question is how to manage such transitions best and transfer knowledge and capabilities into the organization. The knowledge-based theory considers an organization's knowledge as its most vital resource to drive its performance and competitive advantage (Conner 1991). The Socialization-Externalization-Combination-Internalization (SECI) model introduced by Nonaka and Takeuchi (1995) models the creation of such knowledge through the interplay of explicit (formally record) and tacit (known, but not formally recorded) knowledge. Knowledge management is strategically important for SMEs (Bandera et al. 2017; Pillania 2008). According to our results, Fractional CIOs are often hired for knowledge transfer, i.e., to build capabilities, manage and mentor staff, and coach a junior person into the role of an IT executive to take over. This process of hiring a Fractional CIO follows the steps of the SECI model. First, a Fractional CIO with a high level of tacit knowledge (internalization) is engaged. The Fractional CIO then shares knowledge with the staff through interaction and collaboration (socialization).

The staff documents and articulates it (externalization) and eventually integrates and combines the newly acquired knowledge (combination). This knowledge transfer is especially relevant for organizations with an existing IT department.

5.3 Level of integration and control

The second research theme revolves around the level of integration and control that should be granted to a Fractional CIO. This issue is related to agency theory. Agency theory is concerned with the conflicts that arise in an agency relationship, in which one party, the principal, contracts another party, the agent, to perform work (Eisenhardt 1989a; Jensen and Meckling 1976; Ross 1973). There are two main problems with which this theory is concerned. The first problem is agency costs that arise due to conflicting interests and asymmetric information, i.e., when the two parties exhibit conflicting desires or goals. The monitoring of the agent through the principal would inflict high efforts. The second problem is concerned with differing attitudes towards risk and a resulting differing scope of action between the two parties.

Looking at the Fractional CIO for SMEs through the lens of the agency theory, there are several advantages from an SME's point of view on contracting a Fractional CIO compared to an IT consultant. As the Fractional CIO acts as the actual CIO and is usually contracted longer-term, the role is much more aligned with the organization's goals. Further, the integration into the line organization enables much easier control over the agent. However, the question is to what degree a Fractional CIO should be integrated and how much power should be granted to this role to be successful. Further, since the characteristics of the Fractional CIO are more aligned with that of an employee compared to an IT consultant, the Fractional CIO's attitude towards risk is much more aligned with the risk preferences of the organization. Nevertheless, we propose to study how to best control and monitor a Fractional CIO in more detail. Lastly, the ideal type of employment contract, i.e., employee vs. contractor, considering legal restrictions as well as incentive structures should be analyzed.

5.4 Fractional CIO role effectiveness

CIO effectiveness is a well-known topic in CIO research. While the tasks and responsibilities of a Fractional CIO coincide with that of a traditional CIO, the setup of being a contractor bears many challenges. Identifying these challenges and managing them well could significantly influence the effectiveness of the Fractional CIO. Therefore, we propose to investigate the effect of educational and professional background, skills and traits, knowledge, reporting lines, and relationships with TMT members on the effectiveness of a Fractional CIO as well as further factors that influence it.

Additionally, effective collaboration between the CIO and the TMT, and especially the CEO, is driven by communication (Johnson and Lederer 2007), mutual understanding (Johnson and Lederer 2010), trust (Arnitz et al. 2017), and shared mental models (Preston 2004). Building these connections with the TMT and CEO

is even more challenging with the Fractional CIO's external setup. Similarly, the collaboration between the Fractional CIO and the IT team is complicated by the external and part-time setup. However, motivating and leading the client's employees is crucial to deliver on expectations and facilitate change. Therefore, we propose to analyze how effective collaboration models between Fractional CIO and TMT as well as Fractional CIO and IT employees could look.

Further, we propose to study the role of critical success factors and challenges of Fractional CIOs. According to Grunert and Ellegaard (1993), critical success factors are "major skills or resources required to be successful in a given market." A more profound understanding of the critical success factors would help to focus on the few key areas where good results are vital to be successful (Bullen and Rockart 1981; Rockart 1979).

5.5 Evolvement of the Fractional CIO role

The last research theme is about the evolvement of the Fractional CIO role. It includes how Fractional CIOs could organize themselves, e.g., by forming partnerships or working together with a team as well as what different services and functional areas could be serviced. Further, it discusses the impact of Fractional CIO research on established IS/IT management theories.

While most Fractional CIOs are self-employed and without any partners or employees, some are already organized in partnerships, e.g., Freeman Clarke⁵ in the UK or Crimson Technology Partners⁶ in the US. Such partnerships can offer many advantages for Fractional CIOs as well as their clients. Some of the benefits are having an expert network to reach out to, getting a replacement if someone gets sick, and having a broader network and some administration to help with the acquisition process. As time evolves, we expect more partnerships to form. Therefore, we suggest analyzing the advantages of Fractional CIO partnerships in future research.

Another idea for the future evolvement of the role could be to expand the service of a Fractional CIO from self-standing to team. This means that an organization would not only hire a Fractional CIO but an entire team. The team could either consist of people that support the Fractional CIO or that are on the same level providing additional expertise for specific functions—for example, a Fractional CIO together with an IT security expert. Depending on the type of the organization, there could then be different configurations of Fractional CIOs. Some of the individuals we spoke to are already considering one of those approaches. Hence, we propose to study the extension of the self-standing Fractional CIO to the Fractional CIO including a team.

Further, we propose to study the impact of different regional aspects or organization types on the adoption of the Fractional CIO role. Our data indicates that the adoption of the Fractional CIO role varies between regions. While we found a lot of

⁵ <https://www.freemanclarke.co.uk/fractional-cio/>.

⁶ <https://www.crimsontechpartners.com/fractional-cio/>.

interview partners in countries such as the US, Canada, or the UK, in other countries such as Germany or France, we only found very few. Additionally, several individuals reported that they had been Fractional CIOs for non-profit organizations. Therefore, the differences in organization types are another potential future research field.

During the interviews, we talked to several individuals who offer a Fractional CIO role and fractional executive roles with other specializations, like CDO, CISO, or DPO. In an environment where digitization, information security, and data protection are on the agenda for most organizations, the potential for such fractional roles, especially for SMEs, is considerable. Further, fractional roles in non-IT functions, e.g., finance, are also already available in practice,⁷ but there is also a lack of research on these roles. Therefore, we suggest conducting further research on fractional executive roles in general as well as for specific functions and specializations.

Lastly, Alvesson and Sandberg (2011) state challenging assumptions of existing theories instead of just spotting gaps is likely to lead to more influential theories. Since IS research mainly focuses on large organizations, many IS/IT management theories implicitly assume the existence of a full-time CIO. As the Fractional CIO evolves and gets more widely adopted, there is a need to revisit established theories and approaches in IS/IT management sub-disciplines, e.g., alignment or governance, and evaluate whether and how they need to be modified in case of a Fractional CIO.

6 Conclusion

Sarah, the new Fractional CIO of a small but growing healthcare company, now manages the internal IT department. Instead of working at the SME full-time, she supports them for only 2 days a week, and resultingly charges much less than a full-time CIO would have cost. Leveraging her experience, she helps to create an IT strategy that enables the business and supports growth instead of slowing everything down. The mid-term goal is to build capabilities internally and step-by-step coach an employee from the IT department into the role of the IT executive. As a result, Oliver, the CFO of the company and former involuntary IT manager, can finally focus solely on his actual responsibilities. The closing vignette (Klotz et al. 2021) illustrates that the role of the Fractional CIO offers a novel approach to tackle many of the challenges that SMEs nowadays face. It provides access to highly experienced and seasoned IT executives at a fraction of the costs. The role further combines the advantages of a full-time employee (i.e., being integrated into internal structures and having a vested interest in the organization's success) with that of a consultant (i.e., bringing outside-in perspective and flexibility). This combination of characteristics from established roles poses the question of whether the SME is the Fractional CIO's client or his or her employer. The fact that we reach the limits of the current vocabulary to describe this relationship underlines the novelty of the role and the need for research such as ours. For an

⁷ <https://www.preferredcfo.com/what-is-fractional-cfo/>; <https://www.afractionalcfo.com/>.

SME to differentiate itself from its competitors, it is probably better to have a Fractional CIO for 1 to 3 days a week instead of having someone in charge who lacks the experience and strategic vision.

While the role already exists in practice, it has not found attention in research yet. This study, therefore, can make several contributions to research. First, this is the first paper to conceptualize the role of the Fractional CIO (compare RQ1). We derive a definition for the Fractional CIO role based on interviews with 40 individuals occupying such a position and embed and compare the Fractional CIO role with existing CIO roles research. Evaluating the interview data, we derive four engagement types that provide value for SMEs in different situations. Second, we develop a research agenda and detail potential future research questions along four research themes to guide researchers interested in this field (compare RQ2).

Our study also provides contributions to practice. It provides a clear definition of the Fractional CIO role and distinguishes it from other roles. Our study can also help promote the Fractional CIO role among potential Fractional CIOs as well as organizations that have similar challenges, as illustrated in our opening and closing vignette. Most of the interviewees had not heard of the Fractional CIO role before they started offering their services. We assume that this is the same for organizations that employ a Fractional CIO. Therefore, raising awareness of the Fractional CIO role is the first step to broader adoption. Our study further shows that Fractional CIO services are versatile, i.e., organizations with different sizes, challenges, and maturity levels can profit from it. Lastly, as the Fractional CIO role is relatively new, there are diverse possibilities for evolution. The results of this study can serve as guidance for individuals in a Fractional CIO role to tailor their service offerings and extend their service model.

Our study also has several limitations. First, we did not account for regional differences in selecting interview candidates and evaluating the results. As the role of the Fractional CIO is new, the pool of potential interview candidates is small. As the role gets more widely accepted, future research should aim at accounting for these differences. Second, when collecting our interview data, we only included Fractional CIOs in our sample. As those individuals are interested in emphasizing the value of their work, their answers might be biased. To obtain a more neutral perspective, we suggest interviewing decision-makers from SMEs that employ Fractional CIOs. Third, we conducted an explorative qualitative study by interviewing 40 individuals. While this offers a reasonably broad perspective on the topic, selected in-depth case studies on a few cases would be valuable to substantiate and extend our findings. Further quantitative studies could also enrich and strengthen our insights.

Appendix

See Table 8.

Table 8 Overview of interviewees

Interviewee	Gender	Professional IT experience (in years)	Experience in role (in years)	Country
CIO#01	Male	> 30	< 5	USA
CIO#02	Female	> 30	10 to 20	New Zealand
CIO#03	Male	> 30	< 5	Canada
CIO#04	Male	20 to 30	< 5	South Africa
CIO#05	Male	10 to 20	< 5	Ireland
CIO#06	Male	> 30	5 to 10	India
CIO#07	Male	20 to 30	< 5	USA
CIO#08	Male	> 30	5 to 10	New Zealand
CIO#09	Male	20 to 30	< 5	New Zealand
CIO#10	Male	> 30	< 5	New Zealand
CIO#11	Male	20 to 30	< 5	Canada
CIO#12	Male	> 30	> 20	USA
CIO#13	Male	> 30	> 20	USA
CIO#14	Male	20 to 30	> 20	Canada
CIO#15	Male	< 10	< 5	USA
CIO#16	Male	10 to 20	5 to 10	New Zealand
CIO#17	Male	> 30	< 5	USA
CIO#18	Male	> 30	< 5	New Zealand
CIO#19	Male	20 to 30	< 5	Australia
CIO#20	Male	20 to 30	< 5	New Zealand
CIO#21	Male	> 30	< 5	UK
CIO#22	Male	> 30	< 5	UK
CIO#23	Male	20 to 30	5 to 10	Canada
CIO#24	Male	> 30	5 to 10	UK
CIO#25	Male	20 to 30	5 to 10	USA
CIO#26	Male	> 30	5 to 10	USA
CIO#27	Male	> 30	< 5	UK
CIO#28	Male	> 30	10 to 20	USA
CIO#29	Male	> 30	5 to 10	UK
CIO#30	Male	20 to 30	< 5	USA
CIO#31	Male	> 30	5 to 10	USA
CIO#32	Male	20 to 30	< 5	USA
CIO#33	Male	20 to 30	< 5	UK
CIO#34	Male	20 to 30	< 5	USA
CIO#35	Male	> 30	< 5	USA
CIO#36	Male	20 to 30	10 to 20	USA
CIO#37	Male	20 to 30	5 to 10	USA
CIO#38	Male	20 to 30	< 5	Spain
CIO#39	Male	10 to 20	5 to 10	Canada
CIO#40	Male	20 to 30	< 5	Germany

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