Towards an understanding of the digital transformation of facility management in healthcare: perspectives from practice

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Abstract

Purpose – Facility management (FM) in healthcare is an organisational function that provides non-medical activities, ensuring operational functionality of critical health infrastructure. FM leaders are under pressure to implement the digital transformation, confronted with a highly complex and challenging operational environment. However, the current scope and understanding of the digital transformation in FM is rather limited, with a strong focus on technology. This perspective is inadequate to realise a digital transformation in healthcare organisations and requires a new framework. To ensure the practical applicability, a clearer depiction on how FM practitioners in the field, currently understand the digital transformation, is necessary.

Design/methodology/approach – A sequential exploratory mixed-methods design was chosen with a qualitative data collection and quantitative data analysis phase. A total of 23 semi-structured research interviews with professionals from FM in healthcare in Switzerland were carried out. Topic modeling was used to analyse, identify and cluster topics.

Findings – In total, nine distinct digital transformation topics were generated: 'addressing future organisational and people needs', 'end-user-oriented processes', 'digitalisation management vs. digital tools', 'major organisational change', 'information exchange and work culture', 'digital systems', 'pressure', 'company-wide strategy' and 'management support and communication involving non-medical support services'. The findings indicate that FM practitioners perceive the digital transformation beyond the purely technological viewpoint, although they lack the know-how and instruments necessary to implement the digital transformation.

Originality/value – This study employs an innovative research design, resulting in foundational insights on how FM in healthcare perceives the digital transformation. As such, the study expands the notion on what the digital transformation means for the FM field.

Keywords Digital transformation, Healthcare, Facility management, Digitalisation

Paper type Research paper

Introduction

Healthcare is considered one of the most important industries in the world, and healthcare services are a fundamental public good. In the WHO's (2022) world health statistics report, the

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importance of primary health provision was further reiterated in the light of the COVID-19 pandemic. Primary provision of health care is delivered by a network of healthcare organisations and providers, such as general practitioners, hospitals, clinics, and elderly care homes. To that effect, it requires critical infrastructure. Notably, the COVID-19 pandemic has further demonstrated the significance of the health infrastructure for society (Naik *et al.*, 2022). Facility Management (FM) in healthcare plays a primary role in ensuring a highly reliable, safe and sustainable infrastructure. Lavy and Shohet (2007), establish a principle understanding of FM in the healthcare context. Abstracted from Lavy and Shohet (2007), FM in healthcare can be defined as a strategic and operational management discipline of non-medical activities for healthcare facilities, with primary areas in maintenance management, performance and risk management, energy and operations, business management and development.

Considering the complexity of healthcare facilities that need to be continuously operated, this poses a considerable challenge for FM (Loosemore, Chow, & McGeorge, 2014). With roughly one third of the operating costs as for hospitals (Lennerts, Abel, Pfründer, & Sharma, 2003), FM has a substantial stake in healthcare organisations. Historically, FM lacked the strategic recognition, though Honegger, Hofer, Gerber, and Züger (2016) note that there has been a shift towards acknowledging the role of FM. Lavy and Shohet (2007) also stress the importance of the strategic value of FM. Given the challenges many healthcare organisations are facing, requiring managerial and cultural changes (Naik *et al.*, 2022), the strategic relevance of support services, such as FM, will likely increase.

One major challenge which is significantly impacting healthcare organisations is the digital transformation (Maki, Alshaikhli, Gunduz, Naji, & Abdulwahed, 2022). Digitalisation and digital health are thereby disrupting the entire healthcare industry (Rabello, Pêgo-Fernandes, & Jatene, 2022), concerning all healthcare-related domains, including FM in healthcare. Schmitter and Ashworth (2023) point out that for a successful digital transformation, FM processes and technologies need to be combined and integrated with other business processes and services. A case study observing the introduction of digital monitoring systems from a care, management and support services' perspective in eight nursing homes conducted by Dugstad, Eide, Nilsen, and Eide (2019), highlights the necessity to co-create across professional and organisational boundaries. To that end, it is also important to consider the role and approach to the digital transformation of FM. Currently the understanding of digitalisation and digital transformation in the literature stems from a technical focal point (Schmitter & Ashworth, 2023). Besides the technological capabilities, organisational, managerial, leadership, and operational skills and competencies are required (Bellantuono, Nuzzi, Pontrandolfo, & Scozzi, 2021; Dugstad *et al.*, 2019).

Literature review, research problem and research question

Conceptual understanding of the digital transformation

Although the term digital transformation is widely used, a common denominator and definition is lacking (Bellantuono *et al.*, 2021; Grivas & Graf, 2020; Kane, 2017; Reis & Melão, 2023). Nevertheless, there are numerous studies, concepts and frameworks in the information science (IS) and management literature, denotive of a conjecture. Fundamental to the digital transformation is that technology is not per se the primary focal point, but rather an enabler (Brown, 2019). Mergel, Edelmann, and Haug (2019) write that organisations are "changed through the integration of technology into the service delivery process" (p. 11). This means that it affects the entire value creation and associated value chains and the business model. The adaptation of a digital business strategy, as described by Bharadwaj, El Sawy, Pavlou, and Venkatraman (2013), is therefore required. Not only is the value creation intraorganisational, but rather extends throughout multiple businesses, forming digital

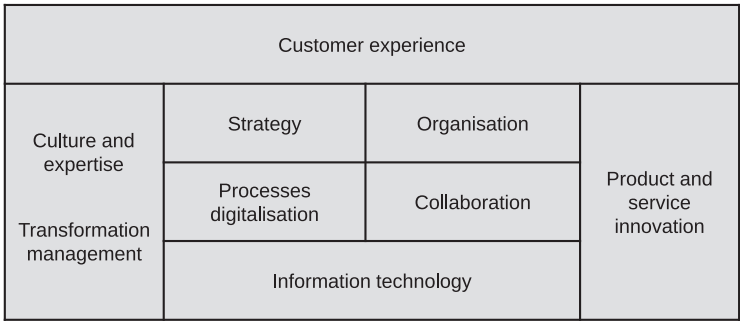
ecosystems (Beverungen, Hess, Köster, & Lehrer, 2022; Bharadwaj *et al.*, 2013). The strategic shift on how business operations are conducted has profound implications for the organisational setup, necessitating changes to organisational structure, culture, leadership, roles and skills (Vial, 2019).

Various models and frameworks exist that depict the digital transformation with its different elements (Bellantuono *et al.*, 2021). Some are more outcome oriented, whereas others depict causal relationships of factors, or incorporate and structure different elements as 'building blocks'. The framework model by Berghaus and Back (2016), shown in Figure 1, which was developed as part of their digital maturity assessment, consists of nine building blocks or dimensions. Through a clear structure with sequenced elements it offers an accessible approach to understanding the digital transformation, and therefore a practical lens for this study.

The discrepancy to the FM literature

As is apparent from the overview of the IS and management literature on digital transformation, the purely technological notion needs to be expanded. Kane (2019) speaks of the so-called "technology fallacy", whereby organisations believe the solution to the digital disruption lies within digital technologies themselves. The scoping review by Schmitter and Ashworth (2023) highlights that FM in healthcare very much tends to focus on (partly even individual) digital technologies and solutions, rather than adopting a digital transformation approach that is contingent with the digital transformation theory found in IS and management literature. Atta and Talamo (2020) focus on innovation in relation to Internet of Things (IoT) platforms and big data. They discuss strategies for using IoT in FM operations and how digital tools can be used to remotely control and monitor facilities. Similarly, Dahanayake and Sumanarathna (2021) examine the digital transformation from the perspective of IoT and Building Information Modelling (BIM), primarily describing how these two technologies can be effectively integrated through a buildings' life-cycle, which includes operations and maintenance management. These examples further illustrate the rather narrow perspective of the digital transformation in FM.

Given the differences between IS and management, and FM literature, when it comes to the digital transformation, it is important to begin to align these understandings within the context of healthcare, and thus create a common denominator. Developing a framework model for FM practitioners in healthcare institutions appears beneficial for a clearer understanding. Because there is currently comparatively little or no empirical data on the



Source(s): Adapted from Gestaltungsbereiche der Digitalen Transformation von Unternehmen, by Berghaus and Back (2016, p. 104)

Figure 1.
Building blocks of the digital transformation

digital transformation in FM in healthcare, primary data is required. For the practical applicability of a framework, it is conducive to begin with a clearer depiction of how FM practitioners in the field understand the digital transformation. Therefore, the following main research question is formed:

RQ1. What is the current understanding of the digital transformation of facility managers in healthcare organisations?

Research methodology

For this study a pragmatic philosophical view is held, recognising the practical relevance of the outcomes for FM, as well as the complexity of the digital transformation topic. The implementation was realised through an abductive approach, using a sequential exploratory mixed-methods design, in which qualitative data through research interviews was collected, and quantitatively analysed using topic modeling.

Data collection through semi-structured research interviews

To best address the explorative aspect of the research question, and capture the complexity and multiplicity of views, while still guiding, and to some extent, confronting practitioners with the theoretical understanding of the digital transformation, face-to-face and online video-call semi-structured research interviews provided the ideal instrument. Semi-structured interviews are widely used in management research to gain different perspectives and experiences (Rowley, 2012).

A semi-structured questionnaire served as the survey instrument, which was divided thematically into three sections, guided by the differentiations of the digital transformation models (see the interview questionnaire in Appendix A). Besides collecting information on a general understanding of practitioners, the model by Berghaus and Back (2016) in Figure 1 served as the theoretical guidance, representing the aspect of structural elements of the digital transformation, and was presented to each participant as part of the interview. To understand possible outcomes and relationships, questions on measures and impacts were asked, motivated by the theory. Each section of the questionnaire had a primary open-ended question, followed by specific sub-questions to prompt possible further answers from the participants.

Overall, 23 interviews with 24 participants were conducted, representing professionals working directly or indirectly in Swiss healthcare institutions between September 2021 and August 2022. Participants were either involved in managing (6), leading (13), or consulting (5) business or organisational units, and processes within the scope of FM (note, that in one interview, there were two participants, each managing specific areas in the same organisation). These interviewees represented a sample of 23 organisations (9 hospitals, 4 clinics, 3 retirement and nursing homes, 2 psychiatries, and 5 consulting firms).

All German audio recordings were initially transcribed manually, by means of intelligent verbatim, and then translated into English for further analysis steps. The corpus of interviews was stored in a single file, with each paragraph representing the response to a specific interview question. The dataset included 139 paragraphs and 2,802 sentences in total. On average each paragraph contains 20 sentences and 269 words.

Data analysis

For data analysis, the approach followed Venkatesh, Brown, and Bala (2013), who emphasise the need to combine the strengths of qualitative inquiry with the lack of analytical bias, ensured by computational methods for development and expansion purposes. Therefore, the topic modeling approach was chosen. Recently, topic modeling has gained attention as a new

and complementary analysis strategy of inquiry (Debortoli, Müller, Junglas, & Vom Brocke, 2016) which allows researchers to study organisations inductively based on qualitative data (Tonidandel, King, & Cortina, 2018). Topic modeling is an unsupervised machine learning (ML) technique where the generated themes are suggested by data instead of a predefined coding scheme (Quinn, Monroe, Colaresi, Crespin, & Radev, 2010), thus avoiding one of the main shortcomings of conventional qualitative data analysis (Schmiedel, Müller, & Vom Brocke, 2019).

Topic modeling

Since, the main dataset is a corpus of interviews, the primary method of analysis was text mining. Topic modeling was run on a paragraph level, as each paragraph responded to a specific question. A text pre-processing phase was performed by completing the following steps: (1) minimising various typos, and correcting slangs and abbreviations; (2) employing bi-gram to identify word associations to see which words often show up together; (3) bringing every words into lower case; (4) stem words by using the Stanford lemmatizer (e.g., "experience" and "experiencing" will change to experience"); and (5) equating synonym words. In the final pre-processing phase, only adjectives, nouns, adverbs and verbs were kept, as they have been shown to be the parts of sentence that carry out most of the linguistic meaning (Tirunillai & Tellis, 2014). In the next stage, topic modeling was applied which is defined as "computer algorithms that identify latent patterns of word occurrence using the distribution of words in a collection of documents", where "the output is a set of topics consisting of clusters of words that co-occur in these documents according to certain patterns" (Jacobi, van Atteveldt, & Welbers, 2016, p. 90).

Implementing topic modeling starts with identifying the number of topics to extract. To do that, two different measures were calculated across a different number of potential topics (from 4 to 14): The coherence score is presented in Figure 2. The higher the coherence value, the better. After considering the results for 7 and 9 topics, 9 topics were chosen which are shown in Table 1. It should be noted that the *Gensim library in Python* was used, with predefined LDA algorithm settings:

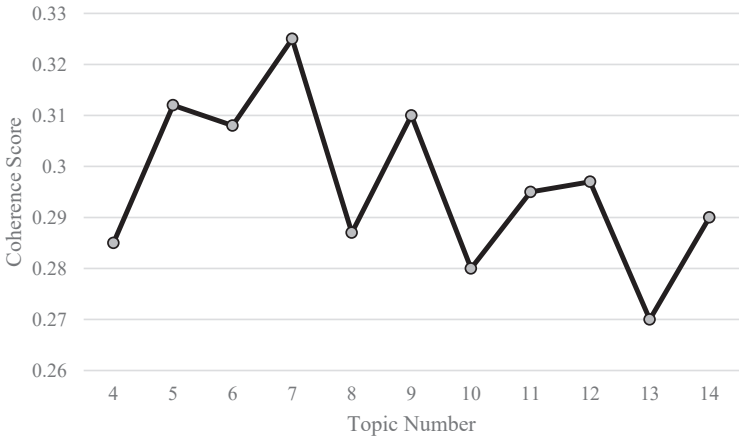


Figure 2.
Coherence score

Topic no.	Topic name	Keywords	Examples	Number of paragraphs
1	Addressing future organisational and people needs	area, people, issue, future, need, question, look, work, certainly, good	"We have discussed the entire business capability map and defined the capabilities that we want in the future in every area that exists for us in the hospital." "Then you have to improve your cleaning cycles. That is something that is not traceable at all."	14
2	End-user-oriented processes	patient, end, get, example, see, time, process, topic, area, sense	"The digitisation of processes is how we actually have to make it as simple as possible for the user [. . .]." "At the moment, the customer experience is central for us, and in the HR area, the biggest fields of action are the time a process can shorten." "The first measure is to create more experiences, to create more individual experiences for the patients."	31
3	Digitalisation management vs. digital tools	management, digital, tool, process, digitalisation, order, need, employee, whole, topic	"For us, it's about support or how can we use tools to simplify our lives or improve the patient's life here during their stay in a clinic." "It's no good if the tools are there, but they're not being used. It's a culture issue and a leadership issue, that's critical." "[W]e map our process management in 'Wisintra', in this tool. This is about our employees, especially in the area of FM, who do not yet all have access to a PC and so on."	10
4	Major organisational change	digitalisation, change, make, know, different, people, organisation, course, whole, huge	"I don't think it's simply about technical innovation [. . .], but to change the entire processes across the board." "That's the problem, because it's a huge issue, a huge complexity." "There is a complete change from our people to work with this product. It's not the same as before. For certain people, that was a big change. That's where the change management comes in."	16
5	Information exchange and work culture	work, process, topic, area, important, exchange, information, today, tool, culture	"We already have our network here, network topics, where you regularly exchange information with your colleagues from the other clinics." "So today there are actually interdisciplinary exchanges, but it really depends on the respective organisations, how they are structured." "The culture changes etc. to create the synergies has not happened yet and will take a long time."	9

Table 1.
Overview of topics

(*continued*)

Topic no.	Topic name	Keywords	Examples	Number of paragraphs
6	Digital systems	system, digital transformation, process, know, example, digitisation, area, important, part, certainly	"I think the biggest realisation of hospitals in recent years in the digital transformation, is no longer everything in one system, but systems that simply work together and can be replaced." "But from my point of view, none of the systems can cover everything. Instead, there are many systems that talk to each other." "Our system we call CAFM, which is actually an order management tool."	15
7	Pressure	process, pressure, want, information, need, hospital, project, aspect, support, cost	"Yes, I feel a lot of pressure because concrete construction projects or concrete needs, concrete changes of a structural nature are necessary for various reasons." "Then there is the external pressure to a certain extent with eHealth, which is also a contribution to the need for further development."	14
8	Company-wide strategy and management support	process, support, digitalisation, management, topic, tool, goal, data, company, strategy	"In my opinion, the measures result from the strategy and goals of the company. In our company, progress, innovation and economic efficiency are clearly anchored and so we are specifically required to inform ourselves and to look for new tools in a targeted manner." "The strategy has not changed because of the digital transformation. Not yet in the organisation either."	15
9	Communication involving non-medical support services	service, course, right, work, non-medical, digitally, look, year, communication, plan	"Also from the medical services, in terms of communication with the non-medical services. Where digitalisation takes place, where we try to make the communication channels as short as possible." "Everything with these food allergens and with the information about what is in the food, we don't have anything today that we can communicate."	15

Table 1.

random_state = 100, update_every = 1, chunksize = 100, passes = 10, iterations = 100, alpha = auto, eta = 0.1

Results and findings from topic modeling

Figure 3 presents the screenshot of the interactive HTML-Widget *LDAvis*, which is generated from the model. On the right-hand side, the most salient terms presented in the interview data are listed. As can be seen, the most prominent words that participants associate with the digital transformation in FM in healthcare are: 'process', 'service', 'digitalisation', 'management', 'support', 'know', and 'system'.

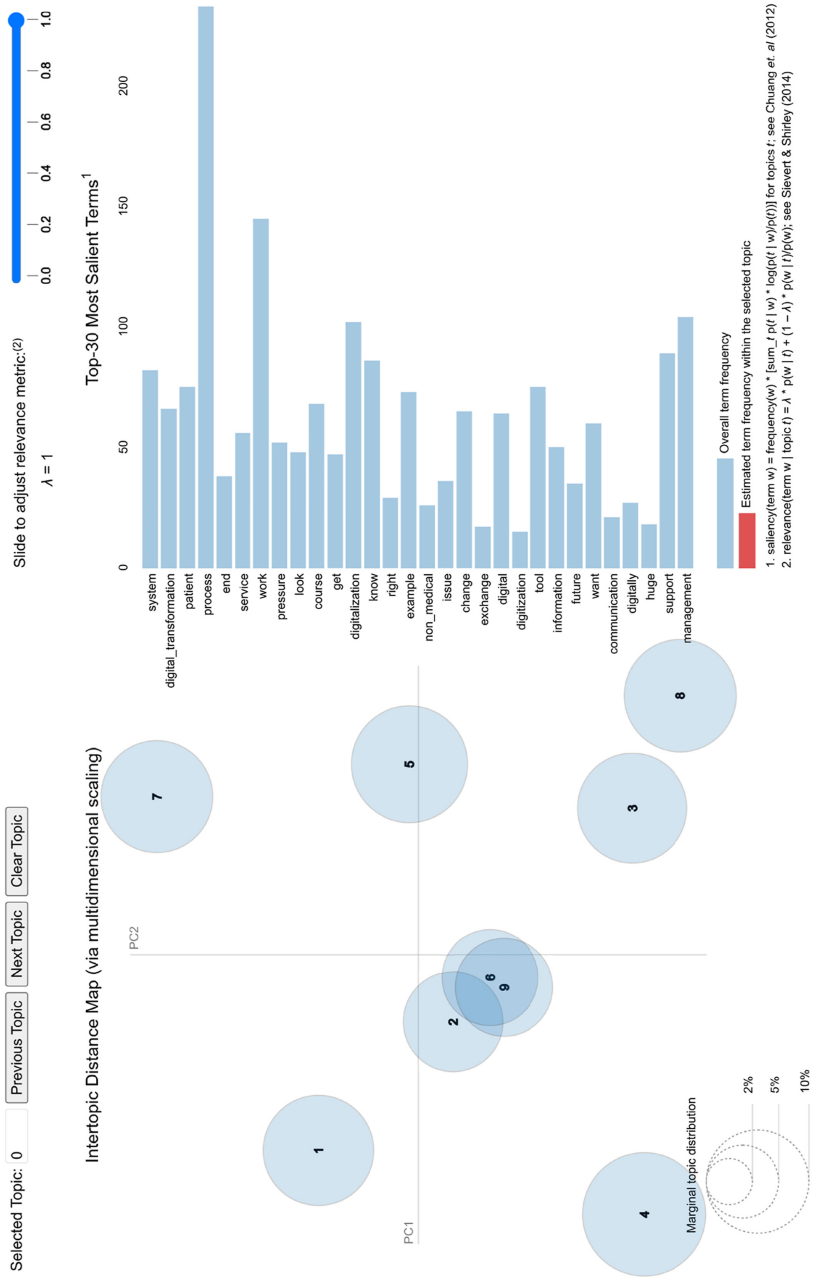


Figure 3.
Overview of the topics from the LDAvis

On the left-hand side of the *LDAvis*, the inter-topic distance map of all nine topics is presented. The relationships between the topics, in terms of content (higher co-occurrence), are depicted by the position of the circles. For example, topics 2, 6, and 9 are closely related to one another. Also, topics 3 and 8 share a closer relationship. The size of the circles depicts the significance of the topic, e.g., the frequency of the terms associated with the topic, compared to the entire corpus. The results from this study show relatively equal sized circles, which suggests that each of the topics have a similar overall importance. The distribution of organisational typologies (hospital, retirement and nursing homes, clinics, psychiatry, and consulting) is also homogeneous in relation to the topics. From the data, no single topic can be ascribed to one type of organisation.

To help distinguish the meaning of the topics, $\lambda < 1$ can be set to increase the ratio of the frequency given to the individual topic, compared to the overall frequency of the words in the corpus. In this way, words that are more specific to an individual topic emerge. With $\lambda = 0.25$, useful results were achieved with the dataset. Note that *LDAvis* generates interactive visualisations, allowing for the setting of λ while examining the results. Together with the *LDAvis* and the entire output of the topic modeling results, each of the nine topics were interpretated. Additionally, interview transcripts were examined, probing key words from the topic model and drawing examples. In Table 1, an overview of all generated topics, including *topic name*, *keywords*, *examples*, and *number of paragraphs,* are provided.

Discussion

Relationships of digital transformation topics

The generated digital transformation topics, are in terms of designation, distinct from each other. Using the inter-topic map of the *LDAvis*, the topic-relationships, based on underlying factors determined by the topic modeling, are discernible. The topics 'end-user-oriented processes' (topic 2), 'digital systems' (topic 6), and 'communication involving non-medical support services' (topic 9) all overlap (especially topics 6 and 9). Yet, upon closer examination, the overlap is mainly due to the term 'example', which refers to the use of "for example" of participants giving examples during the interviews. Further prevalent topics emerged subsuming 'collaboration and communication', 'process optimisation', and 'information management'. Considering that especially collaboration and communication are paramount in topics 2 and 9, they are also highly relevant for the implementation of digital systems (topic 6), which is reflective to the fact that many stakeholders are involved (cf., Dugstad *et al.* (2019)). FM organisations interact with medical, nursing, and non-medical professionals, which increases the complexity of interdisciplinary exchanges. Information management and process optimisation are evidently prerequisites in this regard.

Further topics situated close to each other, though not overlapping, are 'digitalisation management vs. digital tools' (topic 3) and 'company-wide strategy and management support' (topic 8). When comparing individual words in the *LDAvis*, there are several that do overlap. Ostensibly, these are the foremost terms, 'management', 'tools' and 'software', and to a lesser degree, 'company', or 'resource'. Resources are an important aspect that play a tacit role in the context of both topics. Particularly, the discourse between digitalisation management and tools, highlights the problem of resources: The interviewees often raised the issue of struggling with resources due to their focus on implementing digital applications. However, resource management should be regarded as a strategic issue in the context of the digital transformation (Koch, Hansen, & Jacobsen, 2019), which is correspondingly foundational to topic 8. As shown in Table 1, FM organisations align with the requirements of senior management, which include for example, progress, innovation and economic efficiency.

Considerations on the content of the 9 topics

Topic 1 focuses on organisational and people needs, which are thematically conjoined with factors such as strategic orientation (Koch *et al.*, 2019), customer focus (Shaughnessy, 2018), and skill requirements (Atta & Talamo, 2020; Brock & Wangenheim, 2019), described in the literature. In the interviews, participants expressed that continuous external change of needs, for example from customers, determine the organisational trajectory. In this regard, FM also orientates itself along patient experiences. Although in the interviews, the further inference towards the strategic implication was not directly mentioned, the consequences, and thus the organisational response to address such needs, were outlined. This included, among others, implementing organisational change measures, reconfiguring service offerings, or encouraging collaboration. Furthermore, the aspect of 'people needs' was raised with respect to accompanying employees during the change process, to help them adopt and work with new digital tools. This was particularly emphasised in one of the interviews, although other participants also alluded the importance of the change process, in acquiring new skills. According to an interviewee, FM suffers from a considerable lack of preparedness of staff to acquire digital skills. This extends beyond operating applications like Computer Aided Facility Management (CAFM), to understanding databases and formulating IT requirements. It is important to note that digital skills are not limited to basic technical operation, but rather require an integrated systems architecture understanding. Research findings from Brock and Wangenheim (2019) indicate that digital skills are a main driver to realise the digital strategy.

The concept of organisational change is central to topic 4. Principally, interviewees acknowledged that digitalisation could trigger major changes, and that it has the potential to transform the healthcare system. From the interview extracts, it is insinuated that the healthcare organisations do not yet seem to realise the fundamental changes required to digitally transform their organisation. This however, is a fundamental element of the digital transformation (Grivas & Graf, 2020), and highly relevant for leaders (Benchea & Ilie, 2023). As long as the consequences of digital change are not fully acknowledged by facility managers, they will most likely continue to encounter significant difficulties when implementing digitalisation projects. Moreover, change processes are especially challenging in healthcare organisations, as Binci, Palozzi, and Scafarto (2022) highlight in their study.

FM often lies at the interface with other highly specialised disciplines and must deal with a multiplicity of stakeholders. This is why topic 5 on information exchange and work culture is relevant to the change process (and strategy and management support), though is not seen by the interviewees as closely related (cf., Figure 3). Because culture has a significant influence on organisational behaviour (Lee, 2022), it is regarded as an important lever for the digital transformation (Martínez-Caro, Cegarra-Navarro, & Alfonso-Ruiz, 2020). The interviews also show that facility managers in healthcare organisations have recognised the importance of adapting the work culture to leverage synergies and improve the exchange of information and data. It appears from the results that in the healthcare industry, FM perceives the aspect of interdisciplinary exchange as vital, even across institutional boundaries. Furthermore, cultural change is perceived as an important aspect. Interviewees note the long process and tremendous effort to accomplish the change process, due to the historically routed 'siloed' structures in healthcare organisations, may impact the approach towards the digital transformation.

Interviewees were specifically asked if their organisations were under pressure and if they recognised the importance and the urgency, to digitally transform. The COVID-19 pandemic has brought considerable pressure to advance the digital transformation of many organisations, especially in the healthcare sector (Naik *et al.*, 2022). This aspect, and the cost pressure, were the dominant factors that constrain FM organisations to implement digital tools. Throughout the interviewees it is implicitly and explicitly acknowledged that

there is a lack of know-how and knowledge on the digital transformation, particularly in strategic leadership. This discrepancy between the realisation of the need to take action, and the actual course of action, or lack thereof, seems an important finding from these interviews. In other words, those responsible are aware that digitalisation in FM is an inevitable future requirement, but they lack the instruments and the knowledge of how to implement it. The existing FM literature is unfortunately not sufficiently supportive in this regard. This ambiguity could lead to FM perceiving the digital transformation differently to other professional groups.

Conclusion

This paper represents a foundational study, introducing the managerial and strategic concept of the digital transformation, not only for healthcare, but for the FM industry at large. It is in line with the wider body of digital transformation studies, concepts, frameworks, and models found in the IS and management literature. The findings from the interviews provide a novel insight on how facility managers in healthcare organisations perceive the digital transformation with its challenges, constraints, opportunities, and requirements. In this respect, the paper delivers the basis towards establishing a common denominator for the digital transformation in FM, on which the development of a specific framework is possible.

Theoretical implications

By integrating the model shown in Figure 1 as a frame of reference, and structuring the interview questionnaire accordingly, it was possible to prompt the interviewees to reflect on the digital transformation in a more holistic way. This is characterised in the findings, and stands apart from other studies, such as from Atta and Talamo (2020), Dahanayake and Sumanarathna (2021), or Pedral Sampaio, Aguiar Costa, and Flores-Colen (2023), which tend to focus on technological aspects of the digital transformation in FM. Studies from Koch *et al.* (2019) and Maki *et al.* (2022) do shift the conversation in a more comprehensive way, though they lack a frame of reference and theoretical underpinning of the digital transformation. By using topic modeling, it was possible to effectively map the principal topics that delineate the current conceptual understandings of facility managers, which is important to further develop a conceptual framework. Although the perception of the digital transformation among FM professionals in healthcare organisations may not differ significantly from that of other disciplines, it was possible to identify some aspects that may have an impact. Overall, the findings also reinforce the abductive approach chosen, that is according to Dubois and Gadde (2002), especially conducive in transferring existing theories to other fields and creating new combinations through novel insights from the field. As such, this study contributes towards filling the current inadequacy in FM research on digital transformation, by introducing the concepts of digital transformation research from IS and management as a theoretical lens. This is important for FM research's legitimacy and scholarly impact within the wider research community, as a relevant managerial field of study.

Practical implications

Given the strategic importance of the discipline, it is evident that FM must become increasingly represented in senior management of healthcare institutions. In order to provide meaningful contributions to the strategic decision-making process of the digital transformation, facility managers need to 'speak the language'. Therefore, the frame of reference must be the digital transformation, as is understood by the wider management discipline. Only then can FM truly align and integrate their domain-specific know-how on processes, services, solutions, or systems, with the overall organisational digital

transformation initiatives. With this study, the insights of FM on the actual digital transformation topic were systematically researched. The findings shift the conversation away from the technical discussion, towards the other more relevant elements of the digital transformation. When asked about them, facility managers were mostly aware of what is needed, or lacking in their organisation. This proves, that in the field, FM is very much involved in a broader context of digital transformation, which is often not conveyed in the FM literature. What is usually missing is a framework setting, that specifically addresses and integrates the FM requirements, for facility managers to effectively approach the digital transformation. Therefore, when developing a framework, which has practical relevance, the focus should be on establishing a link between the technology-oriented approach of current FM frameworks, the overall FM standards and norms, as well as the wider digital transformation approach.

Limitations and future research lines

There are some limitations to this study in terms of sample, methodology, and findings. As a qualitative approach, the sample size encompasses only representatives of the Swiss healthcare system. Further studies from other countries would be beneficial to include comparable data to develop a general framework. Since healthcare systems in different countries can differ, it is important to be cautious when drawing general conclusions from this study. In terms of using topic modeling as an analysis tool, there are a few limitations to take note of. Ultimately, there is always room for interpretation of the results by the researcher, although an ML technique is applied. It is also acknowledged that only a limited number of studies have applied topic modelling to interview data. Although the results draw on broad digital transformation topics, which has also been stressed in this study as important, the technological aspects of digitalisation in FM should not be neglected. As Dicuonzo, Donofrio, Fusco, and Shini (2023) note, these vital skills are often still lacking in the healthcare system. Accordingly, the study lacks the integration of technological and managerial aspects of the digital transformation, although this was not the primary goal. Further research is needed to unify the current technically driven FM understanding, with the general digital transformation concept. Lastly, a comparison with other professional groups on the perception and integration of digital transformation may be beneficial, especially considering the interdisciplinary nature of FM.

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Further reading

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Appendix

The supplementary material for this article can be found online.

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