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ADMINISTRATIVE INFORMATION

Support - StIL.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 18 March 2026 and was last updated on 18 March 2026.

INTRODUCTION

Review question / Objective This scoping review focuses on management competencies required for healthcare managers in the context of digital transformation in healthcare organisations. The primary research question is: What management competencies are described for managers in the context of digital transformation in healthcare organisations? The question is structured according to the PCC (Population/Participants, Concept, Context) framework.

Population/Participants: Middle and senior managers (e.g., hospital managers, healthcare service managers or a comparable management position with a strategic or tactical responsibility).

Concept: Management competencies, understood as integrated combinations of knowledge, abilities, skills and observable behaviours that enable effective performance of management functions [1].

Context: Digital transformation in healthcare organisations, including hospitals and other inpatient or outpatient healthcare organisations.

The following sub-questions guide the analysis:

- In which organisational settings were the competencies identified?
- Which geographical regions are covered by the included studies?
- What research methods were used in the studies?

The objective of this rapid scoping review is to systematically identify and map the management competencies of healthcare managers described in the scientific literature to create an evidence-based foundation for the development of a competency model for academic teaching.

Background This rapid scoping review is embedded in the SMiLeH (Strategic Management in Learning Health systems) project, funded under the "Freiraum 2026" call by the Stiftung Innovation in der Hochschullehre (StIL). The aim of the project is to develop an AI-based simulation game for the

strategic management of digital transformation projects in the healthcare sector. Identifying and structuring the competencies required of healthcare managers is a prerequisite for the design of the game content and learning objectives.

Over the past two decades, there has been growing international interest in competence-based approaches to professionalising management in the healthcare sector [2,3]. Core competencies for healthcare managers typically encompass knowledge, skills and attitudes necessary for the effective performance of management tasks and responsibilities [2]. In the context of digital transformation, managers need specific digital and integrative skills, including IT knowledge and an understanding of the interplay between people, processes and digital health technologies [4].

Several internationally recognised competency frameworks have been developed. The NCHL 3.0 (National Health Leadership Competency Model) structures 28 competencies into four action domains (Execution, Relations, Transformation, Boundary Spanning) and three enabling domains (Health System Awareness & Business Literacy, Self-awareness and Self-Development, Values) [5]. The Management Competency Assessment Programme (MCAP) identifies six core competencies (Evidence, Resources, Knowledge, Leadership, Communication, Change) through behaviour-based indicators for middle and senior management levels [2]. The Global Competency Directory developed by the International Hospital Federation (IHF) structures 80 core competencies into five areas (Leadership, Communication and Relationship Management, Professional and Social Responsibility, Health and Healthcare Environment, Business) and was designed to be adaptable to different national and organisational contexts [3].

Existing systematic reviews have synthesised evidence on competency domains, including a best-fit framework synthesis identifying seven core competency areas [6], as well as studies addressing business knowledge [7], and future competency dimensions [8]. An important aspect when considering management competencies is that the hierarchical position of managers determines the management skills required [9]. While recent research has made progress in empirically identifying digital competencies for health service managers [11], the field remains characterised by considerable heterogeneity in terms of content, methodology, management levels addressed, and healthcare system contexts [10]. This heterogeneity poses challenges for educational design. Existing frameworks and studies vary in scope and target management

levels, making it difficult to determine which competencies should be prioritised in teaching contexts. For the development of educational interventions in healthcare management, a comprehensive and structured overview of the required competencies is needed, particularly in the field of digital transformation in healthcare.

Rationale Competency-based approaches are increasingly recognised as a central framework for designing and evaluating education and training programmes [12]. Academic education in healthcare management in the context of digital transformation therefore requires a clearly defined competency reference point derived from empirical evidence. The competency model developed on the basis of this review will guide the design of the simulation game and inform broader curriculum development in management degree programmes in healthcare. The use of a rapid approach is justified by the defined project timeline. Limitations introduced by the design are acknowledged and transparently reported.

METHODS

Strategy of data synthesis Three bibliographic databases are searched: PubMed, Web of Science, and CINAHL. The search strategy is developed iteratively in PubMed and then translated for use in the other databases. The strategy combines three concept blocks using the Boolean operator AND: (1) Population (middle and senior managers), (2) Concept (competencies and skills), and (3) Context (digital transformation in healthcare organisations). Within each block, synonyms and related terms are combined with OR (or the corresponding linguistic equivalent in the respective database) to optimise sensitivity. Where possible, controlled vocabularies such as Medical Subject Headings (MeSH) and corresponding index terms in other databases are included to improve search accuracy. Furthermore, truncations will be used. The results of this search will be provided in a final overview.

The following search term illustrates one approach for PubMed and will be further developed with additional terms: ("hospital manager*" OR "hospital director*" OR "healthcare manager*" OR "health services manager*" OR "health services administrator*" OR "healthcare director*") AND (competenc* OR skill* OR qualification* OR capabilit*) AND („digital transformation“ OR „health technolog*“). For most search terms, a title keyword search or a title/abstract/keyword search (or the equivalent in the database) will be performed.

Eligibility criteria Studies are included if they meet all of the following criteria: The publication type is an empirical primary study reporting original data on management competencies, the population/participants are middle and/or senior managers with strategic or tactical planning responsibilities and the study addresses management competencies, or related constructs in the field of digital transformation in healthcare organisations. An abstract must be available, and the full text is written in English or German. Only studies published between 2015 and 2025 be considered.

Studies are excluded if they have a different publication type (e.g., reviews, editorials, opinion pieces, conference abstracts, grey literature reports, or book chapters), address exclusively clinical professional groups (e.g., physicians or nurses without managerial responsibility, clinical team leaders with direct patient contact) or practice managers/coordinators without a clear management component and if they address frontline management levels (e.g., shift supervisors, clinical team leaders). Studies that report on mixed management levels are resolved through discussion during the screening phase.

Source of evidence screening and selection

The platform Covidence is used to manage the literature data and support the screening and extraction process. The search results from all three databases are imported into Covidence. Duplicates are automatically identified and removed before screening begins. Three reviewers are involved in the screening and data extraction. In the first step, a researcher conducts a preliminary search using predefined terms in a database. In the second step, the final search strategy is developed. The search strategy is then translated and applied to the other databases. In the third step, the bibliographies of the publications included in the review are manually searched to include potentially suitable studies that were not directly identified by the search. A pilot title/abstract screening is performed using ten randomly selected titles/abstracts. All three reviewers screen these samples against the eligibility criteria. Discrepancies are discussed within the team and necessary changes are made to the criteria. Title and abstract screening begin once at least 80 % agreement has been achieved. During the title and abstract screening, each study is reviewed independently by at least two reviewers. Inclusion/exclusion is based on the eligibility criteria, and decisions are made blindly by the researchers. Disagreements are resolved by consensus or, if necessary, by the third reviewer. Studies that have been rated “yes” or “maybe” by

at least two reviewers are subjected to a full-text review. The full texts are automatically retrieved via Covidence or, if necessary, obtained from databases or by contacting the authors. A pilot full-text review is conducted on five randomly selected studies based on the inclusion criteria. All reviewers evaluate the sample studies independently of each other. Disagreements are discussed and necessary changes to the criteria are made. During the full-text review, each study is evaluated by at least two reviewers. Decisions on inclusion or exclusion are made blindly, and disagreements are resolved by consensus, with the help of a third reviewer if necessary. Studies that are included by at least two reviewers are selected for final inclusion. A pilot data extraction is then performed to test the draft extraction table. All three reviewers extract data from three randomly selected studies that have been selected for final inclusion. Any discrepancies in the extraction are discussed, and the table is revised as necessary before proceeding with the full extraction. Studies agreed upon for final inclusion undergo data extraction. Disagreements between two reviewers are resolved by consensus or, if necessary, by a third reviewer. The results of the search and study selection process are documented in the final rapid scoping review and visually represented in the PRISMA-ScR (Scoping Review) flow diagram [13].

Data management The PRISMA-ScR guidelines and tools are used as a reference for the rapid scoping review to ensure methodological rigor. A preliminary table is created to systematically record the extracted information and to capture important details such as the following: General information (e.g., title, authors, year of publication), population and sample size (e.g., type of managers, number of participants included in the study), type of study (e.g., case study, observational study), survey method(s) (e.g., quantitative, qualitative, mixed methods), setting (e.g., hospital, community health service), research country, number of competencies and key findings (e.g., core competencies, behavioural items). In an iterative process, the table for data extraction is adjusted depending on the findings in the full texts.

Reporting results / Analysis of the evidence

Based on our findings from preliminary research, a narrative presentation of the results appears appropriate.

Presentation of the results The data is presented in tables or figures for each extraction category, followed by a descriptive analysis.

Language restriction The search will be limited to English and German.

Country(ies) involved Germany.

Keywords Management Competencies; Digital Health Management Competencies; Digital Transformation.

Dissemination plans This rapid scoping review will be published as a journal article in combination with results from qualitative research on competencies and the development of a competency model. The work will form the methodological basis for the SMiLeH (Strategic Management in Learning Health systems) project.

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