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ОБЩЕСТВЕНИ НАУКИ И ИНФОРМАЦИОННИ ТЕХНОЛОГИИ

A PRISMA-DRIVEN SYSTEMATIC LITERATURE REVIEW OF PROJECT MANAGERS' LEADERSHIP COMPETENCIES

Timo Zimenga

University of Library Studies and Information Technologies

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Abstract: *Due to digitalization teams are increasingly working virtually which makes leadership complex, especially when the leader has no formal authority over the team, which is often the case in projects. Project managers, as the leaders of the project, must adapt to the needs of virtual collaboration and have certain leadership competencies. This study examines whether a competency model can be found that lists the leadership competencies of project managers who lead virtual teams without formal authority. The study was conducted using a systematic literature analysis based on the PRISMA structure. Relevant search strings were used and $n = 699$ articles were identified. After completion of the PRISMA process, seven articles were included. The results show that no article cover the core areas of this study. Therefore, no competency model can be identified that lists the leadership competencies of project managers who lead a virtual team without formal authority. This study therefore identifies a research gap and highlights the need for further research to develop this competency model.*

Keywords: *virtual teams; project manager; leadership competencies; lack of formal authority; systematic literature review*

INTRODUCTION

Digitalization has fundamentally changed the way we work. Virtual teams have become increasingly popular in recent years and are now coming to the forefront (Froese et al. 2025). In a large-scale study conducted in 2023 with nearly 360,000 employees, Makridis and Schloetzer (2023) found that approximately 50% of employees work in virtual or hybrid teams. This is supported by Treas (2021) in his study, which examines the extent to which virtual work is the future. Treas (2021) found that virtual work is the future. In his study, 82% of participants voted in favor of remote work (Treas 2021).

Although the relevance of virtual teams has been clearly defined in the literature and virtual teams are therefore the preferred working structure of the future, team members of virtual teams experience some negative effects because of this virtual structure. Among other things, there is a lack of informal and spontaneous contact opportunities within the team (Leslie et al. 2018). In addition, building trust is more difficult than in face-to-face teams, as interaction takes place almost exclusively via information and communication technologies (Torro, Pirkkalainen, Li 2022). Technical problems or uncertainty in the use of information and collaboration technologies can lead to conflicts among team members (Diefenbach 2023). In view of these conditions and the spread of virtual teamwork, the role of the manager is coming to the forefront (Caputo et al. 2024; Dörrenberg, Goerner, Patzak 2019). Specific forms of leadership are necessary, and leadership tasks, roles, and tools need to be reconsidered (Dreas, Klenk 2021). Leaders of virtual teams must adapt to the new situation and be able to commit to this form of leadership (Ilter et al. 2023; Grześ 2024).

Based on this, the complexity of employee leadership is further increased when the leader has no formal authority, as this is often the case in projects (Grześ 2024; Bohinc 2021). According to the definition of the Project Management Institute, a project is “*a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates a beginning and an end to the project work or a phase of the project work. Projects can stand alone or*

be part of a program or portfolio” (PMI 2021). Projects are now a well-established practice in many companies (Wagner, Cammans 2025) and are used where companies want to achieve their goals most efficiently (Blomquist, Müller 2006). The background for the continuously increasing establishment and strategic importance of projects includes digitalization and the associated projectification (Wagner, Huemann, Radujković 2022) of companies (Wagner, Ott 2019; Shamim 2022). Accordingly, Wagner, Huemann, and Radujković (2022) cite the author Midler (1995), who already discovered in 1995 that the projectification of companies has a significant influence on corporate structure, corporate culture, and, consequently, teamwork.

This structural shift toward the increased use of projects is increasing the demand for the right skills to successfully lead these projects (Wagner, Ott 2019). Empirical research shows that deficits in leadership contribute to project failure: Fareed, Su, and Awan (2021) found in a study that 4 out of 5 projects fail due to poor leadership. This would mean that leadership has a major impact on project management. This is confirmed by Moradi, Kähkönen, and Aaltonen (2019), who say that project performance is the sum of the skills of the project team and the competencies of the project manager and that, accordingly, the leadership competencies of the project manager are key elements for successful project management.

According to Zehrer and Mössenlechner (2010), leadership competencies are seen as an interface between the individual basic competencies, which are divided into four competency areas: social and communication competencies, activity and action competencies, technical and methodological competencies, and personal competencies. In contrast to the regular competencies from the previously mentioned competency areas, which enable a person to adapt to the respective situation (Krumm, Mertin, Dries 2012), leadership competencies, according to Zehrer and Mössenlechner (2010), represent a special type of competency that is important for the successful performance of leadership tasks.

Authors such as Nagel (2025), Moradi, Kähkönen, and Aaltonen (2019), Heyse and Erpenbeck (2009), and several others, as well as individual organizations such as the IPMA (GPM 2017) and the PMI (Project Management Institute 2021), have developed competency models for project managers. However, these models only evaluate individual areas or provide a general overview of competencies.

Despite the relevance of project managers’ leadership competencies, these competency models do not explicitly address leadership competencies. With this in mind and considering the individual aspects and framework conditions, the question arises as to whether and in what form competency models exist that focus on the leadership skills of project managers who lead a virtual team without formal authority. This raises the following research question, which will be answered in the context of this systematic literature review:

RQ: To what extent can an independent competency model be identified that describes the leadership competencies of project managers who lead a virtual team without formal authority?

To keep the empirical focus in the foreground, this review treats PRISMA not as the object of analysis but as the transparent screening procedure through which the relevant literature is delimited. The author’s contribution is therefore the category-led evaluation of the included studies against five intersecting criteria: competency model, leadership competencies, project managers, lack of formal authority, and virtual teams. This framing clarifies that the review does not merely reproduce existing literature, but assesses whether the existing evidence jointly covers the specific leadership situation formulated in the research question.

RESEARCH METHODOLOGY

PRISMA-based literature selection

A systematic literature review will be conducted to answer the research question presented above. This study will follow the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for the search strategy, screening, and final selection of literature, as this ensures that the systematic literature review process can be viewed transparently and that the

systematic literature review shows how the review was conducted, what the author did, and what was found (Page et al. 2021). The aim of the systematic literature review is to conduct a systematic and comprehensive search for publications to ensure that as much literature as possible on a specific topic can be identified (Gash 1999). The advantage of this approach is that, due to the increasing use of online media and online databases, more and more potentially relevant digital documents are becoming available. This ensures that scientific literature is easily and comprehensively accessible (Döring, Bortz 2016). Accordingly, this approach also focuses on finding high-quality, existing literature and thus using a database that does not first need to be developed (Döring, Börtz 2016; Mayring 2016).

This methodological description is retained in full in order to make the source selection auditable; the subsequent Results and Discussion sections therefore foreground the screening outcome and the evaluative comparison of the relevant studies.

Following data collection, data review is based on the approach according to Mayring (2016). This approach consists of three steps and begins with emphasizing the research question to ensure that the approach is targeted and based on the research question. The second step is the targeted selection of suitable material for answering the research question. The third step involves evaluating the material which was found (Mayring 2016).

Category-led analytical procedure

In the first step, which is about defining the research question, the introduction already showed how important leadership competencies are for project managers who lead virtual teams without formal authority. As already formulated in the research question, this systematic literature review focuses on the question of whether there is a competency model for project managers who lead a virtual team without formal authority and whether this competency model focuses on leadership skills. This step has already been carried out in the introduction. The second step involves selecting suitable literature. This data collection was carried out using the PRISMA procedure and can be viewed in the following section. In the final step, according to Mayring (2016), the articles that resulted from the data collection are reviewed. The articles are analyzed according to a predefined category-led procedure to ensure that the study review is also carried out systematically.

In summary, the systematic literature review is therefore carried out in a multi-stage process in which scientific publications on a specific topic are selected systematically and based on categories (Döring, Bortz 2016). The aim of this literature review is to obtain a comprehensive overview of the research topic under investigation and thereby provide a valid answer to the research question.

RESULTS

Search strategy and database coverage

Three search strategies consisting of search terms and Boolean operators, combined and formulated in both German and English, were used to collect data and create a comprehensive database. These are presented below:

➤ **Search string #1 (English) and #4 (German):** (“project manager” OR “project leadership” OR “project leader”) AND (“non-formal authority” OR “informal leadership” OR “lateral leadership”) AND (“virtual teams” OR “remote teams” OR “distributed teams” OR “hybrid teams”) AND (“leadership competencies” OR “leadership skills” OR “competence” OR “competencies”);

➤ **Search string #2 (English) and #5 (German):** (“project manager” OR “project leadership” OR “project leader”) AND (“virtual teams” OR “remote teams” OR “distributed teams” OR “hybrid teams”) AND (“leadership competencies” OR “leadership skills” OR “competence” OR “competencies”);

➤ **Search string #3 (English) and #6 (German):** (“project manager” OR “project leadership” OR “project leader”) AND (“non-formal authority” OR “informal leadership” OR “lateral leadership”) AND (“leadership competencies” OR “leadership skills” OR “competence” OR “competencies”).

The search strings were developed based on the topics described in the introduction. The aim was to find as comprehensively as possible a range of suitable literature that could contribute to an-

swering the research question. To conduct the literature, search in both a national and international context and to be able to find literature in both German and English, the search strings were used in the databases BASE Search, EBSCO, Emerald Insight, JSTOR, SAGE, Science Direct, Scopus, Springer, and Web of Science. Search strings #1 and #4 combine all core aspects of the study in a central literature query. The literature searched should cover the core areas of project managers'/project management, leadership without formal authority, virtual teams, and (leadership) competencies. Search strings #2 and #5 focus on the relationship between the project manager or project management, (leadership) competencies, and the virtual team, without referring to leadership without formal authority. Finally, search strings #3 and #6 deal with the connection between project managers or project management, leadership without formal authority, and (leadership) competencies, disregarding virtual teams. The core areas were combined using Boolean operators (AND/OR) to find thematically relevant literature. The form of the selected search strings aims to make the literature search as comprehensive as possible. The possible integration of literature that may only cover three of the four core areas ensures that studies are also considered that do not cover all core areas at the same time but may nevertheless provide important information for answering the research question. To ensure that the articles analyzed reflect the current state of research, articles published before 2010 were excluded during data collection by selecting appropriate filters. Furthermore, articles that were blogs, magazines, or popular literature were excluded to ensure the scientific quality of the examined articles.

In order to make the literature search as efficient as possible, it was limited to keyword searches. During data collection in September 2025, a total of $n = 699$ articles were identified. Following the PRISMA statement process, the literature found in the databases was systematically analyzed in three phases (Page et al. 2021). In the first step (Identification) 50 duplicates were removed. Accordingly, $n = 649$ articles were transferred to the screening process. During the screening process, $n = 625$ articles were sorted out based on the title and abstract review because they were not relevant to the topic. Subsequently, $n = 24$ articles were selected for a full-text search. $n = 3$ articles could not be accessed because they were not available despite university access. Open access articles are essential for research because they guarantee access to articles at any time and increase the research base (Brinken 2021; Björk, Salomon 2012). Accordingly, the full-text search resulted in $n = 21$ articles. During the full-text search, $n = 14$ articles were excluded because they did not ultimately relate to competencies, had no connection to project management, did not analyze the competencies of the project team, or did not evaluate competencies in relation to project success. In the final process according to PRISMA 2020 (Included), $n = 7$ studies were included that are intended to contribute to answering the research question. The process of systematic literature analysis according to PRISMA 2020 (Page et al 2021) can be seen in the following PRISMA flowchart in Figure 1.

PRISMA screening outcome

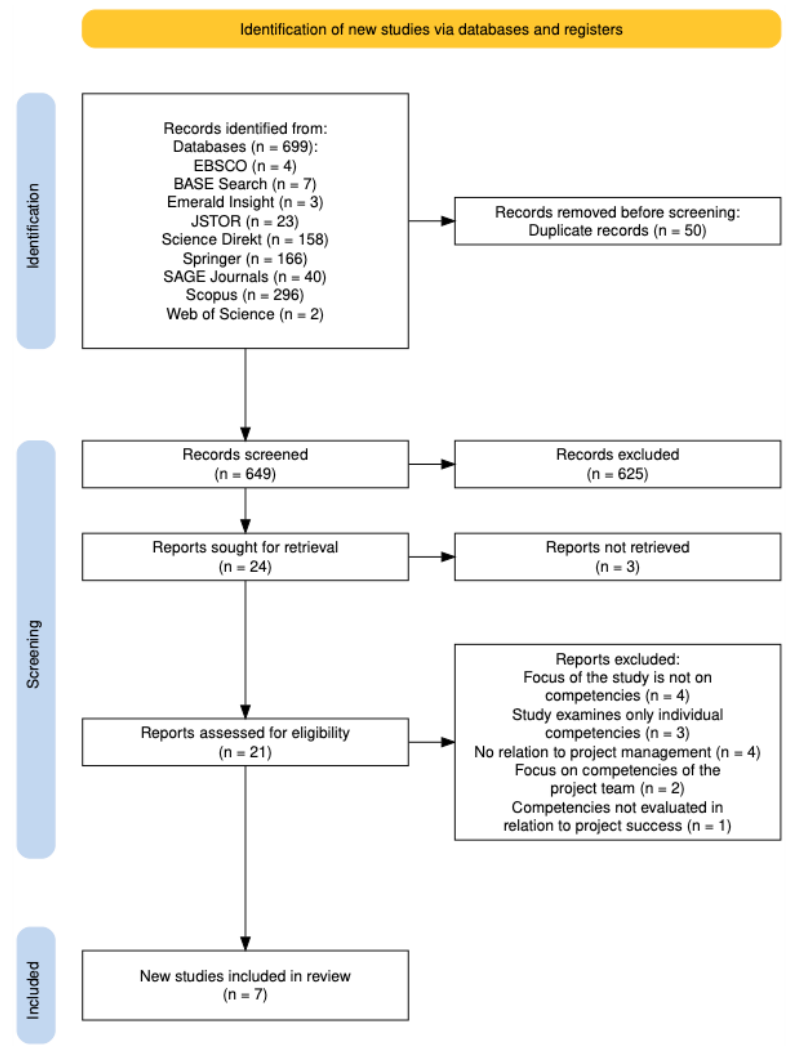


Figure 1. PRISMA Flow Diagram (Source: Own creation based on: Page et al 2021; Haddaway et al. 2022).

DISCUSSION

Analytical evaluation of the included studies

Based on the PRISMA study, seven studies were included in the study and evaluated in detail. Following the systematic data collection, the seven included studies were evaluated individually in a further step. Information about the content and focus of each study was extracted and transferred to a systematic overview. To ensure that this step was also carried out in a systematic manner, categories were first created. With regard to the theoretical basis of this study, the aspects from the introduction, and the research question, the following categories were formed: competency model, leadership competencies, project managers, lack of formal authority, and virtual teams. This structured overview allows the thematic focus and findings from the studies involved to be considered in combination with the research question of this study. The studies involved and their results are shown in the following table (Table 1).

The table should be read as an evaluative matrix rather than as a descriptive list. The authorial assessment applies the five core criteria consistently to each article, so the absence of marks in the columns is itself an analytical finding: it indicates which part of the research question remains unsupported by the selected literature. This is the central result of the review and is the basis for identifying the research gap.

Table 1. Overview of involved studies and results of the article review.

Characteristics and content of each involved article			Results for...				
No.	Author(s)	Short description of the aim and conclusion of the study	Competence Model	Leadership Competences	Project Manager	Missing formal authority	Virtual teams
1	Maduka et al.	This study aims to analyze the skills required to lead a virtual team. The authors found that certain leadership competencies are important for successfully managing virtual teams.	x	x			x
2	Anke & Ringeisen	The study examines the competency requirements of project managers in virtual teams. The authors have developed a requirements profile with 20 competency facets and 12 higher-level competency dimensions.	x		x		x
3	Riesen-berger	The aim of this article is to discuss the five competencies necessary for the success of a global project team.			x	x	x
4	Tabassi et al.	The aim of the study was to analyze the role of managers and their leadership style in the construction sector. The authors have developed a model that shows that the leadership skills and transformational leadership qualities of project managers.		x	x		
5	Faisal et al.	The aim of this study is to define a framework for determining skills for project managers in megaprojects. The framework identified by the authors includes 24 leadership competencies, divided into four clusters.	x	x	x		
6	Ribeiro, Amaral & Barros	The study aims to identify the skills that project managers need to work in Industry 4.0. The authors show that the competencies described in the PMBOK and ICB 4.0 are not sufficient to adequately meet the requirements of these digital transformation contexts.			x		
7	Dumitrascu-Baldau & Dumitrascu	The study aims to identify the most important challenges for global project managers and propose a model for the profile of such a project manager.			x		x

Comparing the results, it is obvious at first glance that none of the studies involved considered all five core areas together. Maduka et al. (2018) found that certain leadership competencies are important for the successful leadership of virtual teams. However, they did not examine in detail why exactly the leadership competencies used in the study were used. Furthermore, they did not mention whether the team leader was a project manager and what the authority relationship between this team leader and their virtual project team was. Anke and Ringeisen (2016) summarize their findings in the competency dimension “Leading and Deciding,” but do not provide any further information about what this competency dimension involves. Accordingly, although the study provides a comprehensive analysis of the competency requirements for leaders of virtual teams, it does not highlight specific leadership competencies. Tabassi et al. (2016) support Anke and Ringeisen’s statement and also say that leadership competencies are crucial for the successful execution of projects. Although the study addressed the leadership competencies of project managers, it did not consider some key areas (competency model, leading without formal authority, and virtual teams). Ribeiro, Amaral, and Barros (2021) conclude that project managers face a number of challenges due to the impact of Industry 4.0 and that the competencies defined in the PMBOK and ICB 4.0 are not sufficient to adequately meet the requirements of Industry 4.0.

The articles presented were at least thematically related to the research focus of the present study. In his article, Riesenberger (2016) primarily addressed possible solutions for the high failure rates of global project teams. As a result, key competencies are defined which, according to Riesenberger, are crucial for project success. Dumitrascu-Baldau and Dumitrascu (2017) concluded in their study that international project managers in virtual working environments can be seen as “managers of the

future.” Neither study has any thematic connection to the research focus of this study.

The findings of Faisal et al. (2023) are the only ones that align with the present research direction. The framework developed by the authors includes 24 leadership competencies divided into four clusters. These leadership competencies were identified using focus groups. The result is a competency model that provides a framework for project managers in megaprojects. The study does not mention the authority relationship between these project managers and their project teams. However, Faisal et al. (2023) use the competencies from the PMBOK as a basis. Faisal et al. (2023) cite Skogmar (2015) and Backlund and Sundqvist (2018), who state that, based on the PMBOK, project managers are the sole decision-makers and therefore have responsibility for the personnel employed. Based on this, it can be assumed that the project manager has formal authority over their project team.

The evaluation of the seven studies involved clearly shows that none of the studies considers the core areas of competence models, leadership skills, project managers, lack of formal authority, and virtual teams together.

On this basis, the research gap is not inferred from the mere absence of one exact publication title, but from the systematic mismatch between the available evidence and the full configuration of the research question. The included studies either address virtual leadership, project-manager competencies, or competence frameworks, but they do not integrate these aspects with the absence of formal authority. The author's contribution is the explicit mapping of this mismatch and the delimitation of a future competency model that would have to combine all five criteria.

CONCLUSION

This systematic literature review shows that digitalization has a huge impact and how important virtual teamwork is these days. At the same time, it makes it clear that working in virtual structures comes with some challenges. Because of these challenges and conditions, leaders are becoming more important, as the understanding of leadership, leadership roles, and leadership tools need to adapt to the challenges of virtual work. It also explains that leadership becomes even more complex when managers do not have formal authority, as is often the case in projects.

That's why this systematic review, done using a PRISMA-based approach, wanted to see if there's already a competency model in the literature that describes the leadership competencies of project managers who lead virtual teams without formal authority. From the 699 studies initially identified, seven studies were selected using the PRISMA approach and submitted to a full-text search. Analysis of the studies along the predefined categories shows that none of the studies investigated addresses all five areas simultaneously.

Therefore, the research question can be answered by stating that there is no independent competency model in the literature that describes the leadership competencies of project managers who lead virtual teams without formal authority. The result thus indicates a proven research gap and the need for further studies to develop a specific competency model that maps these core areas.

Future research should therefore move from identifying isolated competence requirements to constructing and validating an integrated competency model for project managers who lead virtual teams laterally. Such a model should specify the leadership competencies, explain their relevance under conditions of virtual cooperation, and account for the influence of absent formal authority on communication, decision-making, trust building, and conflict resolution.

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СИСТЕМАТИЧЕН ЛИТЕРАТУРЕН ПРЕГЛЕД НА ЛИДЕРСКИТЕ КОМПЕТЕНЦИИ НА ПРОЕКТНИТЕ МЕНИДЖЪРИ, ОСНОВАН НА МОДЕЛА PRISMA

Резюме: Поради дигитализацията екипите все по-често работят виртуално, което прави лидерството сложно, особено когато лидерът няма официална власт над екипа, какъвто често е случаят при проектите. Проектните мениджъри, като лидери на проекта, трябва да се адаптират към нуждите на виртуалното сътрудничество и да притежават определени лидерски компетенции. Настоящото проучване разглежда дали може да се намери компетентностен модел, който изброява лидерските компетенции на проектните мениджъри, които ръководят виртуални екипи без формална власт. Проучването беше проведено чрез систематичен анализ на литературата, базиран на структурата PRISMA. Бяха използвани подходящи търсени изрази и бяха идентифицирани $n = 699$ статии. След приключване на процеса PRISMA бяха включени седем статии. Резултатите показват, че нито една статия не обхваща основните области на това проучване. Следователно не може да бъде идентифициран модел на компетентност, който да изброява лидерските компетенции на проектните мениджъри, които ръководят виртуален екип без формална власт. Следователно това проучване идентифицира пропуск в изследванията и подчертава необходимостта от по-нататъшни изследвания за разработване на този модел на компетентност.

Ключови думи: виртуални екипи; проектен мениджър; лидерски компетенции; липса на формална власт; систематичен литературен преглед

Тимо Цименга, докторант

Researcher ID (ORCID: 0009-0004-8149-6163)

Университет по библиотекознание и информационни технологии

София, България

E-mail: t.zimenga@googlemail.com