Jurnal ARSI (Administrasi Rumah Sakit Indonesia)

Volume 10
Number 3 *October*

Article 4

10-31-2024

HOSPITAL READINESS TO IMPLEMENT ELECTRONIC MEDICAL RECORDS: A SYSTEMATIC LITERATURE REVIEW

Afni Fatmasari
Faculty of Public Health, Universitas Indonesia, Depok Indonesia, afnifs5a@gmail.com

Mardiati Nadjib
Department of Health Administration and Policy, Faculty of Public Health Universitas Indonesia, Depok, Indonesia, mardiatinadjib@gmail.com

Recommended Citation

Fatmasari, Afni and Nadjib, Mardiati (2024) "HOSPITAL READINESS TO IMPLEMENT ELECTRONIC MEDICAL RECORDS: A SYSTEMATIC LITERATURE REVIEW," *Jurnal ARSI (Administrasi Rumah Sakit Indonesia)*: Vol. 10: No. 3, Article 4.
DOI: 10.7454/arsi.v10i3.1189
Available at: https://scholarhub.ui.ac.id/arsi/vol10/iss3/4

JURNAL ARSI (ADMINISTRASI RUMAH SAKIT INDONESIA)
DOI: 10.7454/arsi.v10i3.1189
Oktober 2024, Vol. 10, No. 3, Hal. 139-149

HOSPITAL READINESS TO IMPLEMENT ELECTRONIC MEDICAL RECORDS: A SYSTEMATIC LITERATURE REVIEW

Afni Fatmasari*, Mardiati Nadjib

Departemen Administrasi dan Kebijakan Kesehatan, Fakultas Kesehatan Masyarakat, Universitas Indonesia, Depok, Indonesia

*Korespondensi: Afni Fatmasari, Departemen Administrasi dan Kebijakan Kesehatan, Fakultas Kesehatan Masyarakat, Universitas Indonesia, Depok, Indonesia

afnifs5a@gmail.com

Article history:
Received: 21 September 2024; Revised: 30 September 2024; Accepted: 27 October 2024

Abstract. *Implementing electronic medical records (EMR) in hospitals can increase the efficiency and effectiveness of health services. However, hospitals' readiness to adopt this technology is influenced by various complex factors. This study aims to identify factors that affect hospital readiness in implementing EMR through a systematic literature review (SLR). The SLR process followed the PRISMA method and included a literature search from Scopus, PubMed, and Cochrane databases with keywords related to RME readiness, which yielded 412 articles. After the screening and eligibility stages, 19 articles were selected for further analysis. The findings of this research identify readiness factors based on the theory of technology organization and environment (TOE). In the context of technology, factors such as technology access, perceived benefits, perceived usefulness, and performance expectancy emerge as important determinants of readiness. In an organizational context, management support, organizational culture, computer competency, and knowledge of EMR are key factors. Meanwhile, societal influence and environmental conditions play a significant role in the environmental context. These findings provide valuable insights for policymakers and hospital management in designing strategies to increase RME adoption readiness. This research has limitations in geographic and language coverage and the use of a single database. Therefore, further research is needed to broaden the scope and deepen understanding of the interactions between various readiness factors.*

Keywords: *Electronic Medical Records, Hospital Readiness, Technology Organization and Environment Theory, Systematic Literature Review*

Abstrak. Penerapan rekam medis elektronik (RME) di rumah sakit dapat meningkatkan efisiensi dan efektivitas pelayanan kesehatan. Kesiapan rumah sakit untuk mengadopsi teknologi ini dipengaruhi oleh berbagai faktor yang kompleks. Penelitian ini bertujuan untuk mengidentifikasi faktor-faktor yang mempengaruhi kesiapan rumah sakit dalam menerapkan RME melalui *systematic literature review* (SLR). Proses SLR mengikuti metode PRISMA dan mencakup penelusuran pustaka dari basis data Scopus, PubMed, dan Cochrane dengan kata kunci yang terkait dengan kesiapan RME dan didapatkan hasil sebanyak 412 artikel. Pada tahap penyaringan dan kelayakan, 19 artikel dipilih untuk analisis lebih lanjut. Temuan penelitian ini mengidentifikasi faktor-faktor kesiapan berdasarkan teori organisasi dan lingkungan teknologi. Konteks teknologi, faktor-faktor seperti akses teknologi, manfaat yang dirasakan, kegunaan yang dirasakan, dan harapan kinerja muncul sebagai penentu pentingnya kesiapan. Konteks organisasi, dukungan manajemen, budaya organisasi, kompetensi komputer, dan pengetahuan tentang RME merupakan faktor-faktor kunci. Sementara itu, pengaruh masyarakat dan kondisi lingkungan memainkan peran penting dalam konteks lingkungan. Temuan ini memberikan wawasan berharga bagi para pembuat kebijakan dan manajemen rumah sakit dalam merancang strategi untuk meningkatkan kesiapan adopsi RME. Penelitian ini memiliki keterbatasan dalam cakupan geografis dan bahasa serta penggunaan satu basis data. Oleh karena itu, penelitian lebih lanjut diperlukan untuk memperluas cakupan dan memperdalam pemahaman tentang interaksi antara berbagai faktor kesiapan.

Kata kunci: Rekam Medis Elektronik, Kesiapan Rumah Sakit, Teori Organisasi Teknologi dan Lingkungan, *Systematic Literature Review*

INTRODUCTION

Implementing electronic medical records (EMR) in hospitals is a fundamental step in increasing the efficiency and effectiveness of health services. EMR can potentially reduce medical errors, improve care coordination, and provide easier and faster access to patient information (Awol et al., 2023; Hailegebreal et al., 2023). However, although the benefits offered by EMR are clear, its implementation still faces various complex and diverse challenges, especially in hospital readiness (Biruk et al., 2014).

Hospital readiness to implement EMR depends not only on technological factors alone but also on organizational, human, and environmental factors. Technological factors include the available IT infrastructure and the system's readiness to be adopted. Organizational factors include leadership, organizational culture, and change management strategies. Meanwhile, human factors include staff competency, readiness to adapt to new technology, and adequate training. The external environment, such as government regulations and financial support, is important in EMR implementation readiness (Alshahrani and Bahattab, 2015).

Given this complexity, it is important to understand the factors influencing a hospital's readiness to implement EMR. Knowing these factors can help design effective strategies to overcome barriers and maximize the chances of successful implementation of EMR. This research aims to identify and analyze factors affecting hospital readiness to implement electronic medical records. The research question that is the focus of this SLR is: What factors influence a hospital's readiness to implement electronic medical records? By answering this question, comprehensive insight can be obtained regarding the essential elements that need to be considered in the EMR adoption process in hospitals.

METHOD

This research uses a Systematic Literature Review (SLR) to identify and analyze hospital readiness factors in implementing EMR. This SLR process follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method, consisting of several stages, from article identification to include relevant articles for further analysis. The literature search procedure used Scopus, PubMed, and Cochrane databases. The keywords used in the search were a combination of "EMR" OR "electronic medical records" OR "EHR" OR "electronic health records" AND readiness. These keywords were chosen to ensure all articles relevant to hospital readiness in implementing EMR could be found. The inclusion criteria applied in this research include empirical articles written in English and published in scientific journals. In addition, only articles published within the last 10 years, namely from 2014 to 2024, were included in this review.

The data extraction process was carried out in four stages according to the PRISMA protocol, as depicted in Figure 1. Identification stage, results from all databases, namely Scopus, PubMed, and Cochrane are exported into a Microsoft Excel file containing the title and abstract of each article. Searches using predetermined keywords yielded 409 articles from Scopus, 436 articles from PubMed, and 128 articles from Cochrane, totaling to 973 articles from all databases. Of the 412 articles found, the titles and abstracts were read to determine the relevance of the articles to this SLR topic. This screening process aims to screen articles that are directly related to hospital readiness in implementing EMR and remove duplicate articles found in the three databases.

After the screening process, 49 relevant articles were selected for further review about eligibility. At this stage, full-text PDFs of the articles are read to ensure that the articles meet the specified eligibility criteria. To be considered eligible in this review, the articles need to focus on either EMR or electronic health records (EHR) and its readiness aspects or factors. With regards to research design, the research articles need to be empirical with quantitative, qualitative, or mixed-method design; thus, review articles were excluded from this review. In addition, the articles considered need to be written in English and published in scientific journals in the last 10 years, from 2014 to 2024. Based on a full review at the eligibility stage, 19 articles were selected as final relevant full-text articles and data from these articles were extracted for further analysis.

The analytical method used in this research is content analysis. This analysis was carried out to extract data from selected articles, with a focus on identifying and grouping readiness factors that influence the implementation of EMR in hospitals. Content analysis makes it possible to gain in-depth insight into key elements that can support or hinder a hospital's readiness to adopt EMR technology.

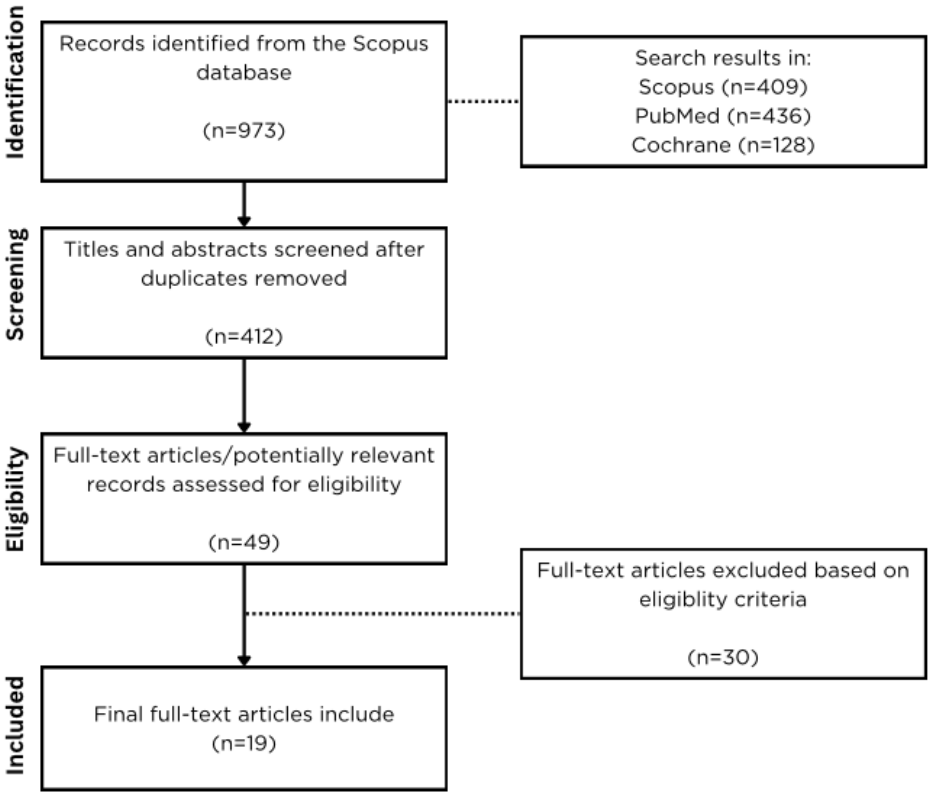

Figure 1. Article Selection Process Diagram based on PRISMA

RESULTS

The results of this study identified various factors that influence hospital readiness in implementing EMR. These factors are grouped based on three main contexts according to the Technology Organization and Environment (TOE) theory: technological, organizational, and environmental contexts (Depietro et al., 1990). In the context of technology, factors such as technology access, perceived benefits, perceived enjoyment, perceived trust, perceived usefulness, perceived ease of use, effort expectancy, performance expectancy, and descriptive norms emerge as important determinants of readiness (Table 1).

Access to technology is a fundamental factor in determining whether a hospital has the necessary infrastructure to support EMR. Perceived benefits and perceived usefulness indicate the extent to which hospital stakeholders believe that EMR will provide added value. Expectations regarding ease of use and performance reflect the belief that the RME system will be easy to use and improve operational efficiency and effectiveness.

Table 1. Readiness Factors in a Technological Context

Factor	Measure	Sources
Technology access	Technological readiness (Innovativeness)	Nicolai et al. (2023)
	Resources (IT)	Alzghaibi et al. (2023)
	Technology infrastructure	Alzghaibi et al.(2023); Esserman et al. (2024)
	E-health readiness (e-records)	Gholamhosseini and Ayatollahi(2016)
	ICT readiness (ICT access)	Gholamhosseini and Ayatollahi(2016)
	ICT functions readiness (network application presence)	Gholamhosseini and Ayatollahi(2016)

Factor	Measure	Sources
Technology access	Technical infrastructure	Ghazisaeidi et al. (2014)
	Computer access	Ngusie et al. (2022); Biruk et al. (2014)
Perceived benefits	Awareness towards EHR	Ngusie et al. (2022)
	Perceived benefits	Ngusie et al. (2022)
Perceived enjoyment	Perceived enjoyment	Razmak (2022)
Perceived trust	Perceived trust	Razmak (2022)
Perceived usefulness	Perceived usefulness	Razmak (2022); Bahadori et al. (2017)
Perceived ease of use	Perceived ease of use	Razmak (2022); Bahadori et al. (2017)
Effort expectancy	Effort expectancy	Dimitrovski et al. (2021)
Performance expectancy	Performance expectancy	Lulin et al. (2020)
Descriptive norms	Descriptive norms	Dimitrovski et al. (2021)

In the organizational context, a large number of factors are found, including organizational culture, management support, human resources, engagement readiness, organizational readiness, core readiness, computer competency, motivational readiness, knowledge of EMR, end user profiles, previous experience with EMR, attitude towards EMR, process compatibility, collective self-efficacy, and behavioral intention (Table 2). Management support and organizational culture are key to facilitating change and ensuring acceptance of new technology throughout the organization. Computer competency and knowledge of EMR are important to ensure that staff have the necessary technical capabilities. Positive attitudes towards EMR and behavioral intention to adopt this technology also play an important role in determining hospital readiness.

The environmental context, which includes societal influence and environmental conditions, shows that external factors are also significant in influencing hospital readiness. Societal influences may include pressure from regulators, support from the medical community, and patient demands (Table 3). Environmental conditions, including government regulations and policies, may also influence the extent to which hospitals are prepared to adopt EMR.

Overall, the results of this study, as presented in the previous section, provide a comprehensive picture of the factors that influence hospital readiness to implement EMR (Figure 2). Technological, organizational, and environmental factors contribute to EMR adoption readiness and success. The studies reviewed indicate that hospital readiness results from complex interactions between these elements. Further research is needed to explore how these factors interact and how strategies can be developed to improve hospital readiness in various geographic and cultural contexts. These findings also emphasize the importance of a holistic approach in designing and implementing effective EMR adoption strategies.

Table 2. Readiness Factors in Organizational Context

Factor	Measure	Sources
Organizational culture	Cultural	Ghazisaeidi et al. (2014)
Management support	Leadership	Ghazisaeidi et al. (2014)
	Attributes of the change	Kabukye et al. (2020)
	Vision clarity	Kabukye et al. (2020)
	Values and goals	Alzghaibi et al.(2023)
	Change appropriateness & efficacy	Kabukye et al. (2020)
	Management	Ghazisaeidi et al. (2014)

Factor	Measure	Sources
Management support	CIO responsibility	Kim et al. (2017)
	Management structures	Alzghaibi et al.(2023)
	Presence of an effective champion	Kabukye et al. (2020)
	Administrative support	Alzghaibi et al.(2023)
	Governance and operational dimensions	Ghazisaeidi et al. (2014)
	Human resources readiness	Gholamhosseini and Ayatollahi (2016)
	Information System (IS) staff size	Kim et al. (2017)
Engagement readiness	Engagement readiness	Nicolai et al. (2023); Oo et al. (2021); Abdulai and Adam (2020); Awol et al. (2020)
Organizational readiness	Management capacity	Yilma et al. (2023)
	Finance & budget capacity	Yilma et al. (2023)
	Operational capacity & resources	Yilma et al. (2023); Esserman et al. (2024)
	Organizational flexibility	Kabukye et al. (2020)
	Organizational alignment	Yilma et al. (2023)
Core readiness	Core readiness	Hailegebreal et al. (2023); Oo et al. (2021); Abdulai and Adam (2020); Awol et al. (2020)
Computer competency	ICT literacy	Oo et al. (2021)
	Computer skills	Hailegebreal et al. (2023); Habibi-Koolaee et al. (2015)
	Computer literacy	Ngusie et al. (2022); Abore et al. (2022); Abdulai and Adam (2020); Awol et al. (2020); Biruk et al. (2014)
	Perceived technology self-efficacy	Ngusie et al. (2022)
	Technology capability	Yilma et al. (2023)
Motivational readiness	Motivational readiness	Nicolai et al. (2023)
Knowledge of EMR	Knowledge of EMR	Awol et al. (2020); Abdulai and Adam (2020); Abore et al. (2022); Hailegebreal et al. (2023)
	Knowledge on EMR	Oo et al. (2021)
	Knowhow on EMR	Biruk et al. (2014)
	EMR knowledge	Yilma et al. (2023); Habibi-Koolaee et al. (2015)
	Knowledge (organizational)	Alzghaibi et al.(2023)
End-user profiles	End-user profiles	Alzghaibi et al.(2023)
Previous experience with EMR	EMR training	Hailegebreal et al. (2023)
	Previous training & experience	Abore et al. (2022)
	Past experience with info exchange initiative	Kim et al. (2017)
	EMR training	Awol et al. (2020)
	Computer training	Yilma et al. (2023)

Factor	Measure	Sources
Attitude towards EMR	Attitude towards EMR	Yilma et al. (2023); Abore et al. (2022); Ngusie et al. (2022); Hailegebreal et al. (2023)
	Attitude	Razmak (2022); Awol et al. (2020); Habibi-Koolaee et al. (2015)
	EMR attitude	Biruk et al. (2014)
Process compatibility	Processes	Alzghaibi et al.(2023)
	Job relevance	Dimitrovski et al. (2021)
Collective self-efficacy	Collective self-efficacy	Kabukye et al. (2020)
Behavioural intention	Behavioural intention	Lulin et al. (2020)

Table 3. Readiness Factors in Environmental Context

Factor	Measure	Sources
Societal influence	Social influence	Dimitrovski et al. (2021)
Environmental conditions	Facilitating conditions	Dimitrovski et al. (2021)
	Environmental readiness	Gholamhosseini and Ayatollahi (2016)

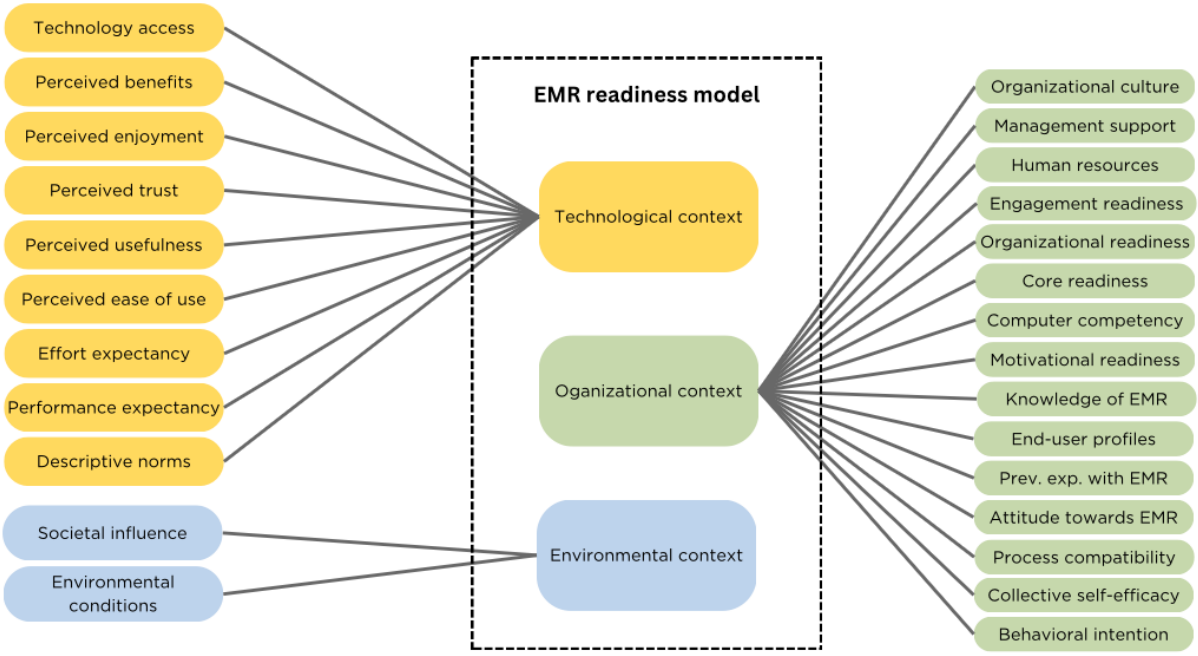

Figure 2. Model of Hospital Readiness Factors in Implementing EMR

The research designs used in the reviewed articles show a predominance of quantitative methods (Table 4). Of the 19 articles, 14 used quantitative methods, 2 used qualitative methods, and 3 used mixed methods. The use of quantitative methods shows a tendency to measure hospital readiness objectively through surveys and statistical analysis. Meanwhile, qualitative and mixed methods provide deeper insight into the factors that influence readiness through interviews, observations, and Delphi techniques.

The most frequently used data collection method was the survey questionnaire, used in 16 articles, indicating a preference for collecting data that could be analyzed statistically. Interviews were used in 5 articles, allowing the researcher to gain in-depth insights from the respondents. The observation and Delphi methods were each used in 1 article, providing additional perspectives through a direct approach and expert consensus. See table 5 for a summary of data collection methods used in previous research.

Table 4. Research Design

Research Design	Study	Amount
Quantitative	Hailegebreal et al. (2023); Yilma et al. (2023); Ngusie et al. (2022); Razmak (2022); Dimitrovski et al. (2021); Oo et al. (2021); Kabukye et al. (2020); Abdulai and Adam (2020); Lulin et al. (2020); Bahadori et al. (2017); Kim et al. (2017); Biruk et al. (2014); Ghazissaedi et al. (2014); Habibi-Koolaee (2015)	14
Qualitative	Nicolai et al. (2023); Esserman et al. (2024)	2
Mixed	Alzghaibi et al.(2023); Abore et al. (2022); Awol et al. (2020)	3

Table 5. Method of Collecting Data

Method of Collecting Data	Study	Amount
Survey questionnaire	Hailegebreal et al. (2023); Yilma et al. (2023); Alzghaibi et al.(2023); Ngusie et al. (2022); Abore et al. (2022); Razmak (2022); Dimitrovski et al. (2021); Oo et al. (2021); Kabukye et al. (2020); Abdulai and Adam (2020); Lulin et al. (2020); Awol et al. (2020); Bahadori et al. (2017); Kim et al. (2017); Biruk et al. (2014); Habibi-Koolaee et al. (2015)	16
Interviews	Nicolai et al. (2023); Alzghaibi et al.(2023); Abore et al. (2022); Awol et al. (2020)	4
Delphi	Ghazissaedi et al. (2014)	1

Various data analysis methods were applied, including bivariate/multivariate logistic regression, descriptive statistics, partial least square structural equation model (PLS-SEM), covariance based (CB) SEM, multivariable logistic regression, hierarchical linear regression analysis, multiple linear regression, chi-square test, Fisher's exact test, grounded theory, content analysis, and thematic analysis. The use of these various analytical methods shows the variety of approaches used by researchers to explore readiness factors and evaluate the relationships between the variables involved (Table 6).

Table 6. Data Analysis Method

Data Analysis Method	Study	Amount
Bivariate/multivariate logistic regression	Hailegebreal et al. (2023); Yilma et al. (2023); Abore et al. (2022); Awol et al. (2020); Kim et al. (2017); Kim et al. (2017); Biruk et al. (2014)	7
Descriptive statistics	Awol et al. (2020); Kim et al. (2017); Biruk et al. (2014); Ghazissaedi et al. (2014); Habibi-Koolaee et al. (2015)	5
PLS-SEM	Alzghaibi et al.(2023); Razmak (2022); Kabukye et al. (2020)	3
CB-SEM	Lulin et al. (2020); Bahadori et al. (2017)	2
Multivariable logistic regression	Ngusie et al. (2022); Oo et al. (2021)	2
Hierarchical linear regression analysis	Dimitrovski et al. (2021)	1
Multiple linear regression	Abdulai and Adam (2020)	1
Chi-square test	Oo et al. (2021)	1
Fisher’s exact test	Oo et al. (2021)	1
Grounded theory	Nicolai et al. (2023)	1
Content analysis	Siswati (2023)	1
Thematic analysis	Abore et al. (2022)	1

The reviewed studies covered a wide range of geographic contexts, with Ethiopia being the country with the largest number of studies (6 articles), followed by Ghana, Iran, and the United States with 2 articles each, and Italy, Macedonia, Myanmar, Saudi Arabia, Uganda, and United Arab Emirates with 1 article each. This geographic

variation provides a broad perspective on hospital readiness across the world, demonstrating that readiness to implement EMR is a global issue with unique challenges and opportunities in each local context (Table 7).

Table 7. Research Country Context

Research Country Context	Study	Amount
Ethiopia	Hailegebreal et al. (2023); Yilma et al. (2023); Ngusie et al. (2022); Abore et al. (2022); Awol et al. (2020); Biruk et al. (2014)	6
Ghana	Abdulai and Adam (2020); Lulin et al. (2020)	2
Iran	Bahadori et al. (2017); Ghazissaedi et al. (2014)	2
United States	Kim et al. (2017); Esserman et al. (2024)	2
Italy	Nicolai et al. (2023)	1
Macedonia	Dimitrovski et al. (2021)	1
Myanmar	Oo et al. (2021)	1
Saudi Arabia	Alzghaibi et al.(2023)	1
Uganda	Kabukye et al. (2020)	1
United Arab Emirates	Razmak (2022)	1

The reviewed studies were conducted in the context of public hospitals (eight articles) and a mix of public and private hospitals (one article). It should be noted that none of the studies were conducted exclusively in the context of private hospitals. In addition, most of the studies (14 articles) did not include the context of hospital type in terms of ownership. Thus, it cannot be concluded that the context of hospital ownership has an influence on readiness for electronic medical record implementation (Table 8).

In addition to the context of hospital ownership, we can also analyze the context of studies from the perspective of the level of health services offered to the community, i.e. primary, secondary, and tertiary hospitals (Table 9). The reviewed studies were conducted in the context of various levels of hospitals. There were two articles conducted at primary care facilities, one article at a secondary referral general hospital, and five articles at a tertiary referral hospital. However, most of the reviewed studies did not specifically mention where the research was conducted (11 articles). With the limited data collected, it cannot be concluded that the type of hospital in terms of the level of health services plays a role in the readiness of health services in implementing EMR.

Table 8. Hospital Context in Terms of Ownership

Hospital	Study	Amount
Government Hospital	Hailegebreal et al. (2023); Alzghaibi et al.(2023); Ngusie et al. (2022); Abore et al. (2022); Lulin et al. (2020); Ghazisaeidi et al. (2014); Yilma et al. (2023)	7
Private Hospital	-	-
Not mentioned	Nicolai et al. (2023); Dimitrovski et al. (2021); Kim et al. (2017); Razmak (2022); Oo et al. (2021) Kabukye et al. (2020); Abdulai and Adam (2020); Awol et al. (2020); Bahadori et al. (2017); Biruk et al. (2014); Esserman et al. (2024); Habibi-Koolaee et al. (2015)	12

Table 9. Hospital Context in Terms of Health Service Level (Hospital Type)

Hospital Type	Study	Amount
Primary Care	Alzghaibi et al. (2023); Awol et al. (2020)	2
Secondary Hospital/ General Hospital	Abore et al. (2022)	1
Tertiary Hospital	Oo et al. (2021); Kabukye et al. (2020); Abdulai and Adam (2020); Biruk et al. (2014); Lulin et al. (2020)	5
Mixed	Ngusie et al. (2022)	1
Not mentioned	Hailegebreal et al. (2023), Nicolai et al. (2023); Dimitrovski et al. (2021); Kim et al. (2017), Razmak (2022); Bahadori et al. (2017); Ghazisaeidi et al. (2014); Yilma et al. (2023); Esserman et al. (2024); Habibi-Koolaee et al. (2015)	10

DISCUSSION

The results of this study provide a comprehensive picture of the factors that influence hospital readiness to implement EMR. Technological, organizational, and environmental factors all contribute to the readiness and success of EMR adoption. The studies reviewed suggest that hospital readiness is the result of a complex interaction between these elements.

The main findings of this study answer the research questions by identifying various factors that influence hospital readiness to implement EMR. In the context of technology, access to technology and perceptions of the benefits and usefulness of EMR are key factors most frequently mention in the articles. In addition, ease of use of EMR also encourages users willingness to be more willing to implement EMR. Although EMR users believe that EMR can make their work easier, if the EMR application is not easy to use, then the willingness to use EMR is also constrained. Even if access to technology is also easy but not easy to implement, then the implementation of EMR will be constrained. Therefore, applications and internet networks that support and facilitate the implementation of EMR play a very important role in the readiness of using EMR.

In the context of the organization, management support, computer competence, and knowledge of EMR are factors most frequently mentioned in the articles that influence readiness. Strong management support will encourage the success of EMR implementation because management is a key factor in decision-making on the development of EMR that is in accordance with the needs of the hospital. Management support can also influence other factors such as increasing employee competence and knowledge of EMR. In addition, the readiness of the organization in adopting EMR is also a factor that determines the readiness of EMR implementation. This affects the way of working and the workflow of organizations that adapt to working using EMR.

The environmental context is also important, with pressure from regulators and environmental conditions affecting hospital readiness. Existing regulations can encourage hospitals to implement EMR. The implementation of EMR also increases if the environment around the hospital has used EMR massively. By looking at the environmental conditions that have used EMR together, it will encourage hospitals to adopt EMR in providing services in the hospital.

All factors in these three contexts need to be considered by hospitals that want to implement EMR. However, it is important to note that hospital type, both in terms of ownership and service level, does not appear to have an influence on readiness to implement EMR. This indicates that all types of hospitals need to consider the readiness factors outlined in this study.

Theoretically, these findings strengthen the TOE theory by showing that factors in the three contexts interact with each other and influence organizational readiness to adopt new technologies. These findings also emphasize the importance of a holistic approach in understanding organizational readiness, given that technological, organizational, and environmental factors cannot be separated from each other.

Practically, these findings provide useful insights for policy makers and hospital management. To improve hospital readiness in implementing EMR, a comprehensive strategy is needed that includes increasing technology access, strong management support, and adjustment to environmental conditions. Human resource training and development are also important factors to ensure that staff have the necessary competencies to adopt EMR.

However, this study has several limitations. First, focusing on articles published in English may have overlooked important studies published in other languages. Second, using only one database (Scopus) may have limited the scope of the literature search. Third, although the PRISMA method was strictly followed, there is a possibility of bias in the screening and selection process of articles. Further research is needed to expand the geographical and language coverage, as well as use additional databases to ensure that all relevant literature is covered.

These findings emphasize the importance of a holistic approach in designing and implementing effective EMR adoption strategies. Further research is needed to explore how these factors interact and how strategies can be developed to improve hospital readiness across geographic and cultural contexts.

CONCLUSION

This study aims to identify factors that influence hospital readiness in implementing EMR. It was found that factors influence hospital readiness to adopt EMR in three primary contexts according to the TOE theory: technological, organizational, and environmental contexts. In the context of technology, access to technology, perceived benefits, and perceived usefulness are key factors determining readiness. On the organizational side, management support, computer competence, and

knowledge of EMR are essential elements. In addition, the environmental context, including regulatory pressures and environmental conditions, also play a significant role in hospital readiness. However, this study has several limitations, including the focus on English-language literature that may limit the scope of the literature search. Therefore, further research is needed to expand the geographical and language coverage and use additional databases.

RECOMMENDATIONS

This study recommends that hospitals pay attention to factors that influence hospital readiness in adopting EMR. These factors consist of three main contexts according to TOE theory: technology, organization, and environment. In the context of technology, access to technology, perceived benefits, and perceived usefulness are factors that must be considered. On the organizational side, management support, computer competence, and knowledge of EMR are the most influential factors. Finally, in the environmental context, regulatory pressure and environmental conditions also play a very important role in hospital readiness. By considering these three contexts as a whole, hospitals will be better to implement EMR effectively, thereby improving the quality of service and overall operations.

REFERENCES

Abdulai, A.F. and Adam, F., 2020. Health providers' readiness for electronic health records adoption: A cross-sectional study of two hospitals in northern Ghana. *PloS One*, *15*(6), p.e0231569.

Abore, K.W., Debiso, A.T., Birhanu, B.E., Bua, B.Z. and Negeri, K.G., 2022. Health professionals' readiness to implement electronic medical recording system and associated factors in public general hospitals of Sidama region, Ethiopia. *PloS One*, *17*(10), p.e0276371.

Awol, S.M., Birhanu, A.Y., Mekonnen, Z.A., Gashu, K.D., Shiferaw, A.M., Endehabtu, B.F. and Tilahun, B., 2020. Health professionals' readiness and its associated factors to implement electronic medical record system in four selected primary hospitals in Ethiopia. *Advances in Medical Education and Practice*, pp.147-154.

Alzghaibi, H., Alharbi, A.H., Mughal, Y.H., Alwheeb, M.H. and Alhlayl, A.S., 2023. Assessing primary health care readiness for large-scale electronic health record system implementation: Project team perspective. *Health Informatics Journal*, *29*(1), p.14604582231152790.

Alshahrani, M., and Bahattab, A. 2015. A Comparative Study on the Adoption of Information Technology in Saudi Hospitals. *Health Information Management Journal*, *44*(3), 23-28.

Bahadori, M., Alimohammadzadeh, K., Abdolkarimi, K. and Ravangard, R., 2017. Factors affecting physicians' attitudes towards the implementation of electronic health records using structural equation modeling (SEM). *Shiraz E-Medical Journal*, *18*(11).

Biruk, S., Yilma, T., Andualem, M. and Tilahun, B., 2014. Health professionals' readiness to implement electronic medical record system at three hospitals in Ethiopia: a cross-sectional study. *BMC Medical Informatics and Decision Making*, *14*(1), pp.1-8.

Depietro, R., Wiarda, E. and Fleischer, M., 1990. The context for change: Organization, technology and environment. *The Processes of Technological Innovation*, *199*, pp.151-175.

Dimitrovski, T., Bath, P.A., Ketikidis, P. and Lazuras, L., 2021. Factors affecting general practitioners' readiness to accept and use an electronic health record system in the republic of North Macedonia: a national survey of general practitioners. *JMIR Medical Informatics*, *9*(4), p.e21109.

Esserman, D., Greene, E.J., Latham, N.K., Kane, M., Lu, C., Peduzzi, P.N., Gill, T.M. and Ganz, D.A., 2024. Assessing readiness to use electronic health record data for outcome ascertainment in clinical trials–A case study. *Contemporary Clinical Trials*, *142*, p.107572.

Ghazisaeidi, M., Ahmadi, M., Sadoughi, F. and Safdari, R., 2014. An assessment of readiness for pre-implementation of electronic health record in Iran: a practical approach to implementation in general and teaching hospitals. *Acta Medica Iranica*, pp.532-544.

Gholamhosseini, L. and Ayatollahi, H., 2017. The design and application of an e-health readiness assessment tool. *Health Information Management Journal*, *46*(1), pp.32-41.

Habibi-Koolaee, M., Safdari, R. and Bouraghi, H., 2015. Nurses readiness and electronic health records. *Acta Informatica Medica*, *23*(2), p.105.

Hailegebreal, S., Dileba, T., Haile, Y. and Abebe, S., 2023. Health professionals' readiness to

implement electronic medical record system in Gamo zone public hospitals, southern Ethiopia: an institution-based cross-sectional study. *BMC Health Services Research*, *23*(1), p.773.

Kabukye, J.K., de Keizer, N. and Cornet, R., 2020. Assessment of organizational readiness to implement an electronic health record system in a low-resource settings cancer hospital: A cross-sectional survey. *PloS One*, *15*(6), p.e0234711.

Kim, J., Ohsfeldt, R.L., Gamm, L.D., Radcliff, T.A. and Jiang, L., 2017. Hospital characteristics are associated with readiness to attain stage 2 meaningful use of electronic health records. *The Journal of Rural Health*, *33*(3), pp.275-283.

Lulin, Z., Owusu-Marfo, J., Antwi, H.A., Antwi, M.O. and Xu, X., 2020. Nurses' readiness in the adoption of hospital electronic information management systems in Ghana: the application of the structural equation modeling and the UTAUT model. *SAGE Open*, *10*(2), p.2158244020931814.

Ngusie, H.S., Kassie, S.Y., Chereka, A.A. and Enyew, E.B., 2022. Healthcare providers' readiness for electronic health record adoption: A cross-sectional study during pre-implementation phase. *BMC Health Services Research*, *22*(1), p.282.

Nicolai, B., Tallarico, S., Pellegrini, L., Gastaldi, L., Vella, G. and Lazzini, S., 2023. Blockchain for electronic medical record: assessing stakeholders' readiness for successful blockchain adoption in healthcare. *Measuring Business Excellence*, *27*(1), pp.157-171.

Oo, H.M., Htun, Y.M., Win, T.T., Han, Z.M., Zaw, T. and Tun, K.M., 2021. Information and communication technology literacy, knowledge and readiness for electronic medical record system adoption among health professionals in a tertiary hospital, Myanmar: A cross-sectional study. *PloS One*, *16*(7), p.e0253691.

Razmak, J., 2022. Assessing patient readiness for a patient portal implementation in the UAE. Journal of Science and Technology Policy Management.

Yilma, T.M., Tilahun, B., Mamuye, A., Kerie, H., Nurhussien, F., Zemen, E. and Tegegne, M.D., 2023. Organizational and health professional readiness for the implementation of electronic medical record system: an implication for the current EMR implementation in northern Ethiopia. *BMC Health Services Research*, *23*(1).