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Systematic Literature Review of the Obstacles in Managing Electronic Records in Mobile Environment

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Abstract. As a rapidly advancing field within information and communication technology (ICT), mobile technology introduces new challenges to records management practices. The proliferation of mobile and wireless devices presents indirect challenges in effectively managing electronic records. To investigate the issues and challenges associated with managing electronic records in a mobile environment across various fields, this study relied on the selected databases of ScienceDirect, Emerald Insight, Scopus, and IEEE Xplore. By conducting a comprehensive review of previous literature published between 2015 and 2022 in the context of the mobile environment, this study presents its findings, encompassing aspects such as the background, research strategy, subject, and year of publication in the selected studies. Drawing from these findings, the identified issues and challenges are examined, and potential directions for future research are discussed. Overall, this study contributes to a deeper understanding of the utilization of electronic records in a mobile environment, highlighting key concerns and offering insights for further exploration.
Keywords: Electronic records, mobile environment, mobile technology, issues, and challenges of records, information management.

1 Introduction

In the present era, the realm of human civilization has been significantly shaped by the pervasive influence of information and communication technology (ICT), particularly concerning the ever-advancing utilization of smartphones for content management (Mohd Suzeren et al., 2019). Smartphones, as sophisticated, dynamic, and portable

devices, allow users to access information regardless of time and location (Al-Barashdi, Buoazza & Jabur, 2015; Al-fawareh & Jusoh, 2014).

The ability of a smartphone to operate like a computer provides many benefits to users while also increasing the level of smartphone ownership and the manner and purpose of its use (Lay-Yee, Kok-Siew & Yin-Fah, 2013; Weinberg, 2012). Througsmartphones, many activities can be implemented, including information sharing, communication, internet browsing, production and editing of documents, and various activities. This can be seen when the existence of various applications on smartphones can simultaneously increase the use of any electronic system that is friendly to the mobile environment. Based on a study from Dainton & Chu (2017), the authors examined electronic medical record-keeping in the mobile environment in austere settings. The study highlighted that record-keeping in the mobile environment can be considered as the potential to support EMRs' organizational accountability, clinical data management, and the integration of evidence-based decision support. In addition, mobile features and applications that are very similar to using a computer make it easier for users to access any formal or informal information. With the increase in the number of users using mobile devices has contributed to new problems, Hence, the objective of this study is to delve into the issues and challenges about the management of electronic records in a mobile environment. In addition to analyzing these challenges, the study provides a comprehensive examination of the broader implications of the mobile environment on records management.

2 Methodology

The systematic literature review is based on preferred reporting items for systematic reviews and meta-analyses (PRISMA) method. The protocol was implemented to ensure consistency throughout the literature review process (Okoli & Schabram, 2010). Furthermore, it delineates the precise procedures to adhere to during the evaluation phase. Following these established processes, other researchers conducting a similar literature study can replicate the results.

2.1 Selection of article databases

A specific set of online databases was targeted to streamline the article search process, thereby narrowing down the number of articles to be retrieved. The chosen databases for this study encompassed ScienceDirect, Emerald Insight, Scopus, and IEEE Xplore

2.2 Search terms

The list below presents a set of search keywords meticulously formulated to procure pertinent articles, aligning with the study's objectives. The search was conducted diligently during the months of October and November 2022. Boolean search strings were employed to refine the search and enhance the relevance of the keywords. These strings

included the following criteria: i. Electronic Records and ii. Mobile Environment OR Mobile Technology.

2.3 Selection of papers: Inclusion and exclusion criteria

After the articles were identified through the search process, a comprehensive evaluation was conducted. Only those articles that satisfied a specific set of predefined criteria, as depicted in Table 1 below, were included in the literature review. The purpose of these criteria was to ensure that the selected articles were relevant to the study's topic. Conversely, articles that did not meet the criteria were not examined further. The articles that successfully passed the screening process were obtained in their entirety and subsequently reviewed during the analysis phase.

2.4 Data analysis

The aim is to explore novel themes within the study field by scrutinizing existing research on electronic records in the mobile environment. Furthermore, it is presumed that many of the articles will lack readily comparable statistical data. Once the selection process identified the relevant articles, they were deciphered and organized into distinct categories, including background field, research strategy, subject, and year of publication. Table 1 shows the inclusion criteria for the systematic review Managing Electronic Records in Mobile Environment.

Table 1: Inclusion criteria for the systematic review of Managing Electronic Records in a Mobile Environment.

Inclusion criteria	Motivation
Published between 2015 - present	Scholarly publications on electronic records in the mobile environment appeared from 2015 onwards.
Focused on Electronic Records	This study is focused on the Electronic Records Management field.
Research on the mobile environment	This study focused on the mobile application.
Research in information technology or information system at any educational level field	The study strictly adheres to the requirement of concentrating on the mobile environment within the realm of information technology and the information system field.
Written in English	It is a requirement that the study is written in English.
Peer-reviewed conference and journal articles	The selection of the article requires peer reviewed.

2.5 Results

This section presents the outcomes derived from the literature review process. Table 2 showcases the number of research papers retrieved from the respective article databases. 81 research papers were initially obtained using predefined search keywords. However, following the application of inclusion and exclusion criteria related to electronic records in the mobile environment, only four articles were selected for a thorough full-text review.

Table 2: Search results for the systematic review of Managing Electronic Records in the Mobile Environment domain.

Databases	Search strings	Number of research papers
ScienceDirect	((Electronic Records) OR (Records Electronic) AND (Mobile Technology))	26
Emerald Insight	((Electronic Records) OR (Records Electronic) AND (Mobile Environment))	10
Scopus	((Electronic Records) AND (Mobile Environment) OR (Mobile Application)) AND LIMIT-TO (topics, “electronic records”)	20
IEEE Xplore	((Electronic Records) OR (Records Electronic) OR (Mobile Devices) AND (Mobile Environment) OR (Mobile Technology))	25

2.6 Background: Social Science

The first category focuses on the background field of the study, which primarily falls under Information Science. To retrieve relevant articles, the study opted to explore the Social Science field. Figure 1 displays the number of search hits, with 81 papers identified across four electronic databases. The analysis revealed that Scopus accounted for 24.6% of the papers, ScienceDirect contributed 32%, Emerald Insight constituted 12.3%, and IEEE Xplore comprised 30.8%. Consequently, only eight papers were deemed pertinent to the study's topic, with Scopus representing 15%, ScienceDirect at 3.8%, Emerald Insight at 20%, and IEEE Xplore at 8%.

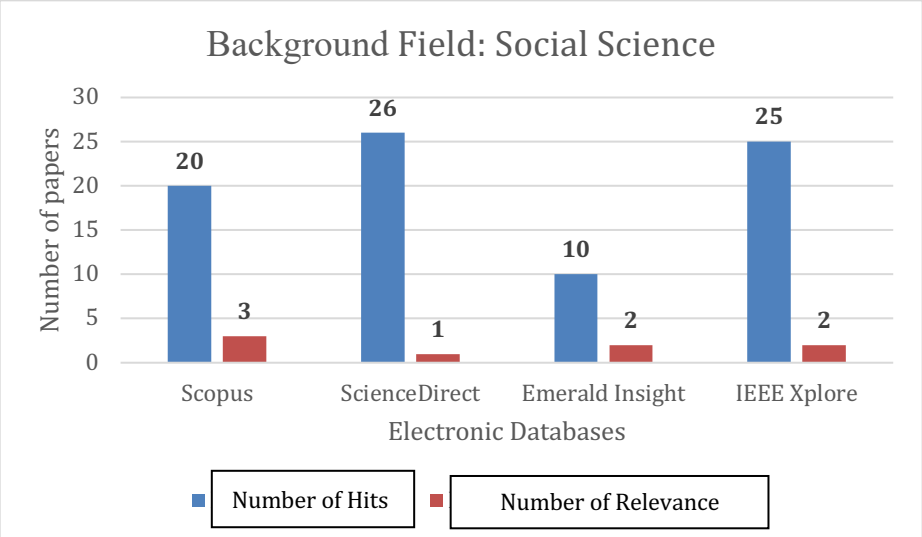

Figure 1: Background field

2.7 Subject

In the second category, the subject area was examined. The analysis revealed that both Social Science and Computer Science had equal searches, accounting for 0.78% each. On the other hand, Health professions comprised only 0.1% of the searches, while Business and Management constituted 0.6%. However, it is important to note that this study prioritizes subject areas within Social Science. Figure 2 shows the subject area for related fields.

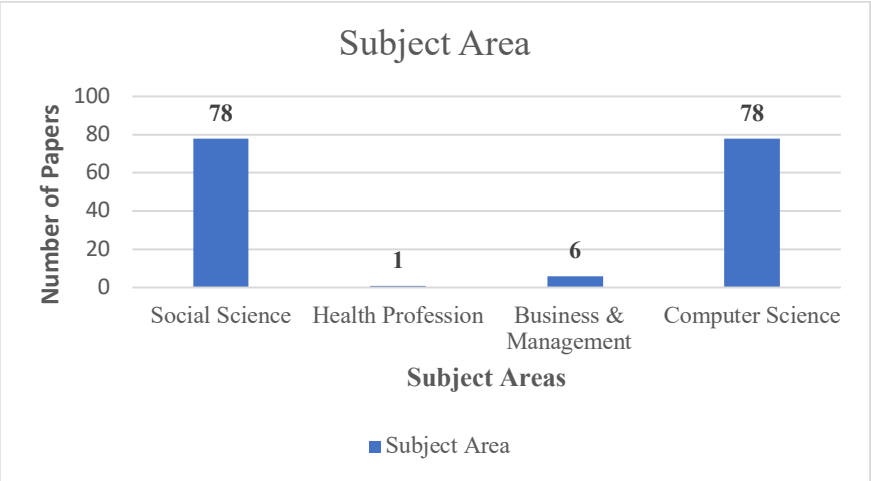

Figure 2: Subject area

2.8 Publication type

The third category focuses on the publication type, aiming to identify the research strategies employed in conducting the study. The study utilized the publication type as a criterion for extracting relevant papers. Figure 3 presents four types of publications: research papers accounted for 0.26%, case studies represented 0.1%, article reviews comprised 0.11%, and conference papers constituted 0.25% of the total papers. Figure 3 shows the type of publication involved.

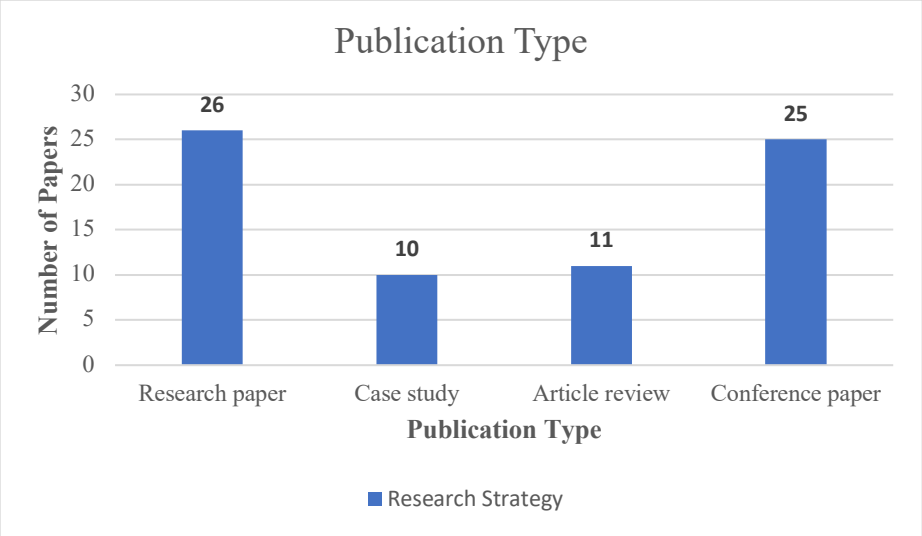

Figure 3: Publication type

2.9 Year of publication

The fourth category focuses on the publication year, with the study specifically searching for papers related to the topic from 2016 onwards. The analysis reveals a notable increase in publications between 2019 and 2020, as depicted in Figure 4. The highest number of publications, totaling thirty-nine (39) papers, was recorded in 2020. This was closely followed by 2019 and 2021, with thirty-six (36) papers. Similarly, 2016 and 2018 saw seventeen (17) papers each. In 2022, twenty-seven (27) papers were published, while the lowest number of publications was in 2017, with fourteen (14) papers. Figure 4 shows the year of publication.

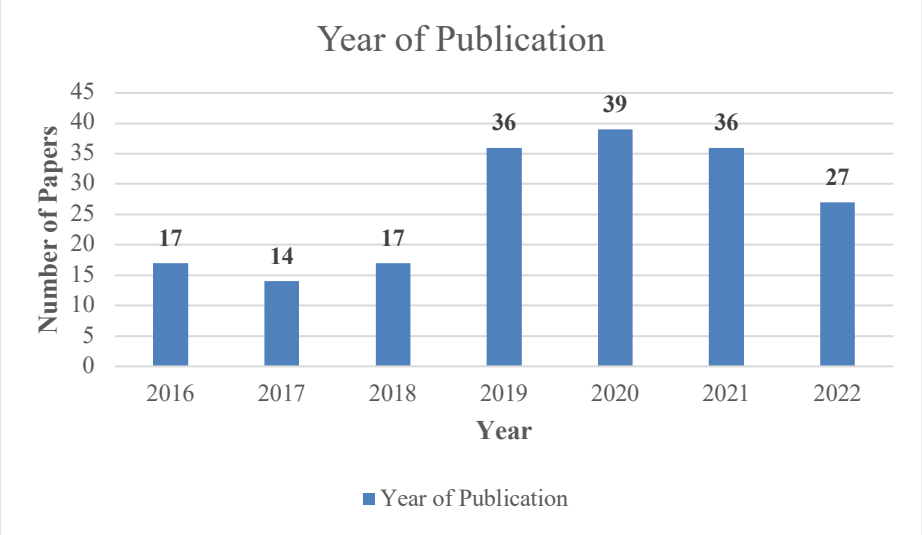

Figure 4: Year of publication

2.10 Discussion

The literature review highlights that most of the research in this field has been conducted within the social science domain. Furthermore, the review encompassed seven (7) years of publication, from January 2016 to October 2022. The analysis revealed that research papers accounted for 0.26% (26) of the publications, while conference papers constituted 0.25% (25) (see Figure 3). Overall, there was a significant increase in the number of publications on electronic records in the mobile environment, particularly between 2019 and 2022 (as illustrated in Figure 4). The highest number of publications, totaling thirty-nine (39) papers, was observed in 2022, followed by 2019 and 2021 with thirty-six (36) papers each.

The selected studies employed various research strategies, including research papers, case studies, article reviews, and conference papers. Among these strategies, research papers and conference papers were the most frequently utilized approaches. Additionally, a significant portion of the research papers aimed to address issues related to electronic medical and health records by leveraging the development of mobile technology or mobile devices. Overall, the analysis demonstrated a successful search result, with approximately 81 research papers, case study papers, articles, and conference papers identifying the effective use of managing electronic records in a mobile environment.

One research limitation is the reliance on articles from only four online databases. This implies that the results could be varied if additional databases were included in the study. However, considering that the four selected databases are substantial and encompass a significant portion of published work within the research field, the potential impact of excluding other databases is expected to be relatively minor.

3 Analysis and Results

This section presents the analysis and results from the literature review. Table 3 shows the challenges and issues of managing electronic records in a mobile environment retrieved from the three articles from electronic databases. Table 3 presents the challenges and issues identified in the aforementioned studies, which slightly vary across different organizations and fields (Mäkinen,2013; Dainton & Chu, 2017; Mohebi, et al., 2018; and Fatin Nur et. al, 2022).

Table 3: Challenges and issues of three selected articles in managing electronic records in a mobile environment.

Articles				
Challenges/issues of managing electronic records in a mobile environment	Mäkinen (2013)	Dainton & Chu (2017)	Mohebi *et al.* (2018)	Fatin Nur et. al (2022)
	Version control	Lack of existing infrastructure	Limited technical expertise	Skills and competencies
	Sharing	Cost of electronic hardware	No internet connectivity in the field and poor electricity supply	Sustainability
	Challenges in storing business records	Difficulties in transporting and exporting data	Lack of community support	Records management life cycle compliance
	Data security risk	Vulnerable to theft in countries with existing security concerns		Governance
	Archiving	Unreliable internet access		

Mäkinen (2013) study focuses on the challenges and practices of electronic records in Information Technology and Communication (ICT), specifically emphasizing the challenges posed by mobile devices and new wireless tools. The study identifies five challenges derived from the research: version control, sharing, archiving, challenges in storing business records, and data security risks.

In managing electronic records within the mobile environment, version control is a significant issue. Mobile workers often deal with different environments and situations, necessitating the production, processing, sharing, and management of records in various electronic versions. This can result in mobile workers managing multiple versions of records across different devices, such as office computers, personal computers, or laptops (Mäkinen, 2013). Akporhonor (2020) supports this notion, highlighting that

producing multiple copies can be costly and time-consuming, leading to confusion regarding the official version of a document. Electronic records, being accessible and used by multiple individuals simultaneously, irrespective of location, can contribute to duplication and complicate the identification of the authoritative record. The development of mobile technology introduces new challenges in managing electronic records, and the issue of version control is just one example.

Another significant issue faced by mobile workers is the archiving of data. Many mobile workers rely on laptop hard drives, without considering the need for external backups or archiving. This indicates a lack of awareness regarding retention schedules and the importance of proper data storage. Even if sensitive records are encrypted, losing a laptop can have severe consequences. More complex issues can arise when a company has a limited number of computers shared among multiple individuals. Unauthorized access to records and potential destruction of records required to be retained according to the retention schedule becomes possible.

The issues of storing, transferring, and exporting records and data from wireless devices, as mentioned in the studies by Mäkinen (2013) and Dainton & Chu (2017), are closely related to mobile devices. Various protocols, such as FTP (File Transfer Protocol) and messaging protocols, are utilized for data transmission between devices. FTP is commonly used to transfer files between remote computers, while messaging protocols are well-suited for web applications in the IoT (Internet of Things) framework. However, it is essential to note that FTP may not be suitable in its existing format for IoT, as IoT nodes require raw data collection from basic sensor nodes in the framework's application scenario. Therefore, messaging protocols are considered more suitable for IoT applications. Nonetheless, both protocols are interdependent and play a crucial role in developing mobile applications.

Data security risk is indeed a prevalent challenge in the mobile technology environment. The study highlights the potential risks of unsecured data falling into the wrong hands. Viruses and worms, particularly in email and telecommunication, pose a significant threat. The presence of viruses like Commonwariors specifically targeting mobile environments exacerbates the risk. Glisson & Storer (2013) further point out inappropriate activities involving the unauthorized distribution of confidential information, such as unauthorized transmission, access, copying, and storage of excessive non-business-related data and personal information. Despite using various data encryption techniques, wireless networks still pose significant security risks. This can lead to information loss and compromise the integrity of an organization's information due to the complexity of communication systems (Mäkinen, 2013).

Another challenge identified in the study by Dainton & Chu (2017) is the lack of existing infrastructure. The cost of electronics or hardware in mobile devices can be prohibitive, hindering the establishment of necessary infrastructure. Rourke et al. (2022) support this finding, indicating that issues with mobile device infrastructure often arise due to the lack of vendor support. Similarly, Mohebi et al. (2018) mention the challenge of a lack of community support. In health institutions, some families may be hesitant to provide personal and family information, leading to resistance among staff to require the necessary details and documents for entry into the application. This significant issue within the organization can result in the system being abandoned. The

lack of infrastructure also impacts the software's capability, including limitations on multi-user access, data access, and data output restrictions in the mobile environment. Furthermore, unreliable internet access poses another challenge. Mohebi et al. (2018) also highlight this issue, noting the absence of internet connectivity and poor electronic supply for managing data entry. The requirement for online mode and document uploading exacerbates data synchronization issues, as the system cannot capture and save information reliably.

The study by Mohebi et al. (2018) identifies limited technical expertise as a challenge. Managing records in a digital environment necessitates acquiring new skills and competencies to adapt to new technologies and effectively handle electronic records (Wamukoya & Mutula, 2005). The knowledge processes in managing records entail understanding important context, content, information, and collaboration within and between professional groups that utilize the records (Harries, 2009).

Furthermore, Fatin Nur et al. (2022) emphasizes significant consumer issues related to electronic medical record management. These issues include records management life cycle compliance, privacy concerns, and data breaches. Transitioning from a traditional records management system to an electronic medical record management system introduces various risks, such as records theft by hackers. Establishing a trusted electronic medical record system in healthcare requires clear guidelines to protect against illegal actions and address concerns related to cybersecurity, privacy, increasing malpractice liability, and patient apprehension. Weighing the advantages and disadvantages of electronic medical records, experts and policymakers must consider adopting effective electronic record management systems to reap substantial benefits.

4 Conclusions

Based on the analysis of various types of electronic records with their respective challenges and issues, it can be concluded that there is currently no specific regulation for producing, editing, and storing records in the mobile environment. However, it is crucial for records management professionals to take proactive measures in recognizing the significant impact and addressing the challenges and issues associated with managing records in mobile working environments. This involves acknowledging the current situation, understanding the root causes of these issues, identifying potential threats, and establishing regulations to manage records in mobile environments effectively. This resolution can be achieved through collaborative efforts among professional groups, including records and archives professionals, information technology specialists, and mobile workers. Mobile workers should be made aware of the importance of records management and archival services, as preserving organizational memory is essential for the smooth operation of an organization. It is necessary to prioritize incorporating new innovations into processes and activities to ensure optimal performance, considering the dynamic nature of progress in this field. By addressing these challenges and implementing appropriate regulations, organizations can better navigate the complexities of managing electronic records in mobile working environments.

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