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Managing Document Management Systems' Life Cycle in Relation to an Organization's Maturity for Digital Transformation

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Abstract: Document management systems (DMS) have become an important topic regarding digital transformation in organizations because they enable paperless business, speed up processes, lower business costs, and support sustainability activities in organizations. DMSs should be considered as green technology and also as technology crucial for green digital transformation. Sustainability is becoming increasingly crucial for organizations and society, and DMSs, along with paperless business, can contribute to the sustainable orientation of organizations. However, the problem with DMS implementations is that they often fail and that DMS users often use DMSs at a basic level, which means that, among other things, they still prefer to print documents rather than use electronic documents. A framework that can contribute to a better implementation and a higher level of use of DMSs, which both lead to a more green digital transformation of the organization, represents an organization's maturity. We used the Process and Enterprise Maturity Model (PEMM) to assess the organization's maturity level concerning the DMS' life cycle. Findings are presented from the research study. The research study was based on a questionnaire and collected data from DMS users. The research study showed that an organization's maturity impacts the DMS' life cycle. Organizations that manage the DMS' life cycle will better cope with digital transformation and sustainability issues related to paperless business.

Keywords: digitalization of processes; document management system (DMS); organization maturity; process maturity; life cycle; digital transformation

Citation: Sternad Zabukovšek, S.; Jordan, S.; Bobek, S. Managing Document Management Systems' Life Cycle in Relation to an Organization's Maturity for Digital Transformation. *Sustainability* **2023**, *15*, 15212. https://doi.org/10.3390/su152115212

Academic Editor: Marc A. Rosen

Received: 28 August 2023
Revised: 15 October 2023
Accepted: 22 October 2023
Published: 24 October 2023

1. Introduction

Information technology (IT) and digital transformation increasingly support sustainable orientation and concepts, while digital transformation implements green computing concepts and technologies. On the other hand, the implementation of information solutions follows green digital transformation features, which also include developing and implementing various information technologies, allowing fast and more structured creation of different documents [1]. These technologies are crucial to achieving a higher level of sustainability, and, at the same time, they can make processes leaner, paperless, and more effective, impacting the organization's carbon footprint. In addition, today's competitive environment forces organizations to digitalize their processes, including documents [2]; therefore, organizations can successfully continue and develop their operations only by restructuring work and adjusting business processes. This, in turn, forces organizations to better manage business processes and information. While documents appear in practically all business processes, managing document systems also means running the business's processes.

A business process comprises a sequence of activities initiated by a specific input, resulting in a desired outcome. On the other hand, the process of digitization involves the conversion of these inputs and outputs into digital formats [1,3]. The primary objective of digitization is to remove recurring tasks within an organization while enabling the workforce to concentrate on vital operational responsibilities [4,5]. This transition aims to

improve efficiency, productivity, and profitability while reducing business costs [2,3,6]. By digitalizing processes, organizations can explore new possibilities and gain competitive benefits over other institutions [7,8]. Information system (IS)/IT managers continually face the challenge of effectively managing the rapid emergence of new technologies and integrating them into the evolving needs of their organizations [9].

As early as 1983, Limanowski [10] emphasized the need to manage unstructured content and directed organizations to develop initial electronic document archives and document systems. Over the years, and especially in today's modern business environment, document management systems (DMS) have emerged as a key element [11]. As organizations embark on their digital transformation journeys, the integration of DMS stands out as one of the key components of this evolution [12]. With organizations operating globally, seamlessly sharing, accessing, and updating documents in real time has become increasingly indispensable [5]. A DMS effectively manages the digitalization processes, and preventing extensive use of paper documents. The utilization of DMSs offers numerous advantages for organizations and their users [1,5,8,9,12–18]:

- Managing extensive document volumes incurs significant financial expenses for organizations. By implementing a DMS, organizations can automate and streamline document management processes, resulting in notable cost reductions in areas like printing and human resources. This enables organizations to allocate resources more effectively towards beneficial business processes;
- DMS allows efficient and convenient access to information, eliminating the need for physical presence in the office, and allows DMS users to save time and focus on other work-related tasks. Moreover, a user-friendly DMS simplifies the search for data, information, files, and processes, enhancing productivity and efficiency;
- A DMS helps streamline work processes by reducing the steps required to complete procedures. This directly contributes to increased agility and efficiency, as employees can swiftly locate the information or documents they need for their tasks;
- Compliance with legal norms and regulations and maintaining an audit trail are crucial for all businesses. Meeting regulatory requirements can be challenging, especially for organizations subject to multiple legal provisions. An appropriate DMS plays a vital role in supporting the implementation of regulatory and legal frameworks, ensuring data and information protection. Additionally, a DMS enables the recording of critical steps and activities, creating an audit trail that facilitates internal and external audits.

It is, therefore, crucial that organizations make the most of DMS use. One of the concepts that can contribute to the selection, implementation, and use of a DMS (i.e., the DMS' life cycle) is the organization's maturity [18], which refers to the extent to which the organization has consistently and explicitly applied processes and practices that are observed, managed, documented, measured, and constantly improved [15]. For example, a more mature organization can better anticipate and plan as it matures in understanding and use of a DMS; for example, it can define processes that reduce errors and increase document management efficiency. The system and its processes can be smoothly scaled up (or down) based on the organization's needs, and the DMS can be adapted without major revisions as the organization grows or its requirements change. Organizations can identify and mitigate the risks associated with document mismanagement, data breaches, regulatory non-compliance, and cost optimization as redundant or inefficient processes are eliminated or improved, and can also lead to more effective collaboration, as employees can seamlessly share, co-author, and review documents. It can be exposed that an organization's maturity in its DMS life cycle can reflect its ability to manage documents effectively and ensure operational efficiency, compliance, risk mitigation, and other benefits that contribute to its overall success and, consequently, its sustainability orientation [18]. An organization's maturity level can be measured through a maturity model evaluation, enabling stakeholders to identify improvement areas and select actions to succeed in higher maturity levels [19–21].

Maturity models are increasingly employed in management and IS to make continuous improvements [19–21]. The evaluation of an organization through a maturity model is a valuable technique for assessing business processes or specific areas within an organization. It provides a roadmap for achieving a more organized and systematic approach to conducting business [19]. Alignment with an organization's maturity is closely linked to the success of modern businesses, as highlighted by Panda [22]. Adekunale and colleagues [23] posited that for organizations to achieve digital maturity, there must be a transition from traditional processes (non-digital) to fully integrated digital processes. Attaining this level of digital maturity is paramount in the modern era, given the inherently collaborative nature of most technologies, making the rapid and extensive dissemination of information essential.

The increasing relevance of IT in the corporate world stems from various elements that have revolutionized how businesses function and compete in today's environment. This includes the shift towards digital platforms, reliance on data for decision-making, the rise of e-commerce, achieving operational efficiency, fostering innovation, enhancing the customer experience, the widespread adoption of remote working, and the emphasis on adaptability, among others [24]. Furthermore, contemporary technologies such as the Internet of Things (IoT), artificial intelligence (AI), big data, cloud solutions, and mobile platforms play a pivotal role in advancing sustainable initiatives, covering aspects like pollution mitigation, waste reduction, eco-friendly production methods, and more [25]. DMS is essential in modern organizations' evolution [9], especially in the context of maturity. When measured through the lens of maturity models, the effectiveness of DMS becomes even more apparent, as we can speculate that mature organizations that have skillfully adopted and adapted DMS to their needs often demonstrate increased efficiency, reduced operational costs, and improved compliance capabilities.

On 7 July 2023, we searched the Scopus database to see how many bibliographic items appeared when searching for the keywords "document management system" and "maturity". One article and five conference papers appeared that included the keywords in the title, abstract, and keywords. An article conducted by Jordan and Sternad Zabukovšek [18] studied organizations' maturity and the influence of sustainability orientation on the DMS' life cycle through case research on a financial organization. The aim of the conference paper by Gelashvili and Pappel [26] was to examine the difficulties associated with implementing electronic document and record management systems (EDRMS), focusing on user acceptance. Additionally, the paper sought to assess the current maturity level of EDRMS and explore the potential of integrating virtual assistants into decision-making processes. Erden et al. [27] researched activities to improve an organization's knowledge, documents, and institutional memory using the example of the development of a DMS in an organization and its effects, among which they highlighted the improvement of organizational awareness and maturity; the other three conference papers did not refer to organization maturity (see [28–30]). Except for the case research of Jordan and Sternad Zabukovšek [18], none of the mentioned research highlighted the importance of an organization's maturity as a critical factor in the DMS life cycle. To address this gap, the primary objective of this research is to investigate the impact of an organization's maturity on the DMS life cycle. The research question guiding this study is as follows: "Does the organization's maturity influence the various stages of the DMS life cycle?"

Based on 22 different maturity models, Koshgoftar and Osman [31] and Proença and Borbinha [19] highlighted the following five models in the field of business IS: the Crosby Quality Management Maturity Grid (QMMG) [32,33], the Capability Maturity Model (CMM) [34,35], the Capability Maturity Model Integration (CMMI) [36,37], the Business Process Maturity Model (OMG BPMM) [38,39], and the Process and Enterprise Maturity Model (PEMM) [40,41]. DMS is used in processes and has the potential to innovate them, so process maturity must be involved in research. Therefore, based on the researched literature and comparison of different maturity models, the PEMM model proposed by Power [40,41], which evaluates the process and organizational maturity, was chosen to assess the organization's maturity concerning the DMS life cycle. The survey was conducted

in medium-sized and large Slovenian organizations that use DMSs. Based on 165 responses from DMS key users, analysis was carried out using the partial least squares structural equation modeling (PLS-SEM) technique.

This article is structured as follows: in the chapter Materials and Methods, maturity models are first presented, followed by chapters related to DMS, including a bibliometric analysis of DMSs and the DMS life cycle, as well as the presentation of the research model. Chapter 3 presents the research with the results. The fourth chapter contains a discussion, and the paper ends with a concluding chapter.

2. Materials and Methods

2.1. Organization's Maturity

Maturity is usually used as a measure to evaluate various aspects of process performance, process orientation, and/or process management [42]. Maturity models are recognized as tools by Proença and Borbinha [19] and Blondiau et al. [43] to demonstrate steady and organized development and continuous improvement of general skills, structures, processes, or conditions within companies. Gibson and Nolan [44] are considered to be the founders of the concept of the maturity model, introducing a model focusing on the utilization of computer resources in organizations. Since 2002, there has been a significant increase in publications on maturity models, indicating their growing significance in research [19]. While maturity models initially emerged within the field of business informatics (e.g., [45]), their application quickly expanded to other domains (e.g., [46–51]). From a bibliometric study on maturity models, Adekunle et al. [23] determined that from 2020 onwards, maturity models were formulated in areas such as BIM (building information modeling), smart cities, the IoT, green and smart manufacturing, cyber security, industry 4.0, network security, digital transformation, digital maturity, and digitization, among others [23]. They also noted that the introduction of maturity models has significantly accelerated the spread of new technologies and digitization efforts. Consequently, maturity models are increasingly perceived as essential for progressive process optimization.

Organizations play a crucial role in determining the necessary improvements when undergoing process changes, which is the key reason for the utilization of maturity models [52]. In essence, maturity models serve as tools for evaluating and enhancing processes, capabilities, and overall organizational performance. They also assist organizations in assessing the weaknesses and strengths of their business processes, allowing for comparisons with standards of quality as well as adopting best practices from other organizations [53].

Although maturity models have gained widespread popularity, they have not been immune to criticism. One notable critique is that maturity models are often demanding and complicated to utilize, while the procedures employed to assess maturity levels are relatively simplistic [54]. It has also been argued that maturity models are introduced in stages and do not have adequate empirical foundations. Despite similarities observed among different models, the documentation pertaining to their implementation remains unsatisfactory [55]. In their research, Proença and Borbinha [19] and Koshgoftar and Osman [31] provided an overview of the key characteristics of various maturity models. Their analysis encompassed 22 distinct maturity models. Five commonly utilized maturity models have been identified within the business IS field. These models are Crosby's quality management maturity grid (QMMG) [32,33], the Capability Maturity Model (CMM) [34,35], the Capability Maturity Model Integration (CMMI) [36,37], the Business Process Maturity Model (OMG BPMM) [38,39], and the Process and Enterprise Maturity Model (PEMM) [40,41]. Each of these models guides organizations towards process improvement and maturity, albeit within different focus areas, which are presented through their purpose, advantages, and limitations in Table 1.

Table 1. Maturity model comparison.

Model	Year	Purpose	Advantages	Limitations
Crosby's Quality Management Maturity Grid (QMMG)	1979	To enhance quality management within organizations through a five-stage maturity grid.	Emphasizes quality management and provides a clear framework for improving quality processes. The five-stage maturity grid is relatively easy to understand and implement.	Its primary focus on quality management may overlook other crucial organizational processes.
Capability Maturity Model (CMM)	1987	Improve and refine an organization's software development process by navigating a five-level evolutionary path.	Provides a structured framework for systematically improving process capabilities in software development. Offers a benchmark for comparing software development practices against industry standards.	It is primarily focused on software development, which might not cover other organizational processes.
Capability Maturity Model Integration (CMMI)	2000	Extends CMM's scope to include software engineering, systems engineering, and other processes, aiding organizations in improving their process maturity.	It encompasses software engineering, systems engineering, and other processes beyond software development. It aims to improve performance, reduce costs, and ensure the quality of processes across different domains.	Despite its broader scope compared to CMM, it may still not cover all organizational processes, and its implementation can be resource-intensive.
Business Process Maturity Model (OMG BPMM)	2002	To appraise and improve the maturity of business process workflows, providing a roadmap for organizational capability and improvement across five maturity levels.	It is designed to optimize business process workflows and improve organizational efficiency. Provides a standardized method for assessing the maturity of business processes.	It may not be well-suited for organizations that are not process-oriented or those in the early stages of process maturity.
Process and Enterprise Maturity Model (PEMM)	2007	Aids organizations in transitioning to process-centric entities by assessing the maturity of specific business processes and the enterprise as a whole.	Offers a comprehensive view by assessing both specific business processes and the enterprise. Aids in managing transitions to higher process and enterprise maturity levels, supporting organizational evolution.	It may require a significant organizational change, which could be challenging to implement, especially in organizations with established operational frameworks.

Sources: [33–41,53,56].

The CMM model has been criticized for its need for extensive process reviews, which are both costly and time-consuming. It is also considered to be confusing due to its diverse structures, terminologies, and formats [53]. The CMMI model is often criticized for focusing solely on processes and overlooking crucial human, cultural, and organizational factors. Although it has specific training and expertise requirements, it remains the most frequently used maturity model favored by researchers. The OMG BPMM model is rarely discussed in the academic literature when compared to CMM and CMMI; its most significant drawback is the lack of IT support [53]. While CMM and CMMI are more tailored towards software and systems engineering, QMMG emphasizes quality management. OMG BPMM and PEMM offer broader frameworks for evaluating and advancing business process maturity and enterprise-wide process management. The PEMM model, although relatively young, faces challenges related to its strategic alignment and IS, and it does not link business outcomes to distinct maturity levels. Albliwi et al. [53] further critically reviewed QMMG,

CMM, CMMI, and OMG BPMN maturity models against several criteria presented in Table 2. The authors added the PEMM assessment for exposed criteria based on [40,41,56].

Table 2. Maturity model evaluation criteria.

Criteria	QMMG	CMM	CMMI	OMG BPMN	PEMM *
Target	Quality Management	Software Industry	Different Industries	Business Processes	Assist organizations in transitioning towards a process-centric approach.
User-friendliness	✓	X	X	X	X
Training	X	✓	✓	✓	X
Experience and prior expertise	✓	✓	✓	✓	✓
Precision in determining the present maturity level	✓	✓	✓	✓	✓
Practical evidence	X	X	✓	X	✓
Based on the experience of the researchers	✓	X	X	X	X
Based on quality standards/previous models	X	✓	✓	✓	✓
Complexity	X	✓	✓	✓	✓
Accuracy	X	✓	✓	NA	✓
The availability of criteria to determine the current level of maturity, the completion of the level, and the transition to the next level.	X	X	X	✓	✓
Methodological rigor	X	X	X	NA	✓

Source: Modified from Albliwi et al. [53]. Note: * Added by the authors based on [40,41,56]; ✓—yes, X—no, NA—not applicable.

Based on the models in Tables 1 and 2, the QMMG model is unsuitable for DMSs, while CMM and CMMI have the potential for DMS use, but OMG BPMN and PEMM are more suitable. If the main objective of this research was to measure digital maturity related to business processes, OMG BPMN might be appropriate, as it focuses on business processes and the criteria it provides for measuring maturity levels. However, since the focus is on the DMS life cycle, where it is a more comprehensive organizational transformation with a process-focused approach, PEMM appears more holistic, offering methodological rigor, practical evidence, and precision. DMSs are workflow-based systems oriented toward process automation; therefore, using the PEMM model is promising. Also, PEMM provides detailed criteria for evaluating process maturity. Such detailed measures can be invaluable in assessing and improving the system's efficacy for a DMS, which relies heavily on document creation, approval, distribution, and archival processes.

Further, PEMM assesses and provides potential paths leading to improvements [40,41,56], which is crucial for a DMS, where continuous improvement can drive operational efficiency, enhance user adoption, and result in better document management. Compared to the other four, PEMM also showcased strengths in critical metrics like the requirement for prior knowledge and experience, clarity in current maturity level, practical evidence backing, adherence to quality standards, and the availability of criteria to determine when to transition to the next maturity phase [40,41,56]. Such robustness can provide a DMS with a solid framework to gauge its maturity and understand areas of improvement. It also distinguishes between organizational maturity (OM) and process maturity (PM) and provides separate frameworks for

evaluating both process and business models [40,41,56]. Although PEMM has shortcomings, such as the lack of strategic alignment with IT and the disconnect between business outcomes and individual maturity levels, these gaps might be addressed by tailoring the model specifically for DMS use. On that basis, the PEMM is highly suitable for assessing an organization's maturity level concerning the individual phases of the DMS life cycle. Within the PEMM model, the business model recognizes four abilities and four maturity levels: leadership, culture, knowledge, and management [40,41,56]. These capabilities play a vital role in shaping an organization's overall maturity. The process model identifies five capabilities: design, performers, owner, infrastructure, and metrics, and these contribute to the effectiveness and efficiency of the organization's processes. The process model also encompasses four maturity levels, which provide a structured framework for organizations to assess and improve their process maturity. The PEMM model is designed to support organizations on their journey toward process excellence and achieving business objectives. Organizations can systematically evaluate and enhance their overall maturity by focusing on the capabilities and maturity levels within the business and process models, leading to improved performance and success.

Additionally, maturity models assist organizations in ensuring compliance with standards such as SOC 2 [57], ISO 27001 [58], and relevant regulations [18]. Adopting maturity models gives them a structured framework to evaluate and improve their DMS life cycle's overall efficiency and effectiveness. This, in turn, leads to enhanced document management practices, fostering better organization, security, and compliance within the document management process.

DMSs can also significantly aid organizations in their quest for sustainability. Published research by Odważny et al. [59] and Cagnin et al. [60] examined the connection between organizational maturity and sustainability levels. The researchers pointed out that it is important to understand the relationship between an organization's maturity levels and sustainable development goals. With higher levels of maturity, an organization should develop further sustainable concepts and features and, in such a way, increase its sustainable maturity.

Odwazny et al. [59] defined five levels of sustainable features of organizational maturity. Level 1, named Ignoring—operation procedures according to sustainable development concepts do not exist. Level 2, named Defining—key processes and procedures related to sustainable development are being defined. In level 3, named Adapting—there is a focus on effective resource management and sustainable development. Level 4, named Managing—implements some best practice solutions within the organization for managing natural resources and processes, which are evaluated and improved systematically while using opportunities and managing risks. Level 5, named Integrating—sustainable development goals are a highly interlaying organizational strategy and processes designed to achieve demand performance effectively and efficiently within sustainable development concepts. New technologies play an important part in the strategy.

On the other hand, Cagnin et al. [60] defined a five-level business sustainability maturity model that corresponds to organizational maturity models. Business sustainability or sustainable development can be defined as the actions required to manage an organization and its relationships, aiming to improve performance along the network of the organization in terms of its characteristics in an economically, socially, and environmentally coherent manner, whereby the organization corresponds to a certain organizational level of maturity, many of the characteristics of which are in line with the level of sustainability. They defined seven dimensions for each business sustainability level and explained how they look at each level of the business sustainability model. Technology and operations dimensions are important for this research because they allow us to research the DMS' life cycle in connection to the organization's maturity, keeping in mind sustainability aspects.

By using DMSs, organizations can lessen their environmental footprint, champion the welfare of employees, customers, and other stakeholders, and bolster financial sustainability by enhancing efficiency, cutting costs, and driving revenue growth. Conversely, an organization rooted in sustainability can influence every stage of the DMS life cycle.

Given DMS' myriad benefits, organizations prioritizing sustainability will likely show more enthusiasm in selecting and deploying a DMS. Moreover, while utilizing a DMS, such organizations often seek ways to optimize its use, leverage its advanced features, or restructure business processes to amplify sustainable outcomes.

2.2. Document Management Systems

According to Bjork [61], there are two main categories of documentary systems: (1) archival and (2) electronic document and process management systems, commonly known as a DMS. Archival document systems primarily focus on managing documents, encompassing tasks such as capturing documents with metadata, archiving documents, and enabling fundamental search in addition to review functionalities [10,61]. In contrast, a DMS goes beyond the capabilities of an archival system by supporting document creation, editing, change tracking, and event management [12,16]. DMSs also facilitate data/document capture and storage, document distribution, electronic document processing, and centralized storage of large amounts of electronic documents [16]. To ensure efficient classification of these electronic documents, many such systems use a storage process that includes special components known as metadata [1,2,16]. By implementing a DMS, organizations can streamline their document management processes [6,9,62].

Consequently, organizations have directed their efforts toward selecting and implementing DMSs to automate business and decision-making processes [63]. The utilization of DMS enables organizations to enhance and modernize their business processes. Digitizing and automating business processes allows documents to be stored and accessed much faster, reducing the time and costs linked with manual document management [16,64]. Additionally, DMS enhances the accuracy of document management by minimizing the possibility of errors in automated document processing [65]. The organization's primary responsibility is effectively executing the DMS, encompassing various elements such as organizational considerations, process modifications, and adherence to regulatory requirements and legal frameworks [66]. Singh and Gildhiyal [67] emphasized the design of modern DMSs to restrict access to confidential documents exclusively to authorized individuals. This necessitates implementing authentication methods like biometrics, passwords, and multi-factor authentication (MFA). DMSs can guarantee that only authorized users can view and modify sensitive information by incorporating these security measures. Alongside authentication protocols, encryption technologies are employed within DMSs. Encryption guarantees that intercepted documents remain unreadable without the corresponding decryption key, preventing unauthorized access to confidential content.

Furthermore, DMSs often adopt additional security measures, such as data masking, which restricts data visibility to unauthorized individuals, reinforcing overall document security. DMSs also allow a more effortless flow of documents inside organizations as well as long-lasting documentation storage [68]. In their work, Al Qady and Kandil [69] emphasized the significance of enhancing document accessibility, facilitating document updates, promoting seamless user collaboration, and reducing the life cycle duration of documents.

The adoption of DMS is steadily growing in organizations of various sizes [1,5,8,9,70], as these systems offer many advantages that increase operational efficiency and organization within the business [71], which will be discussed below. DMSs offer several key benefits, including cost savings, time efficiency, process improvement, and regulatory compliance with an electronic audit trail [15,17,18]. Managing an enormous volume of documents can incur substantial financial expenses for any organization. However, with DMS implementation, organizations can automate, streamline, and expedite various processes, resulting in cost reductions related to printing, human resource utilization, and other expenses. These cost savings can be redirected towards more profitable business endeavors. Another advantage is the time-saving aspect, as DMSs enable fast access to data and information without physically visiting an office. This allows DMS users to spend more time on other essential tasks in their work. Moreover, DMSs simplify the process of

locating data, information, files, and specific processes, enhancing overall efficiency. An important aspect of DMSs is their document property management functionality, reflected in document categorization, document usage, and system activities such as sharing criteria, duplication, and version management [24,72].

An effective DMS brings about notable enhancements in work processes by reducing the number of steps required to execute procedures. This streamlined approach directly contributes to increased work process efficiency, enabling company employees to swiftly access the information or documents they need for their tasks. Additionally, compliance with regulations is a crucial advantage, as adhering to legal norms and staying up-to-date is vital for all businesses [73]. Meeting all obligations can be complex, particularly for organizations bound by specific legal provisions [74]. Furthermore, DMSs enable the comprehensive recording of all steps involved in performing specific activities within the system [75]. Drawing upon case studies, Adam [75] highlights that the benefits of a DMS can be further categorized as measurable and non-measurable advantages.

In the subsequent chapter, the aim is to examine publications related to DMSs and discern the primary research avenues in the field of DMSs, which was carried out with the help of bibliometric analysis.

2.3. Bibliometric Analysis on Document Management Systems

Bibliometric analysis has become increasingly popular among researchers as a methodology for examining and analyzing vast amounts of scientific data. This approach allows researchers to monitor the progression of a specific field and identify emerging sub-fields [76]. Conducting a bibliometric analysis involves several steps, including (1) clearly defining the study's objectives and scope, (2) selecting suitable techniques for the analysis, (3) gathering the necessary data for analysis, and (4) conducting the bibliometric analysis and presenting the results.

Bibliometric analysis techniques can be broadly categorized into performance analysis and scientific mapping. Performance analysis, often found in scientific review articles, primarily involves examining the contributions of research elements to a particular field, and its emphasis is on descriptive analysis [77]. In contrast, scientific mapping aims to reveal the relationships between research components [78]. Notable techniques used for scientific mapping include co-word analysis, citation analysis, co-citation analysis, co-authorship analysis, and bibliographic coupling. In this analysis, the technique of related word analysis was employed, which delved into the actual content of publications. This approach typically utilizes "author keywords" to extract relevant words, but in their absence, words can also be derived from "article titles", "abstracts", and "full texts" [78].

The widely used Scopus database was utilized for bibliometric analysis, encompassing a vast collection of indexed publications [79]. The bibliographic units obtained from the Scopus database were then subjected to bibliometric analysis using the VOSviewer 1.6.19 software [80]. VOSviewer is a visualization tool designed explicitly for exploring network connections among bibliographic units [80,81]. As part of our scientific mapping technique, we created term maps based on a corpus of documents. This approach allows us to visualize and analyze the relationships between terms within the dataset.

Therefore, on 23 June 2023, we performed a bibliometric analysis of the Scopus database for the query "document management system", where we excluded the year 2023 because it is the ongoing year (there were 13 publications in 2023). From 1980 to 2022, there were 1173 published documents, of which 48.6% (570) were conference papers, followed by articles (39.4%, 462), review articles (4.9%, 58), conference review articles (2.3%, 27), book chapters (2.2%, 26), and others (short research, note, report, etc.). The most published documents were in the field of computer sciences (52%, 610), followed by the fields of engineering (38.45%, 451), mathematics (12.45%, 146), social sciences (12.45%, 146), business, management and accounting (11.08%, 130), and other areas (12.02%). The documents originate predominantly from the United States, with subsequent numbers

from Germany, the Russian Federation, China, the United Kingdom, Italy, India, Japan, Spain, and South Korea.

Figure 1 shows that the number of publications increases on average as organizations switch to paperless operations due to the advantages mentioned in the previous subchapter.

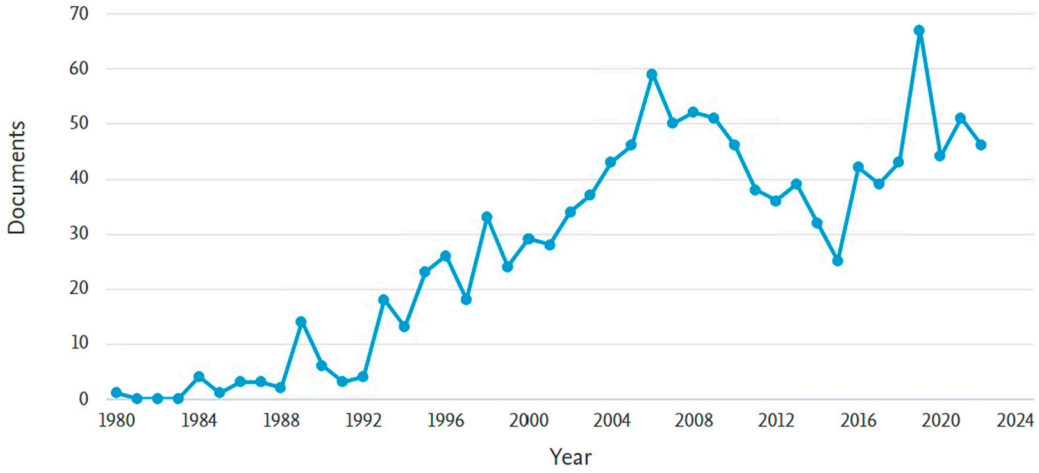

Figure 1. Time series graph of the number of publications in the Scopus database for the "document management system" keyword on 23 June 2023 (authors' research, based on Scopus data).

Two peaks can be observed, namely in 2006 (59 publications) and 2021 (51 publications). The first peak coincides with the beginning of one of the biggest financial crises (2007–2008) globally. It can be assumed that due to the crisis, organizations began to optimize processes and reduce operating costs massively, and therefore, the number of publications jumped. In contrast, the second period coincides with the COVID-19 pandemic. The World Health Organization (WHO) declared the disease caused by the SARS-CoV-2 virus, known as COVID-19, a pandemic on 11 March 2020 [82]. Due to the containment of the epidemic, organizations had to quickly adapt and start doing paperless business, which could be the reason for greater interest in publishing in this area. Based on their bibliometric analysis conducted using the Scopus database, Jordan and Sternad Zabukovšek [18] highlighted a correlation between the research interest in DMS and digital transformation. Their analysis revealed that a significant number of research papers on DMSs were published from 2018 onwards, indicating a concurrent rise in interest in digital transformation.

Further, from the query in the Scopus database, it can be seen that the keywords that appear most often in connection with DMSs are information services (442), information management (282), information retrieval systems (171), database systems (108), management information systems (98), etc. Further insight into individual sectors shows that the research was mainly focused on the state and public sector (59), followed by healthcare (55), education (28), the oil and gas industry (19), the finance sector (17), law (17), etc.

Since the bibliometric analysis aimed to find connections between individual keywords, a network visualization analysis was performed using the VOSviewer 1.6.19 software [83]. From all 2102 keywords, keywords with the same meaning were combined. In total, 2068 unique keywords were obtained, of which 84 appeared at least thrice in 2 clusters (Figure 2).

In the first cluster, keywords such as electronic document, e-government, quality management, knowledge sharing, paperless, access control, document workflow, decision-making, software architecture, information extraction, artificial intelligence (AI), document model, etc. appeared in connection with DMSs (see the larger red rectangle in Figure 2). In the second cluster, the following keywords appeared: interoperability, information system, management information system, decision support system, content management systems, construction management, content analysis, electronic signature, etc. (see the smaller green

rectangle in Figure 2). From the obtained data, it can be concluded that researchers in the first cluster researched technologies related to DMSs, while in the second cluster, they researched DMSs related to various IS.

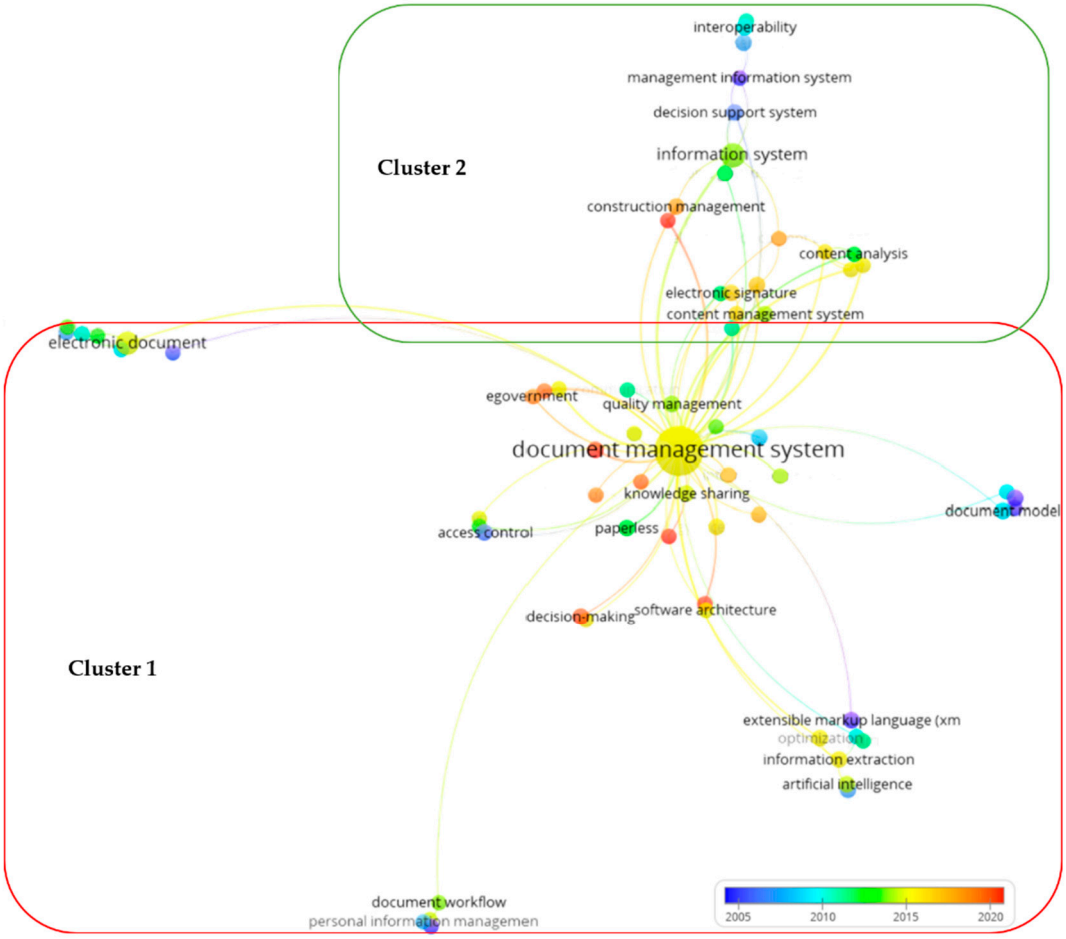

Figure 2. Bibliometric mapping of connections between keywords throughout the period and from the point of view of groups based on the Scopus database on 23 June 2023 (authors' research, based on Scopus data).

By referring to Figure 2, the evolving focus of research can be observed by examining the keywords that have been emphasized over time. Until 2010, research focused on management information systems, decision support systems, personal information management, electronic documents, and extensible markup language (XML). In the second period, research focused on content analysis, document workflow, artificial intelligence (AI), quality management, paperless, information processing, content management systems, and quality management. The most frequently used keywords with DMS in recent years are information extraction, optimization, electronic document and record, construction management, e-government, decision-making, software architecture, and knowledge sharing.

Although maturity models play a crucial role in the setting of DMSs, as they present organizations with a means to assess as well as enhance various processes and abilities connected with document management and maintenance, from the bibliometric analysis, it can be concluded that the organization's maturity in connection with DMSs is poorly researched. Within the realm of DMSs, maturity models can offer valuable utility in several key areas. Firstly, maturity models enable organizations to improve collaboration and knowledge sharing in document collaboration and retention by implementing a centralized document repository. This facilitates efficient access and exchange of information while supporting organizations in managing document retention throughout their life cycle, en-

suring appropriate archiving and disposal practices. Maturity models are also instrumental in helping organizations establish clear policies and procedures for effective document management in terms of governance. They also provide a framework to ensure the security of the DMS, safeguarding sensitive information and preventing unauthorized access.

From the bibliometric analysis, it can also be concluded that few publications were devoted to the selection (e.g., see [12,84,85]), implementation (e.g., see [5,8,9,84,86–88]), or use of DMSs (e.g., see [15,69,89,90]). The bibliometric analysis did not emphasize the DMS life cycle as a whole. Only one article was found that investigated an organization's maturity in relation to the DMS life cycle (see [18]).

2.4. DMS Life Cycle

Observing information systems in the sense of their life cycles provides better insight into their presence in the organization. The concept of the IS life cycle was introduced by Nolan [44], known as the Nolan stage model, where he defined four stages of IS growth: initiation, expansion, formalization, and maturity. Nolan concluded that there are six stages in the evolutionary process of IS, and in 1979, presented an improved six-stage model, which included the following stages: initiation, contagion, control, integration, data administration, and maturity [91]. In 1987, Kwon and Zmud [92] proposed a framework to examine the technology diffusion process, dividing the life cycle of IT/IS into six stages: initiation, adoption, adaptation, admission, routinization, and infusion. However, in 2004, Swanson and Ramiller [93] refined this framework by consolidating the six stages into four: understanding, adoption, implementation, and assimilation. The first two stages primarily deal with pre-implementation behavior, while the last phase pertains to post-implementation behavior.

Business IS, also called enterprise systems, are commercial software designed to facilitate the integration of transaction-oriented data and business processes within an organization [94]. The adoption and implementation of these systems typically occur in multiple phases, each consisting of specific tasks, collectively known as the enterprise systems life cycle [95]. Various models have been proposed to describe the enterprise system's life cycle stages. Markus and Tanis [94] introduced a four-step model comprising the following phases: charting, project, shake-down, and onward and upward. Ross and Vitale [96] presented a five-stage model of design, implementation, stabilization, continuous improvement, and transformation phases. Shao et al. [95] proposed a four-phase enterprise life cycle model, including the adoption, implementation, assimilation, and extension phases. It is vital to note that the literature lacks consensus on the precise nature and milestones of these phases within the business IS life cycle. Huang and Yasuda [97] identified 26 business IS life cycle models. As we have seen above, authors name individual phases differently, but they all point to the following key features of the business IS life cycle stages [97,98].

The initial phase of the business IS life cycle is the selection project, which involves defining requirements and choosing a solution provider from the market. During this phase, the business IS to be implemented must support the assessment of circumstances, goals, costs, and priorities. Additionally, it plays a crucial role in facilitating the appointment of the project team and structuring the requirements. The first phase concludes with selecting an appropriate solution and signing a purchase and implementation agreement between the organization and the chosen provider.

The second phase of the business IS life cycle is the implementation project, which encompasses three key steps: (1) preparing and securing the necessary resources for the chosen solution's implementation, (2) carrying out the implementation activities as per the project plan, and (3) the go-live stage. Preparing and ensuring resources for the implementation project involves several essential tasks; these include forming the project team and clearly defining the roles of team members, garnering support from relevant stakeholders and other key individuals, maintaining continuous monitoring and updates to the project plan, managing changes and crises, effectively managing the relationship with

the selected provider, ensuring the availability of required hardware and software, and devising an education strategy for solution users. The project team members develop the implementation project plan, including clearly defined tasks, documentation preparation, user training, data transfer from existing solutions, and integration with other necessary systems. Subsequently, the go-live step ensues, wherein the solution is handed over to users who commence its usage. This step necessitates appropriate problem-solving and evaluation to ensure smooth operations and optimal performance.

The third phase of the business IS life cycle is the actual use of the solution following the go-live step. This phase comprises three stages: (1) solution stabilization, (2) advanced use of the solution, and (3) retirement of the solution. During the stabilization stage, which typically lasts for several months, efforts are focused on addressing any problems identified during solution usage. This includes providing extended user training and establishing effective user support mechanisms. The advanced use stage involves ongoing maintenance, upgrades, and the implementation of new releases to ensure the solution's optimal performance. It also entails providing daily user support, conducting additional in-depth training for users, activating more advanced modules that were not initially implemented, leveraging advanced functionalities offered, and adapting business processes to align with the solution. The third and final stage is retirement, where the solution becomes obsolete. Business IS upgrades and the integration of new IS are no longer feasible at this point, and it may be necessary to consider replacing the retired solution with a more modern and up-to-date alternative.

Business IS life cycle models can also be applied to DMSs and serve as the foundation for the DMS life cycle. According to the literature on DMSs, the life cycle of a DMS consists of three stages: DMS selection, DMS implementation, and DMS use after successful implementation. Abdulkadhim et al. [5], Haider et al. [9], and Alshibly [86] highlight that selection and implementation of a DMS is a complex project involving significant organizational operations changes. Organizations usually purchase a suitable DMS solution rather than developing an in-house one. This adaptation of the DMS meets each organization's specific requirements and processes and impacts the phases of the implementation process. Ten steps involved in DMS implementation can be outlined: (1) planning of the project; (2) planning of the DMS; (3) implementation of a pilot project in a small, limited part and in-depth training of key users; (4) testing solution; (5) end-user training on solution usage; (6) solution implementation and integration with other IS; (7) simultaneous use of existing and new solutions to verify the correctness of the new solution; (8) end-user training on processes and use of DMS functionality; (9) preparing and implementing the electronic document management policy and end the project; and (10) DMS system use and performance, as well as operation audit [9,88]. By following these steps, organizations can effectively navigate the DMS implementation process, ensuring a smooth transition and successful adoption of the new system.

The DMS implementation phase must not be viewed as the end point of the DMS life cycle; it is merely the first phase. Therefore, effective management of the remaining two phases is crucial. It is common for the business IS life cycle, including DMS, to span ten years or more. Neglecting any of these three phases can result in failures related to solution usage, despite organizations often prioritizing the implementation phase over the subsequent use phases [99]. The focus should then shift towards advancing the use of the implemented solution. Consequently, it becomes necessary to monitor the solution's performance following its implementation [100].

Bagayogo et al. [101] emphasize that organizations often encounter challenges after making substantial investments in IT, as these technologies frequently underperform due to the underutilization of their capabilities. They further stress the necessity for IS research to delve deeper into the mechanisms guiding how individuals expand their utilization of IT functionalities. Enhanced utilization can manifest in various ways, such as employing previously untouched features, increasing the range of tasks addressed using IT, or leveraging advanced functions and attributes of the technology. If organizations

progress into the advanced (extended) use stage, they can implement more advanced modules in addition to functionalities, re-engineer business processes, include additional features from other providers, and more. These actions are crucial for gaining a competitive edge over other organizations. By implementing the DMS and leveraging its advanced capabilities, organizations can keep or improve their competitive advantage in relation to other organizations. How comprehensively and strategically organizations utilize the capabilities of IS is related to the organization's maturity.

From the above analysis, it can be concluded that the DMS life cycle is poorly researched and, in our opinion, often poorly managed. A DMS is often used at a basic level instead of a more advanced one, which would positively affect greater work performance with the DMS [15]. We believe that the phases of the DMS life cycle need to be investigated to better manage the impacts of the DMS life cycle on its actual use; this is because the DMS is not seen as an isolated IS within the organization but is considered part of the information ecosystem, which could be studied as the maturity of an individual organization [18]. DMSs that are utilized in processes are recognized to have the potential for process innovation, suggesting that process maturity should be incorporated into the research.

2.5. Research Model

The research aimed to identify if the organization's maturity level influences the DMS life cycle. The research question is: "Does the organization's maturity influence the various stages of the DMS life cycle?". Based on the PEMM maturity model, which considers process maturity (PM) and organizational maturity (OM) (as described in Section 2.1), our research model aimed to examine the impact of perceived process and organizational maturity on the selection, implementation, and use phases of the DMS life cycle by DMS key users.

To test our research question, firstly, the hypotheses regarding the DMS life cycle based on Chapter 2.4 were formulated (as shown in Figure 3):

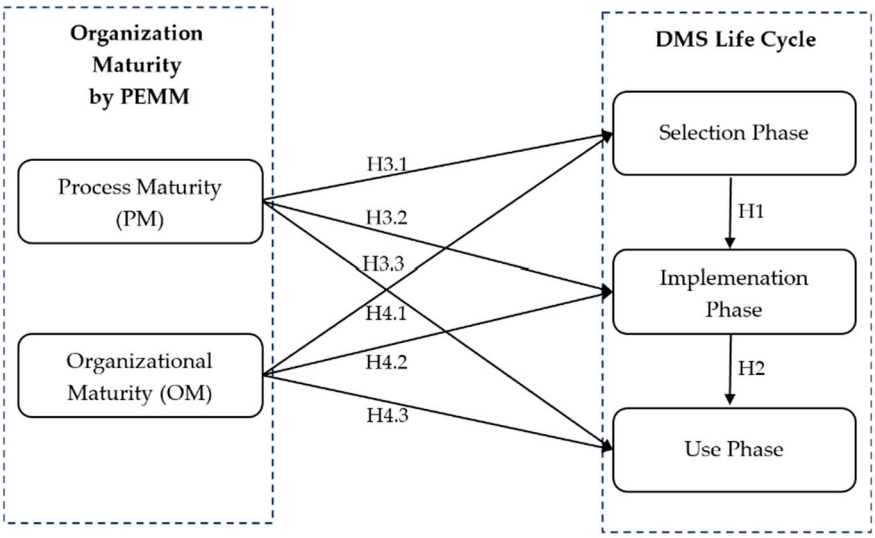

Figure 3. Research model.

H1. *The DMS selection phase positively impacts the DMS implementation phase.*

H2. *The DMS implementation phase positively impacts the DMS use phase.*

Process maturity (PM), as indicated by the PEMM [40,41,56], can significantly influence how an organization approaches DMS selection. Organizations with a higher degree of process maturity can clearly define requirements that mirror their process needs and select solutions that align perfectly with these specifications. Such high-maturity organizations will also implement DMSs more adeptly, having already established procedures for

adopting new technologies. Furthermore, these organizations understand how to identify and address risks associated with system implementation and manage them effectively. During the DMS use phase, we believe that companies with well-developed processes will have routines in place for regular maintenance, upgrades, and system quality assurance. They identify and resolve issues quicker, ensuring continual system enhancement than companies with lower process maturity. Moreover, more mature organizations will systematically assess emerging needs and opportunities, adjusting or expanding the DMS to meet these requirements. They typically possess predefined procedures for testing and deploying new features or integrations. From the above, it can be inferred that process maturity profoundly affects how an organization and its DMS users approach each phase of the DMS life cycle. Organizations with more mature processes are likely to address each stage in a more structured, systematic, and deliberate manner, increasing the chances of success at every juncture of the system's life cycle. Hence, the following hypothesis and three sub-hypotheses were proposed:

H3. *Process maturity positively impacts the DMS life cycle phases.*

Which was tested through the following three sub-hypotheses:

H3.1. *Process maturity positively impacts the DMS selection phase.*

H3.2. *Process maturity positively impacts the DMS implementation phase.*

H3.3. *Process maturity positively impacts the DMS use phase.*

Organizational maturity (OM) reflects how well an organization is structured, how effectively it executes its strategies and processes, and responsiveness to internal and external challenges. This encompasses the organization's culture, leadership, communication, risk management, continuous improvement, and other pivotal areas [40,41,56]. During the DMS selection phase, it can be speculated that mature organizations will assemble multidisciplinary teams to evaluate and select a DMS, considering various facets of the business and having a more profound understanding of their business needs and how these translate into functional requirements for the DMS. In the implementation phase, organizations with a higher degree of maturity will likely have superior procedures for planning and executing project tasks, including DMS deployment. Additionally, risks associated with the implementation and deployment will be better identified and managed and are likely fewer than those with a lower degree of organizational maturity. In the usage phase, organizations with a higher level of organizational maturity will have clear procedures established for maintenance, quality control, and the continuous enhancement of the DMS, promptly addressing issues or challenges during regular usage. Organizational maturity can significantly influence an organization's approach, success, and efficiency at each stage of the DMS life cycle. More mature organizations will likely experience better outcomes and fewer challenges in deploying and using the DMS. On that basis, the following hypothesis (H4) and three sub-hypotheses are proposed:

H4. *Organizational maturity positively impacts the DMS life cycle phases.*

Which will be tested through the three sub-hypotheses:

H4.1. *Organizational maturity positively impacts the DMS selection phase.*

H4.2. *Organizational maturity positively impacts the DMS implementation phase.*

H4.3. *Organizational maturity positively impacts the DMS use phase.*

As depicted in Figure 3, our research model consists of five factors. We followed a multi-stage process recommended by Lewis et al. [102] to develop the measurement instrument for these factors. Initially, an initial instrument was developed based on an extensive literature review and expert discussions with DMS experts (the expert group consisted of three professors of MIS, three DMS key users, and three DMS consultants). Minor improvements were made to the questionnaire based on the issues highlighted by

the DMS experts. The instrument was then pilot-tested by 24 DMS users from a medium-sized financial institution in Slovenia, owned by one of the leading financial institutions in Austria and the CEE. In this financial institution, significant investments have been made in the lean processes of all its subsidiaries, ensuring that all necessary regulated standards were met and is recognized as an advanced user of digital services.

After that, an exploratory factor analysis (EFA) was conducted to measure the instrument's reliability. After confirming the Kaiser–Meyer–Olkin (KMO) test and Bartlett's test of sphericity, the Cronbach alpha (α) test followed [102]. The Cronbach's alpha values, which exceeded the threshold value of 0.5, indicated a satisfactory level of reliability [103], but 0.8 or higher is more desirable [102]. From the 13 initial included statements that explain the DMS life cycle, 3 statements based on EFA criteria were deleted, leaving 4 statements that defined the factor DMS selection (Cronbach's alpha value was 0.925), 3 statements that defined the factor DMS implementation (Cronbach's alpha value was 0.944), and 3 statements that defined the factor DMS use (Cronbach's alpha value was 0.919). From the initially included 10 statements for the organization's maturity, 3 statements based on EFA criteria were deleted, leaving 4 statements that explained the process maturity factor (Cronbach's alpha value was 0.950) and 3 statements that explained the organizational maturity factor (Cronbach's alpha value was 0.925). The final version of the statements can be seen in Table 3.

Structural equation modeling (SEM) proceeded with having reliable measurements in place. SEM is a statistical technique for analyzing relationships between observed and latent variables. It enables testing complex theoretical models and evaluating data fit to these models [104]. SEM offers various techniques, with PLS-SEM (partial least squares SEM) and CB-SEM (covariance-based SEM) being the most commonly used. For our data analysis, PLS-SEM was employed, which is suitable for analyzing complex models with smaller sample sizes or unusual data distributions. Moreover, PLS-SEM is favorable for capturing relationships between latent variables and does not require the estimation of the covariance matrix [104].

Based on reference data on the websites of DMS providers, medium-sized and large organizations that implemented a DMS were selected. More than 60 medium-sized and large organizations were sent an invitation with a link to an online survey, in which they were asked if their DMS key users could complete the online survey. All questions were closed-ended, as all factor items were evaluated on a seven-point Likert level varying from "strongly disagree" to "strongly agree". Additionally, demographic data was also collected. The survey was conducted from March to May 2023. In total, 729 respondents started to complete the online questionnaire, of which 165 completed it (22.63%) from 31 organizations.

The "10-fold rule" is a common approach for determining the minimum sample size in PLS-SEM [105,106]. Based on the guideline, the sample size should either be ten times the highest number of formative indicators for any single construct or ten times the greatest number of structural paths directed towards any specific construct in the structural model [107]. As seen from the research model (see Figure 3), three structural paths are directed to factor DMS Implementation and factor DMS Use. According to the "10-fold rule" method, the minimum sample size should be 30. Therefore, our sample size is considered as satisfactory.

One hundred and sixty-five answers were used for further processing in the PLS-SEM analysis using SmartPLS 4 software [108]. The guidelines of Henseler et al. [109], Garson [110], Hair et al. [107], and Sarstedt et al. [106] were followed by analyzing the data. In the Results chapter, the final version of our research is presented.

Table 3. Descriptive statistics of factors items *.

Factors	Items	Items Code	Mean	SD	IL
PM	I believe the organization provides financial and personnel resources to implement changes in document management.	Q1a	5.127	1.681	0.918
	I believe that the business processes are clearly defined.	Q1b	5.061	1.701	0.946
	I believe that the chosen DMS process is based on the wishes and needs of the customers.	Q1c	5.042	1.631	0.926
	I believe that the processes in the organization are organized in such a way that it serves to optimize my work.	Q1d	5.000	1.618	0.926
OM	I believe that the organization perceives business processes as a way of management.	Q1h	5.067	1.592	0.933
	I believe the users themselves propose the need for changes in the DMS.	Q1i	5.109	1.652	0.946
	I believe process owners are responsible for controlling the implementation of changes regarding the DMS.	Q1j	5.091	1.654	0.932
DMS_S	The DMS strategy was planned based on the organization's business expectations during the selection phase.	Q1k	5.176	1.595	0.915
	The organization went for DMS to manage the costs incurred due to the DMS process.	Q1l	5.139	1.599	0.917
	The organization went into choosing a DMS to manage the risks associated with its IT.	Q1m	5.224	1.619	0.921
	I believe the strategy of individual organization services allows us to ask ourselves whether we need a specific service.	Q1n	5.048	1.673	0.899
DMS_I	I believe that the continuous operation of the organization was ensured when the DMS was implemented.	Q1q	5.248	1.608	0.929
	During the training, I was given clear instructions on avoiding unwanted risks in my work performance.	Q1r	5.115	1.631	0.933
	I believe that when the DMS was implemented, they captured the good practices of my work.	Q1s	5.261	1.568	0.955
DMS_U	We have clearly defined access rights to certain services through the DMS.	Q1u	5.345	1.571	0.952
	I think the DMS is upgradeable.	Q1v	5.533	1.594	0.966
	I believe that the DMS enables continuous improvement of the organization's processes and services.	Q1w	5.394	1.476	0.961

* Legend: PM—process maturity, OM—organizational maturity, DMS_S—DMS selection phase, DMS_I—DMS implementation phase, DMS_U—DMS use phase, SD—standard deviation, IL—indicator loadings.

3. Results

Of the 165 responses received (sample size), 130 (79%) were from financial institutions. Among the respondents, 88 (55%) were male, while 71 (45%) were female. Most of them were managers (58%) and were employed in the organization for 8.9 years on average and in their current work position on average 5.7 years. A detailed overview of the factor items and their respective descriptive statistics is provided in Table 3.

3.1. Measurement Model

The measurement and structural models were evaluated using PLS-SEM. In the measurement model, indicators are determined, and weights (loadings) are assigned for each latent variable in the measurement model. This way, the strength and direction of the relationship between each indicator and the corresponding latent variable can be seen. Paths (coefficients) are then defined in the structural model, representing relationships between latent variables. Path coefficients show the direction and strength of relationships.

Reliability and validity should be checked within the measurement model's framework. Reliability was checked using the following measures: indicator reliability and internal consistency. The reliability of the indicators was verified with the help of indicator loadings, which must be at least 0.70. All indicator loadings of the research model were above the threshold merit of 0.7 (see the last column of Table 3). Internal consistency was checked using Cronbach's alpha (α), rho_a composite reliability (ρ_a), and rho_c composite reliability (ρ_c), where all three measures must exceed the value of 0.70. Table 4 shows that all values of all three internal consistency measures exceeded 0.9.

Table 4. Construct reliability and validity of constructs.

Constructs	α	ρ_a	ρ_c	AVE	R^2
Process Maturity	0.947	0.948	0.962	0.863	
Organization Maturity	0.931	0.931	0.956	0.878	
DMS Selection	0.934	0.934	0.953	0.834	0.824
DMS Implementation	0.933	0.934	0.957	0.882	0.752
DMS Use	0.957	0.958	0.972	0.921	0.732

Legend: α—Cronbach's alpha, ρ_a—composite reliability, ρ_c—composite reliability, AVE—average variance extracted, R^2—coefficient of determination.

Additionally, a validity confirmation was conducted by assessing convergent and discriminant validity. Convergent validity was evaluated using the average variance extracted (AVE), where AVE values should exceed 0.50 [111]. As shown in Table 4, all AVE values surpassed the threshold of 0.5, indicating satisfactory convergent validity.

Discriminant validity was examined using the Fornell–Larcker criterion and the HTMT (heterotrait–monotrait) ratio. The Fornell–Larcker criterion tests whether the square root of AVE for each latent variable is greater than the correlation between that variable and the other latent variables in the model [111]. In Table 5, the diagonal values represent the square root of AVE. These values are higher than those in the rows above and columns below, demonstrating discriminant validity.

Table 5. Discriminant validity—Fornell–Larcker criterion.

Constructs	01	02	03	04	05
01: Process Maturity	0.929				
02: Organization Maturity	0.844	0.937			
03: DMS Selection	0.856	0.885	0.913		
04: DMS Implementation	0.817	0.817	0.841	0.939	
05: DMS Use	0.746	0.818	0.781	0.813	0.960

The HTMT ratio, shown in Table 6, was used as another measure of discriminant validity. The HTMT ratios for each pair of latent variables should be below a predetermined

threshold (e.g., Garson [110] suggested a threshold below 1.0). These ratios indicate that the latent variables exhibit distinctness and discriminant validity. Importantly, all values in Table 6 are below 1.0, confirming discriminant validity within the model. This means that the average correlation between indicators of different latent variables was lower than between indicators of the same latent variable [110].

Table 6. Discriminant validity–HTMT-ratio.

Factors	01	02	03	04	05
01: Process Maturity					
02: Organization Maturity	0.899				
03: DMS Selection	0.909	0.948			
04: DMS Implementation	0.867	0.876	0.900		
05: DMS Use	0.781	0.866	0.825	0.860	

Various fit indicators can be used to assess the fit of a research model to the data. A commonly used indicator for reflective models in PLS-SEM is the standardized root mean square residual (SRMR), which has to be less than 0.85 [107]. The SRMR for our research model was 0.040, indicating a good fit of the data to the research model.

3.2. Structural Model

An analysis of the structural model follows. The hypotheses mentioned in the subchapter 2.5 were subjected to testing using bootstrapping with 5000 sub-trials, as suggested by Hair et al. [107] and Sarstedt et al. [106]. This method assessed the statistical meaning of every path coefficient (β) using *t*-tests. Several significant relationships can be observed based on the findings presented in Table 7 and Figure 4.

Table 7. Hypothesized relationships.

Hypotheses	β	M	SD	t	f^2
H1: DMS Selection → DMS Implementation	0.394	0.396	0.114	3.449 **	0.110 [a]
H2: DMS Implementation → DMS Use	0.435	0.437	0.101	4.331 **	0.195 [b]
H3.1: PM → DMS Selection	0.378	0.378	0.083	4.550 **	0.233 [b]
H3.2: PM → DMS Implementation	0.290	0.280	0.135	2.151 *	0.079 [a]
H3.3: PM → DMS Use	−0.001	0.010	0.106	0.006 [n.s.]	0.000
H4.1: OM → DMS Selection	0.565	0.565	0.086	6.598 **	0.518 [c]
H4.2: OM → DMS Implementation	0.225	0.233	0.119	1.887 [n.s.]	0.038 [a]
H4.3: OM → DMS Use	0.463	0.450	0.132	3.495 **	0.190 [b]

Legend: PM—process maturity, OM—organizational maturity, β—path coefficient, M—sample mean, SD—standard deviation; t—t-statistics. Note: path significance: * $p < 0.05$, ** $p < 0.01$, [n.s.] = not significant. f^2—thresholds: [a] > 0.02 represents weak effect, [b] > 0.15 represents moderate effect, and [c] > 0.35 represents strong effect.

Firstly, the DMS Selection exhibited a strong positive and statistically significant effect on the DMS Implementation (t = 3.449, $p < 0.01$; H1 was confirmed). Furthermore, the DMS Implementation demonstrated an even stronger positive and statistically significant effect on DMS Use (t = 4.331, $p < 0.001$; H2 was confirmed).

The process maturity (PM) exerted a strong positive and statistically significant influence on the DMS Selection (t = 4.550, $p < 0.001$; H3.1 was confirmed). It also demonstrated a slightly less statistically significant influence on the DMS Implementation (t = 2.151, $p < 0.01$; H3.2 was confirmed). However, its influence on DMS Use was deemed statistically insignificant (t = 0.006, $p > 0.05$; H3.3. was not confirmed). On the other hand, the Organizational Maturity (OM) showcased a very strong positive and statistically significant

influence on the DMS Selection (t = 6.598, $p < 0.001$; H4.1 was confirmed). However, it did not significantly influence the DMS Implementation (t = 1.887, $p > 0.05$; H4.1 was not confirmed). Nonetheless, it maintained a strong positive and statistically significant influence on the factor DMS Use (t = 3.449, $p < 0.001$; H4.3 was confirmed).

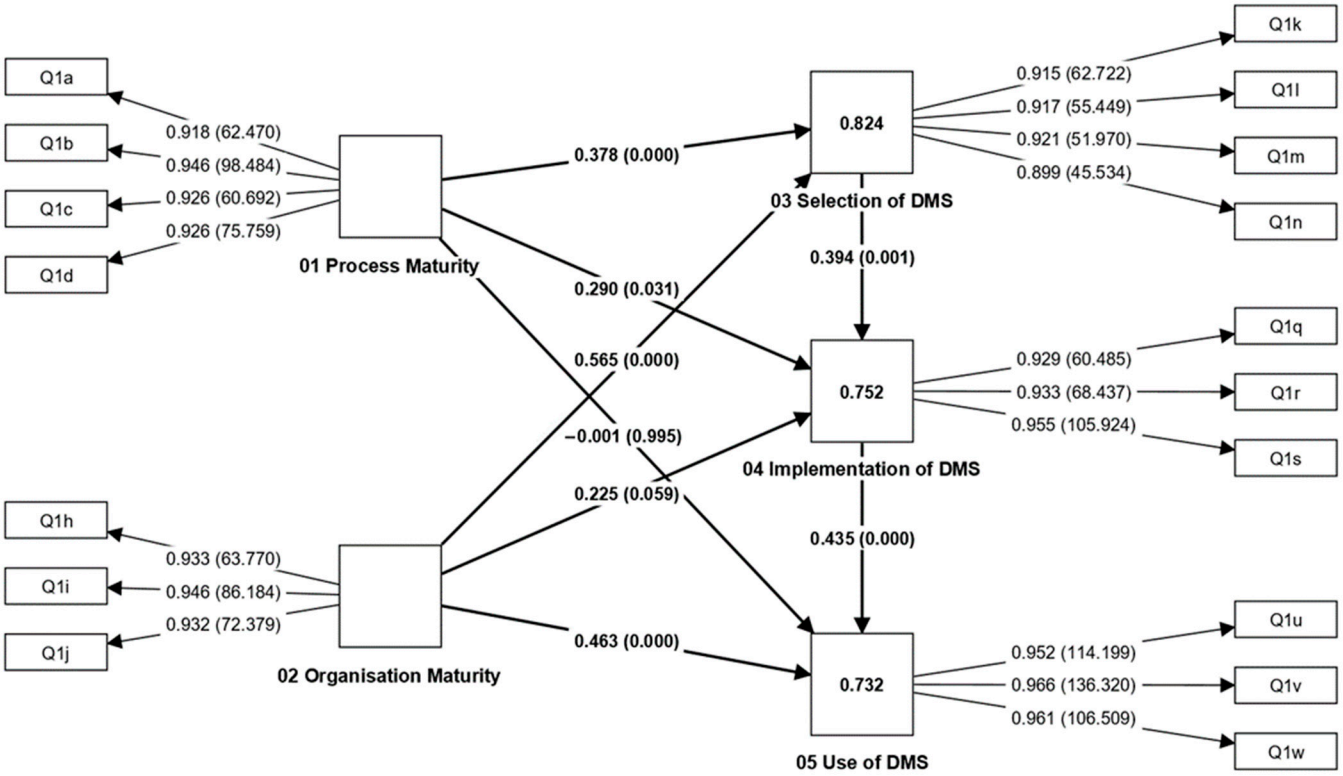

Figure 4. Structural model analysis. Note: the first value represents outer loadings on the links between factors and items, and the value in parentheses represents the t-statistic. On the links between factors, the first value represents the path coefficient, and the value in parentheses represents the *p*-value. Values in squares represent R^2 values.

The coefficient of determination (R^2) is a statistical measure used to evaluate the goodness of fit of a research model [109,110]. It quantifies the proportion of variance in the dependent variable that can be explained by the independent variable(s) included in the model. R^2 ranges from 0 to 1, where 0 indicates that the independent variables have no predictive power in explaining the dependent variable, and 1 represents a perfect fit where all the variability in the dependent variable is accounted for by the independent variable(s). Our structural model exhibited a strong predictive power, as evidenced by the high R^2 values for the dependent variables. The average R^2 across all dependent factors was 0.769, which is considered very high. Following Chin's [112] suggested threshold values, all R^2 values for dependent factors are classified as "substantial". Specifically, the R^2 value for the DMS Selection was 0.824, for DMS Implementation was 0.752, and for DMS Use was 0.732 (see Table 4 and Figure 4). These values indicate that the independent variables in our model account for a significant proportion of the variance in the dependent variables.

The effect size (f^2) is a statistical measure used to evaluate the strength of the relationship between independent and dependent variables in statistical analysis. It quantifies the proportion of variance in the dependent variable that can be attributed to the independent variable(s). The f^2 value also ranges from 0 to 1, where 0 indicates no relationship between the independent and dependent variables, and 1 represents a perfect relationship. Higher f^2 values generally indicate a stronger independent variable(s) effect on the dependent variable [106,107]. According to the results presented in Table 7, we can observe the influence of various factors on the relationships within the model. The relationship between factors

of OM and DMS Selection demonstrated a strong influence (f^2 = 0.518). The relationships between factors PM and DMS Selection (f^2 = 0.233), OM and DMS Use (f^2 = 0.190), and DMS Implementation and DMS Use (f^2 = 0.190) exhibited a moderate level of influence.

On the other hand, the relationships between factors PM and DMS Implementation (f^2 = 0.079), OM and DMS Implementation (f^2 = 0.038), and DMS Selection and DMS Implementation (f^2 = 0.110) had a weak influence. Notably, the f^2 value for the relationship between factors PM and DMS Use was 0, indicating that removing this relationship from the model would not impact the research model. However, it is not known from the above analysis whether PM also indirectly affects the use of DMS, so the mediation effects were examined in the next section.

3.3. Mediation Effect

PLS analysis can be employed to investigate mediation effects by examining the indirect effects between variables. The mediation effect is typically evaluated by assessing the model's total, direct, and indirect effects. The total effect represents the relationship between the independent and dependent variables. In contrast, the direct effect signifies the relationship between the independent and dependent variables after controlling for the mediator. Conversely, the indirect effect reflects the effect transmitted through the mediator [113].

Hair et al. [113] have emphasized that mediation effects regularly appear in models but are frequently overlooked in analyses. In the research model, two potential types of non-mediation can be observed:

1. "no-effect", where no significant effect is observed;
2. "direct-only" is characterized by a significant direct effect only.

Additionally, three mediation types are recognized:

1. "complementary", where direct and indirect effects are substantial and point in the same direction;
2. "competitive", where both effects are substantial but point in inverse directions;
3. "indirect-only", where only the indirect effect is substantial.

These categories, as identified in the literature [114,115], aid in distinguishing the various patterns of relationships between variables in terms of mediation effects. The possible effects of the factors of the research model were investigated, and the results are shown in Table 8 and explained below:

- PM influences on the DMS Implementation reveal a complementary partial mediation effect with significant direct and indirect effects;
- PM influences of the DMS Use reveals that it does not directly affect it. However, it indirectly influences DMS Selection and DMS Implementation factors;
- OM influences of the DMS Implementation reveal that it does not have a direct effect. However, it demonstrates an indirect effect through DMS Selection and DMS Implementation factors;
- OM influences on DMS Use reveal a complementary partial mediation effect, where both the direct and indirect effects are significant;
- DMS Selection does not directly impact DMS Use, but the indirect effect is statistically significant. It shows that the mediator (factor DMS Implementation) fully mediates the relationship between the independent and dependent variables.

Table 8. Direct, indirect, and total effects of the research model.

	Direct Effect (DE)	95% Confidence Interval of DE	t-Value	*p*-Value	Indirect Effect (IE)	95% Confidence Interval of IE	t-Value	*p*-Value	Total Effect (TE)
PM → ImD	0.290	[0.017; 0.541]	2.151	0.031 *	0.149	[0.053; 0.278]	2.596	0.009 **	0.439
PM → UsD	−0.001	[−0.187; 0.234]	0.006	0.995 $^{n.s.}$	0.191	[0.071; 0.333]	2.852	0.004 **	0.191
OM → ImD	0.225	[−0.006; 0.457]	1.887	0.059 $^{n.s.}$	0.222	[0.089; 0.368]	3.146	0.002 **	0.222
OM → UsD	0.463	[0.176; 0.703]	3.495	0.000 **	0.195	[0.086; 0.346]	2.910	0.004 **	0.658
SeD → UsD	-	-			0.171	[0.056; 0.324]	2.448	0.014 *	0.171

Legend: PM—process maturity, OM—organizational maturity, SeD—DMS selection, ImD—DMS implementation, UsD—DMS use, DE—direct effect, IE—indirect effect, TE—total effect. Note: path significance: * $p < 0.05$, ** $p < 0.01$, $^{n.s.}$ = not significant.

3.4. IPMA

The Importance–Performance Map Analysis (IPMA) is a technique used to evaluate and prioritize different attributes or factors based on their importance (I) and performance (P). By plotting the relevance and performance scores on a grid, organizations can identify areas where they need to focus their improvement efforts [110]. Table 9 and Figure 5 show the importance and performance factors that influence the dependent factor DMS Use.

Table 9. IPMA for factor DMS Use.

Factors	Importance (I)	Performance (P)
01 Process Maturity	0.191	67.586
02 Organization Maturity	0.657	68.137
03 DMS Selection	0.171	69.127
04 DMS Implementation	0.436	70.166
Mean Value	0.363	68.754

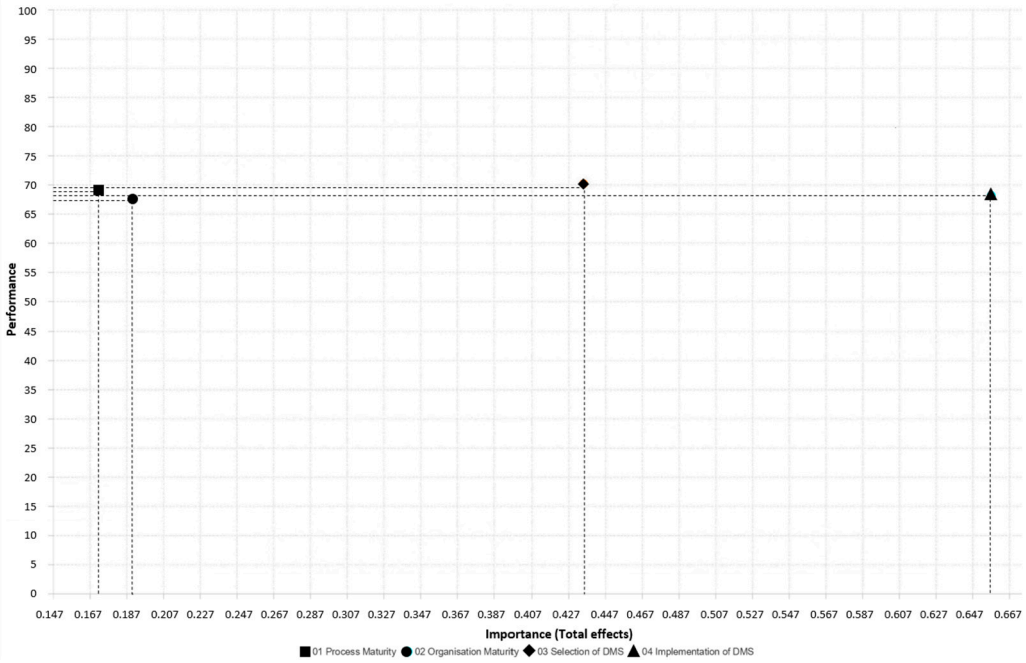

Figure 5. IPMA graf for factor DMS Use.

The findings of the IPMA are typically visualized using a two-dimensional graph. On the horizontal axis, it can be seen the "importance" values of the influencing factors, which range from 0 to 1. This importance indicates the total effect or significance of each factor. On the other hand, we see the values of their performance on the vertical axis in the range from 0 to 100. Performance reflects how well each factor is currently being executed or delivered. From Table 9 and Figure 5, it can be seen that the most important factor, which had the most significant impact on DMS Use, was the Organization Maturity (OM; I = 0.657, P = 68.137), followed by the DMS Implementation (I = 0.436, P = 70.166), the Process Maturity (PM; I = 0.191, P = 67.586) and the DMS Selection (I = 0.171, P = 69.127).

The IPMA results show that the most important factor, Organizational Maturity (OM), did not have the highest performance value to enhance the utilization of the DMS. Management should, therefore, prioritize efforts toward improving the Organizational Maturity factor.

4. Discussion

In order to remain competitive in the market, companies have increasingly recognized the need for digitalization [1]. A vital component of this digital transformation is the adoption of DMS, also known as paperless business solutions [2]. Implementing DMS is crucial for organizations today, not only for cost reduction purposes but also to enable remote work capabilities, centralizing document storage, and controlling access to documentation [14,15], as well as the sustainable orientation of companies [18]. The utilization of DMSs provides numerous advantages for companies, as explained in Chapter 2.2.

Based on the bibliometric analysis, several important conclusions were drawn. Firstly, DMS is not as researched as other business IS (for example, ERP systems, where 15,828 documents were published, or CRM systems, where 7677 documents were published in the Scopus database upto 9 July 2023). From 1980 to 2022, 1173 documents with the included keyword DMS were published across various types, with conference papers and articles being the most common. Two significant peaks in DMS publications were observed in 2006 and 2021: the first peak correlated with the global financial crisis, while the second aligned with the COVID-19 pandemic. Using VOSviewer 1.6.19 software, two main clusters of keywords associated with DMS were identified. The first cluster pertains to DMS-related technologies, while the second involves DMS in relation to various IS. Until 2010, the focus was on management information systems and electronic documents. Post-2010, the research pivoted towards content analysis, artificial intelligence (AI), and quality management. Despite the importance of maturity models in assessing and enhancing processes associated with document management, there is limited research on the interplay of an organization's maturity and the DMS life cycle.

A case study conducted by Jordan and Sternad Zabukovšek [18] emphasized that while implementing and utilizing a DMS, it is crucial to consider the significance of the organization's maturity. This factor offers the organization a structure to assess and improve the whole effectiveness as well as efficiency of the DMS, resulting in enhanced decision-making processes and increased productivity. Maturity model assessments provide a meaningful measure of the current level of maturity within specific aspects of an organization. Through this evaluation, stakeholders can recognize the strengths of improvement areas and rank actions to attain a higher maturity level [20,21]. The presented PEMM model and additional maturity models, such as QMMG, CMM, CMMI, and IMG BPMM, offer a valuable framework for evaluating companies [53]. Each model has its advantages and disadvantages. In the context of DMSs, we believe that the PEMM model holds the highest utility value, primarily because the PEMM model encompasses both an organizational and process model and incorporates detailed criteria and proper enhancements for assessing an organization's maturity. Process maturity (PM) refers to an organization's processes' development, effectiveness, and efficiency level. It considers how well-defined, repeatable, and optimized these processes are within the organization. At the same time, organizational maturity (OM) encompasses a broader perspective and refers to the entire organization's overall development, capability, and readiness. It considers various factors such as leadership, culture, management practices, and overall organizational effectiveness [40,41,56]. Its comprehensive nature makes it particularly suitable for evaluating the maturity of organizations utilizing DMS.

Building upon these foundational insights, we devised a research model to examine the impact of process and organizational maturity on distinct phases of the DMS life cycle, specifically from the vantage point of key DMS users. Utilizing an online questionnaire, we garnered 165 responses from these primary users, subsequently undertaking a quantitative analysis. The main findings are summarized in the following chapters.

4.1. Structural Model Analysis

Based on field research on a sample of 165 respondents, our research model shows a good fit of the data to the research model (SRMR = 0.040). The results of hypotheses testing suggest that the DMS Selection significantly impacts the DMS Implementation (H1 is con-

firmed), which substantially influences the DMS Use (H2 is confirmed). At the same time, DMS selection does not directly affect DMS use (see Table 7). It affects DMS Use indirectly through DMS Implementation (see Table 8). The confirmed hypotheses indicate that the results of this research are consistent with the results of other researchers. The process of DMS Selection plays a pivotal role in influencing DMS Implementation. How an organization chooses a DMS can significantly determine how well it is implemented [9,12,55,78,79]. While DMS Selection does not directly influence DMS Use, its impact is felt indirectly through how a DMS is selected and implemented, which shapes how it is eventually used within the organization. DMS Implementation is a bridge or mediating factor between the selection and actual use of the DMS. Proper implementation is crucial for ensuring that the DMS is utilized optimally [5,8,9,72,86,88–90].

The process maturity (PM) significantly affects the DMS Selection and DMS Implementation (H3.1 and H3.2 are confirmed). The PM has no statistically significant effect on DMS use (H3.3 is not confirmed; see Table 7). An organization's PM plays a substantial role in both the DMS Selection and DMS Implementation phases. This suggests that their abilities to select and implement a DMS improve as organizations mature in their processes. Despite its impact on selection and implementation, PM does not directly influence how the DMS is used. This might mean that while mature processes can guide an organization in choosing and setting up a DMS, the day-to-day utilization might depend on other factors not captured by PM alone.

The organization maturity (OM) predominantly influences the factors of DMS Selection and DMS Use (H4.1 and H4.3 are confirmed). The results suggest that an organization's overall maturity increases, enabling it to select the suitable DMS and utilize it effectively in its operations. While the OM factor does not statistically affect DMS Implementation (H4.2 is not confirmed; see Table 7). This might imply that the actual process of implementing a DMS within an organization is influenced by factors other than its overarching maturity level. In essence, while OM can guide it in choosing the suitable DMS and ensuring its effective usage, this maturity does not necessarily guarantee smooth or effective implementation of the DMS.

Our research model's coefficient of determination (R^2) demonstrates that the independent variables substantially impact explaining the variability in the dependent variables (see Figure 4 and Table 4). Our research's coefficients of determination (R^2) clearly show that the chosen independent variables are robust predictors for the outcomes observed in the dependent variables [109,110]. Specifically, the independent variables PM and OM account for 82.4% of the dependent variable DMS Selection variance, implying that these factors are crucial determinants when an organization selects a DMS. Furthermore, the independent variables PM, OM, and DMS Selection explain 75.2% of the dependent variable DMS Implementation variance. This suggests a combined influence of an organization's maturity and initial selection process on how well the DMS is implemented. Lastly, the independent variables PM, OM, and DMS Implementation account for 73.2% of the dependent variable DMS Use variance, which indicates that the maturity of organizational processes largely governs the success or effectiveness of DMS utilization, the overall organization's maturity, and how the DMS was implemented. PM and OM and the sequential stages of the DMS life cycle (selection and implementation) play critical roles in shaping the outcomes at each phase. The research model demonstrates that these factors are integral in determining the effectiveness and success of a DMS within an organization.

The f^2 value, or effect size, helps us understand how strongly two variables are related in a statistical model and vary between 0, where the independent and dependent variables have no relationship at all, and 1, where the independent variable fully explains the variance in the dependent variable [107,115]. OM (how developed and mature an organization's processes and structures are) greatly affects the decision on which DMS to choose; this is indicated by a high f^2 value of 0.518 (see Table 7). The maturity of an organization's processes has a noticeable, though not overpowering, effect on which DMS they select (f^2 value is 0.233). At the same time, the OM influences how the DMS is used to a moderate

extent (f^2 value is 0.190), and how a DMS is implemented also moderately affects its usage (f^2 value is 0.190).

In contrast, PM only slightly affects how a DMS is put into action or implemented, and OM also has a weak influence on DMS Implementation. The DMS Selection weakly affects its implementation. Interestingly, the maturity of an organization's processes (PM) does not affect how the DMS is used. This suggests that other factors might be at play regarding actual DMS usage. We can conclude that the maturity of an organization and its processes play various roles in selecting, implementing, and using a DMS. Some relationships are strong and obvious, while others are weaker or non-existent. This understanding can guide organizations in focusing on areas that most influence successful DMS selection, implementation, and utilization.

4.2. Mediation Effect Analysis

The mediator variable serves as a bridge that helps to clarify or convey the effect of the independent variable on the dependent variable [113]. The results of mediation effects are presented in Table 8.

PM has both a direct and indirect (through other factors) influence on DMS Implementation, characterized as a "complementary partial mediation" effect; this means that as PM (the degree to which processes are defined, managed, measured, controlled, and effective) increases or decreases, DMS Implementation (how a DMS is put into practice) is directly affected. The change in DMS Implementation is not only because of other variables but also due to process maturity itself. The PM also impacts DMS Implementation through another factor that then affects DMS Implementation. PM does not affect DMS Use directly but has an indirect influence through its effect on DMS Selection and DMS Implementation. Specifically, PM affects how a DMS is selected and implemented, and these two factors (DMS Selection and DMS Implementation) affect DMS Use. For example, an organization with more mature processes might choose a particular type of DMS and implement it in a certain way. This selection and implementation method influences how the DMS is eventually used. The results showcase the multifaceted influence of PM. While it directly impacts how a DMS is implemented, its effect on the actual use of the DMS is more nuanced and channeled through the stages of DMS selection and implementation. This understanding highlights the intricacies of organizational processes and their cascading effects on technological adaptation and utilization.

OM does not directly impact but indirectly influences DMS Implementation through its effects on DMS Selection; this implies that an OM level does not determine how a DMS is implemented. In other words, just because an organization is mature does not mean it will automatically implement a DMS in a certain way without considering other factors. OM also indirectly affects how a DMS is implemented by influencing the process of DMS selection. More mature organizations might select DMS based on specific criteria or considerations that align with their maturity level. This choice, in turn, affects how the DMS is subsequently implemented. But OM directly affects how the DMS is used. This suggests that certain attributes or characteristics of mature organizations inherently lead them to use a DMS in particular ways. Apart from the direct effect, OM also influences DMS Use indirectly through other intermediary factors, which means there is a pathway or process in which the maturity of the organization shapes other aspects (like DMS selection or implementation), which then influence the DMS usage. The findings suggest that OM is a nuanced factor that plays a multifaceted role in shaping the DMS landscape of an entity. While it does not dictate DMS implementation directly, it shapes the process indirectly through its bearing on DMS selection. Regarding actual DMS usage, OM influence is twofold, directly affecting usage and molding it through other intermediary stages or factors. Recognizing this multi-dimensional influence is crucial for organizations aiming to optimize their DMS strategy in line with their maturity level.

DMS Selection does not have a direct effect on DMS Use. However, it indirectly affects DMS Use through DMS Implementation, which acts as a full mediator. Choosing a DMS

does not directly dictate how it will be used. This means that even if an organization carefully selects a DMS considering various features or benefits, it does not guarantee that the system will be utilized in a specific way based solely on the selection process. While DMS Selection does not influence DMS Use directly, it does have an indirect impact. Specifically, selecting a DMS influences how that system is implemented in the organization. The way the DMS is implemented subsequently determines how it will be used. In simple terms, the choice of DMS influences the strategies and methods of its deployment, which then shape its actual utilization. DMS Implementation is a "full mediator", meaning that DMS Implementation completely bridges the relationship between DMS Selection and DMS Use. All of the influence that the DMS Selection has on DMS Use is channeled through the DMS Implementation. There is no direct link between selection and use without considering implementation. This underlines the pivotal role that DMS Implementation plays in translating the intentions and criteria of the selection phase into the practicalities of day-to-day usage. The results emphasize the intricate interconnectedness of selecting, implementing, and using a DMS. The choice of a DMS is not directly connected to how it is used. Instead, how a DMS is selected sets the stage for how it is rolled out or deployed (implementation). This roll-out process, shaped by the earlier selection, dictates usage patterns. It underscores the importance of a thoughtful implementation phase, as it is the conduit through which the benefits and features sought during the selection process are actualized in daily operations.

These conclusions provide insight into the complex relationships between PM and OM and how a DMS is selected, implemented, and used. Some influences are direct, some are indirect, and some factors serve as bridges or mediators between others. Recognizing these relationships helps understand the dynamics of DMS selection, implementation, and utilization in organizational and process maturity.

4.3. IPMA Analysis

At the end of the empirical research, we researched, with the help of IPMA, which factors are most important for the successful use of DMS. The IPMA results show that the most critical factor, OM, does not have the highest performance value (see Table 9 and Figure 5). Therefore, if an organization wants to increase DMS use, the management of organizations should prioritize efforts to improve the OM factor.

The finding that PM is important in the DMS selection phase and DMS implementation phase but not in the DMS use phase suggests an interesting pattern in the relationship between PM and the different stages of DMS adoption. While the specific reasons for this pattern would require further investigation, we can speculate that PM is likely to be important in the DMS selection and implementation phases because it ensures that the chosen DMS aligns well with existing processes and supports their improvement. During the selection phase, organizations must assess how well a DMS fits their current processes and how it can enhance or streamline them. In the implementation phase, PM becomes crucial to effectively integrate the DMS into existing workflows and optimize its utilization. However, once the DMS is successfully implemented and users become familiar with its functionalities, the direct impact of PM on DMS use may diminish as users focus more on utilizing the system's features rather than evaluating its alignment with processes. Further research and analysis would be needed to explore these relationships in greater depth and to provide more conclusive insights.

As can also be observed from the empirical research, OM plays a key role in effectively using a DMS. Our research shows that OM is important in the DMS selection phase and DMS use phase but not in the DMS implementation phase. OM is significant in the DMS selection phase because it helps guide decision-making and ensures that the chosen DMS aligns with the organization's strategic goals and requirements. OM encompasses factors such as leadership, culture, knowledge, and management practices [40,41,56], which are crucial in evaluating and selecting a DMS that fits the organization's needs and objectives. A mature organization is likelier to have transparent processes for assessing DMS options,

evaluating their compatibility with existing systems, and making informed decisions. The finding that OM is unimportant in the DMS implementation phase suggests that other factors, such as project management, technical expertise, change management, etc., become more critical during this stage [2]. While OM influences an organization's readiness and capability, its direct impact on successfully implementing DMSs may be less pronounced. OM remains essential in the DMS use phase because it influences the system's effective utilization and ongoing management. A mature organization with well-established processes, a collaborative culture, and a focus on continuous improvement is better positioned to leverage the full potential of the DMS. OM facilitates knowledge sharing, collaboration, and adherence to established processes, which are critical for optimizing the use of the DMS and deriving maximum value from its features. Further research and analysis are needed to validate and explore these relationships in specific organizational settings.

A case study by Jordan and Sternad Zabukovšek [18] concluded that the researched financial institution, as evaluated using the PEMM model (described in Section 2.1), belongs to maturity phase 3. They added that several key findings support this conclusion. The management demonstrated a clear vision for the financial institution and its processes, effectively distributing responsibilities and possessing extensive process knowledge. Process owners were vital in overseeing change implementation, while teamwork and employee engagement were highly evident. The organization's processes were optimized to enhance work efficiency, with comprehensive process documentation covering intermediate phases. Personnel were well-trained and empowered to make informed decisions, and process owners showed strong commitment. Strategic process measurements were in place. Furthermore, the case research indicated an advanced level of DMS utilization within the financial institution, which aligns with its maturity stage.

5. Conclusions

A mature organization usually has well-defined and documented processes in place. These processes can align with DMS functionalities and capabilities, ensuring the system supports and enhances existing workflows. This alignment simplifies operations and maximizes the benefits of using a DMS. Further, the successful implementation and adoption of a DMS often necessitate changes in work practices and employee behavior [89,90,116].

5.1. Contribution to Theory

Organizations with a higher level of maturity are well-prepared to handle change management processes effectively. They can provide essential training, communication, and support to employees, facilitating a seamless transition and encouraging widespread adoption of the DMS. In a mature organization, there is a deep understanding of the value of information assets, and comprehensive management frameworks, policies, and procedures are established. These practices ensure that the utilization of the DMS aligns with regulatory compliance, data security, privacy requirements, and overall information management objectives. A mature organization typically has a culture that emphasizes collaboration and effective communication between teams and departments. These attributes are essential to successful document collaboration and information sharing using a DMS. An organization with a higher level of maturity can leverage a DMS as a centralized platform to enable seamless collaboration, version control, document sharing, and effective communication. An organization's maturity often involves a commitment to continuous improvement and learning. Organizations can utilize a DMS effectively to gather insights, analytics, and feedback on document-related processes. These insights can then be used to identify areas for improvement, optimize workflows, and drive efficiency gains over time.

Corporate sustainability emphasizes incorporating environmental, social, and economic facets into an organization's operational practices and strategic decisions. As Ashrafi et al. [116] highlighted, it seeks to actively manage a business's influence on society and the environment, ensuring enduring profitability and delivering value to its stakeholders. They further suggest that corporate sustainability extends beyond immediate financial

ambitions, offering a more holistic approach that values the welfare of individuals, the environment, and the prosperity of upcoming generations. This entails weighing business actions and decisions' social, environmental, and economic implications. A clear indication of an organization's commitment to corporate sustainability is often its adoption of corporate sustainability standards (CSS). These standards present a set of policies and actions intended to meet or exceed prevailing regulatory benchmarks [117].

Moreover, studies have identified links between an organization's maturity and sustainability quotient [24]. Corporate sustainability is more than just a trendy term; it signifies an organization's dedication to conducting business in a socially accountable manner, fostering economic growth while enhancing the well-being of its employees, their families, and the broader society. As Ashrafi et al. [116] highlighted, corporate sustainability is multifaceted, targeting reductions in environmental impact, championing social fairness, and securing enduring economic health. We believe that when IT aligns strategically with an enterprise's goals, it can amplify sustainable values and methodologies throughout the organization. For example, DMSs can reduce paper consumption and, thus, reduce an organization's environmental footprint, which plays a crucial role in achieving green goals. Organizations can use DMSs to optimize processes, reduce waste, and promote economic resilience. In addition, DMSs can be instrumental in increasing transparency, supporting ethical business, and enhancing social sustainability.

5.2. Contribution to Practice

Based on the presented research findings and discussion, there is a noticeable gap since OM is the most critical factor for successfully using DMSs but does not have the highest performance value. Management must focus on improving OM to optimize the use of a DMS. The research found that OM is essential in the DMS selection and DMS use phases. Mature organizations with clear leadership, culture, and knowledge structures are better equipped to select and use DMS effectively. While OM is essential, the implementation phase may require a shift in focus to technical expertise, project management, and change management.

PM is critical in the DMS selection and DMS implementation phase. Management must ensure that their processes are mature enough to select a DMS that aligns with their needs and implement it effectively.

As a DMS progresses from selection to implementation and use, the relevance of certain factors, such as PM, changes. Management should be agile and flexible in their approach, adjusting their focus as they move from one phase of DMS adoption to another. A mature organization that emphasizes continuous improvement, knowledge sharing, and collaboration is best positioned to maximize the benefits of a DMS. Management should encourage these qualities to ensure the organization gets the most out of its DMS.

A case study by Jordan and Sternad Zabukovšek [18] provides a snapshot of how an organization at the third level of maturity uses a DMS. Management should consider benchmarking and learning from such studies to understand best practices and areas for improvement. The case study also highlights the importance of well-trained staff empowered to make decisions. This points to the broader implication that ongoing training and empowerment are critical to the optimal use of a DMS. As the case study shows, the role of process owners is crucial. They must be committed, and their participation is critical to controlling change and ensuring the success of a DMS.

Organizations can continuously evaluate and refine their DMS practices through strategic process metrics; this is an essential implication for management to ensure continuous improvement. These findings highlight the need for organizations and their management teams to take a holistic approach to DMS adoption. It is not just about choosing the right system but is about ensuring the organization's maturity level and processes align to get the most value out of the DMS. The DMS adoption journey requires different focuses and strategies, emphasizing the importance of flexibility and continuous learning.

5.3. Limitations and Further Research Directions

The identified limitations of this study present an opportunity for future research. Replication of this study in organizations belonging to different industries (manufacturing, retail, finance, etc.), varying in size (small, medium, large), market scope (local, regional, national, or international), or other pertinent differences could provide valuable insights. In addition, within the framework of the research, we discovered several mediation effects between the independent and dependent variables (see Table 8), which would be reasonable to investigate in more detail (for example, in the way suggested by Rosen et al. [118]).

Furthermore, this research can be expanded by considering other critical factors that impact the DMS life cycle, such as management support, organizational culture, cost-effectiveness, project support, etc. [117,119], or as suggested by Ziemba et al. [8], to create a framework of CSFs, not only for the implementation, as the authors mentioned above did, who highlighted 23 factors in four groups (economic, organizational, technological, and legal issues), or Alshibly et al. [86], who suggested 37 factors in six groups, or Haider et al. [9], who identified 13 factors, but not only for the implementation phase. Further investigation can also explore the DMS' acceptance by users during different DMS life cycle phases. The TAM (Technology Acceptance Model) [120,121] and extensions of the Unified Theory of Acceptance and Use of Technology (UTAUT) model [122] are commonly employed in this domain, where we found a study by Donmez-Turan [89] that investigated the mediating role of willingness to adopt based on the UTAUT, on the relationship between user resistance, as well as user anxiety and attitudes towards using the system among administrative staff working at a public university. By incorporating these additional factors and models, a more comprehensive understanding of DMS life cycle acceptance can be obtained.

Author Contributions: Conceptualisation, S.S.Z., S.J. and S.B.; methodology, S.S.Z., S.J. and S.B.; software, S.S.Z. and S.J.; validation, S.J. and S.B.; formal analysis, S.S.Z. and S.J.; investigation, S.J.; resources, S.J.; data curation, S.S.Z.; writing—original draft preparation, S.S.Z., S.J. and S.B.; writing—review and editing, S.S.Z., S.J. and S.B.; visualization, S.S.Z.; supervision, S.S.Z. and S.B.; project administration, S.J.; funding acquisition, S.S.Z. and S.B. All authors have read and agreed to the published version of the manuscript.

Funding: Authors acknowledge the financial support from the Slovenian Research Agency (research core funding No. P5–0023, "Entrepreneurship for Innovative Society").

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

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