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Treasury management digitalization: Current state of the art of research

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Abstract The increasing digitalization of business processes in all spheres of the economy all over the world is an undeniable trend. Over the past two decades, research on digital transformation has garnered increasing attention, with a broad array of topics explored in the literature. However, certain research domains have received less scholarly attention from this viewpoint, with treasury management being a notable example. Therefore, this is of particular interest to provide insight into the current state of research devoted to treasury management digitalization, especially in light of the development level of this function and its overall significance. The purpose of the study is to provide a comprehensive overview of digitalization in treasury management, delineating the primary research tendencies and thematic concentrations within this critical research domain. To achieve these objectives, the research strategy primarily utilized bibliometric analysis to map the intellectual structure and evolution of the field. This was complemented by a traditional systematic literature review, which synthesized qualitative insights to offer a comprehensive understanding of the current state of research on treasury management digitalization. The employed bibliometric and systematic literature review (B-SLR) analysis revealed three key clusters offering valuable insights into treasury management digitization: research focusing on treasury units' digital transformation generally emphasizes risk control, viewing digital transformation as a significant adoption reflected in the establishment of smart analytical centers; studies geared toward banks perceive digitalization as liquidity management efficiency enhancer across both risk and business parameters; research on corporates examines digital technology as a cash management automation tool, approaching digitalization from a managerial perspective aimed at information and management centralization. This study offers valuable insights for academic scholars by identifying research gaps and suggesting promising future directions for empirical investigation and theoretical development. For industry practitioners, the study clarifies impactful digital transformations and provides relevant analogies, thereby creating real-world value and informing decision-making in this dynamic field.

Keywords: liquidity management, digital transformation, B-SLR, VOSviewer

1. Introduction

Digitalization technologies are fostering innovation on a global scale across various industries, enhancing operational efficiency and creating new sources of value. This transformative wave has been the subject of extensive scholarly inquiry over the past two decades, with researchers meticulously examining digitalization's impact on a wide range of business functions. However, some sectors still exhibit a lack of research, partly due to the limited integration of digital technologies, which stems from the inherent nature of their operations and the significant costs associated with business digitalization (Kuang et al., 2023). Corporate treasury, while a relatively new organizational function, exemplifies a business unit constrained in its adoption of digital technologies. This is largely due to solidified processes and systems that hinder rapid digital change. As a result, digital technologies may disrupt traditional treasury practices, requiring corporations to implement significant changes in order to remain competitive in the evolving landscape. Moreover, bank treasury, as a far more complex and heavily regulated unit, is similarly resistant when it comes to digital transformation. This inflexibility has sparked interest among industry practitioners in the challenges of managing digital change in such institutions (von Solms & Langerman, 2021). Nevertheless, in light of the dynamic nature of the business environment, the role of the treasury is constantly evolving. It has transitioned from a solely transactional business model to a value-adding unit with a strategic focus (Blach et al., 2014). Given the significant development of the treasury function across industries and its overall importance at the corporate level, even minor adjustments can significantly boost process efficiency. Digital transformation now seems not merely a technological upgrade, but a crucial set of managerial and operational adjustments necessary to align with macro-trends. Consequently, promoting digital transformation is imperative, as managerial and technological changes, though seemingly small, represent significant internal actions necessary to align with more substantial trends such as Industry 4.0 (Polak et al., 2018). The aforementioned tension between the treasury's growing strategic mandate and the inherent operational inertia creates a pressing need for a structured investigation into the digital evolution of treasury management. A rigorous examination of the implementation and

utilization of digitalization practices within the treasury function is currently fragmented across numerous studies. A consolidated study clarifying key trends, identifying best practices, and charting future directions in this research domain is essential. This research is designed to fill this critical void.

Therefore, the purpose of the study is to conduct a comprehensive review of extant academic literature on the digitalization of treasury management, employing the bibliometric and systematic literature review (B-SLR) approach. This method is designed as a comprehensive toolkit, capable of addressing a wide array of research objectives, including theory development, identification of future research avenues, and the establishment of connections across diverse topics. This approach offers significant academic benefits by combining quantitative and qualitative methods to analyze current knowledge (Alegre et al., 2023). Given the absence of existing review studies on this topic from the proposed perspective, integrating bibliometric analysis with a traditional systematic literature review is especially topical. In addition to the examination of current theoretical advancements, the study aims to provide valuable insights for both academic researchers and industry practitioners concerning future developments in this area. Thus, the study aims to answer the primary research question:

(1) "What are the views of researchers regarding treasury management digitalization?".

Additional research questions are:

(2) "What is the trend of research development regarding the digitalization of treasury management?" and,
(3) "What is the main focus in research on the digitalization of treasury management?".

The contemporary relevance of this research also stems from the acknowledged role of digitalization in mitigating diverse exogenous threats, which is particularly relevant in a VUCA (volatility, uncertainty, complexity, ambiguity) economic landscape, where managers are compelled to anticipate a broader spectrum of business and financial factors and formulate more adaptive strategies (Boscoianu et al., 2024). Consequently, comprehending the current state of research on treasury management digitalization and leveraging optimal approaches is imperative for fostering crisis resilience through intelligent, rapid decision-making and enhancing operational performance during regular business cycles.

The paper structure is as follows: the Introduction highlights the background and overall research purpose; the second section is devoted to a description of methodological aspects and details of the study conducted; the Results and Discussion section provides in-depth insights regarding the current views of researchers as well as research trends and focus on this topic, and the interpretation of the results obtained, highlighting the study's academic contributions, practical implications, and limitations. The Future Perspectives section is devoted to the potential expansion of the research with special emphasis on challenges, applications, trends, and interdisciplinarity of the study. The final section addresses research conclusions, providing a summary of key elements of the study.

2. Materials and Methods

The methodology of this study is guided by the objectives outlined above. The research strategy combines bibliometric analysis with a traditional systematic literature review to provide a comprehensive overview of the current state of research on treasury management digitalization. The data collection process and methodological framework adhere to established guidelines for bibliometric-systematic literature reviews outlined by Marzi et al. (2024), and built upon well-established protocols such as PRISMA and AMSTAR 2.

The first step is a keyword search in the Scopus database and the Google Scholar search engine. A proposed combination of keywords is developed to specify search queries, focusing on the corporate and bank treasury domains in order to address the research questions. It is important to note that broader financial management terms are excluded to ensure the relevance of results and to maintain conceptual precision within the defined perimeter of treasury management. Additionally, treasury studies from public, state, and government entities are excluded; thus, the non-business orientation of a study is defined as a major exclusion criterion. Regarding digitalization, the search strategy incorporated multiple word forms and endings by using truncation wildcards to capture semantically related and constituent words as alternatives to the term “digitalization”. The search is conducted within titles, abstracts, and keywords. The complete Boolean search queries used are presented in the table below with source-specific syntax (Table 1):

Table 1 Search queries.

Scopus
TITLE (("treasury management" OR "liquidity management" OR "cash management" OR treasury) AND (digital* OR technolog* OR intelligen* OR AI*))
Google Scholar
(intitle:"treasury"|intitle:"treasury management"|intitle:"liquidity management"|intitle:"cash management" intitle:"digitalization"|intitle:"digital"|intitle:"intelligent"|intitle:"AI")

The search queries do not initially include any search restriction filters commonly used to reduce irrelevant results. Instead, a manual adjustment is applied at a later stage, based on inclusion and exclusion criteria. The search results include

language and time constraints: they are limited to English-language publications and cover the time period from 2010 to 2025 to include a full decade of topic-related papers and the most recent papers. The date of the last search query and data retrieval was 25.03.2025.

Initially, 113 scientific records on the requested search input were obtained from both data sources. Articles in the initial sample were evaluated in line with the research aims and the aforementioned conceptual perimeter. The number of records after database merger, duplicate removal, and initial screening was 30, due to the exclusion of non-business studies. The full document flow of the search process is described in the figure below for better process visualization (Figure 1). After the final screening procedure and checking for the availability of the full texts, 25 unique contributions were confirmed eligible for bibliometric-systematic analysis.

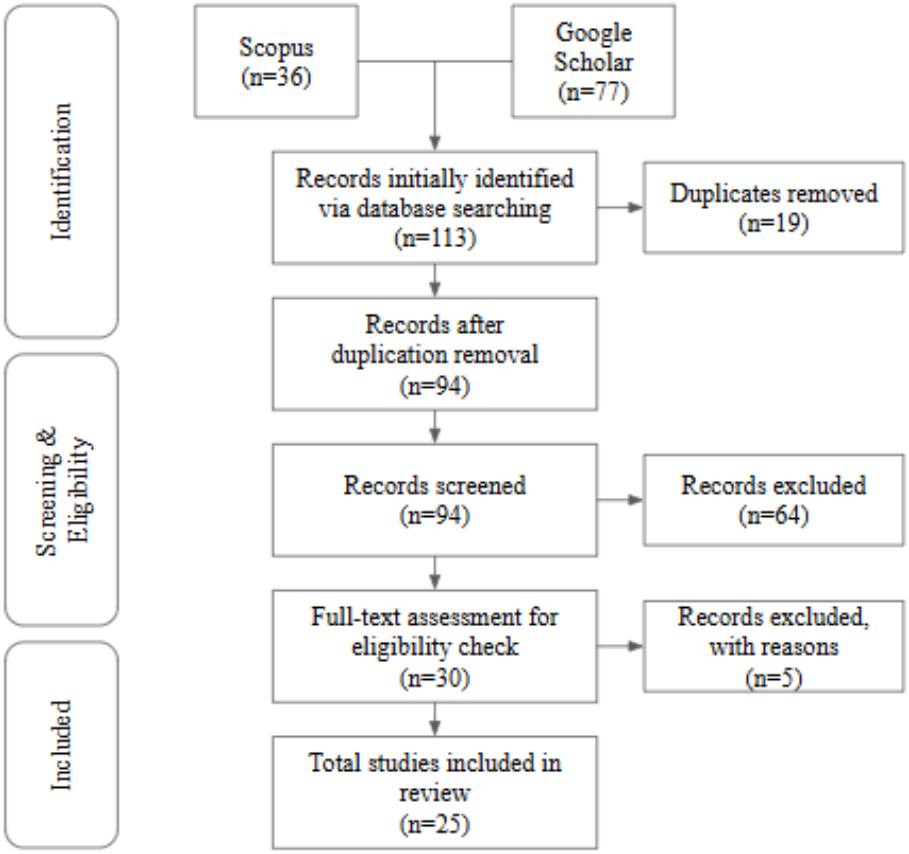

Figure 1 Document flow diagram.

3. Results and Discussion

3.1. Trend of development

The next stage of the study is bibliographic data processing from the selected sources. This section aims to address one of the research questions, in particular: "What is the trend of research development regarding the digitalization of treasury management?". The collected data show that the number of publications increased steeply after 2019. The peak year in terms of publication volume related to treasury management digitization was 2024, and 80% of all publications meeting the screening criteria were published after 2019. In contrast, the early 2010s exhibited relatively low research output on the topic. This may be connected with the limited relevance of digitalization within treasury functions during that period. The decade began with the global economy recovering from the Great Recession, when inflation and interest rates stayed steady throughout that time. It was not until the latter half of the decade when the pace of global economic recovery accelerated and strategic interest in digitalization emerged more prominently in treasury contexts. Such statistics indicate research progress and overall topic novelty for academia. In terms of citations, 2023 was the most cited publication year, suggesting that papers published that year became a strong reference base for subsequent research. The number of publications and citations in dynamics are tabled below (Table 2).

Another point to mention is the relative dispersion of authorship, meaning no relationship between the researchers in the research scope is presented. Overall, the observed 7-year gap at the beginning of the decade and a gradual increase thereafter, with most citations concentrated in a five-year timespan, can be interpreted as an upward trend in topic-related research activity in recent years, reflecting the topicality of digitalization in treasury management.

Table 2 Number of publications and citations.

Year	Number of articles	Share in total number of articles	Citations	Share in total number
2010	3	12.00%	22	10.20%
2011	0	0.00%	0	0.00%
2012	0	0.00%	0	0.00%
2013	0	0.00%	0	0.00%
2014	0	0.00%	0	0.00%
2015	0	0.00%	0	0.00%
2017	0	0.00%	0	0.00%
2018	1	4.00%	18	8.40%
2019	1	4.00%	0	0.00%
2020	3	12.00%	52	24.20%
2021	4	16.00%	44	20.50%
2022	3	12.00%	23	10.70%
2023	4	16.00%	55	25.60%
2024	5	20.00%	1	0.50%
2025	1	4.00%	0	0.00%
TOTAL	25	100%	215	100%

3.2. Word co-ocurrence

Prior to the systematic content analysis, a word co-occurrence analysis is conducted as part of the bibliometric study. This section specifically aims to address the research question "What is the main focus in research on the digitalization of treasury management?". The figure below presents a network visualization map illustrating the relationships between words in the selected articles (Figure 2). The co-occurrence analysis conducted via the VOSviewer software tool highlights the connections between terms, with the most prominent words being represented by larger nodes.

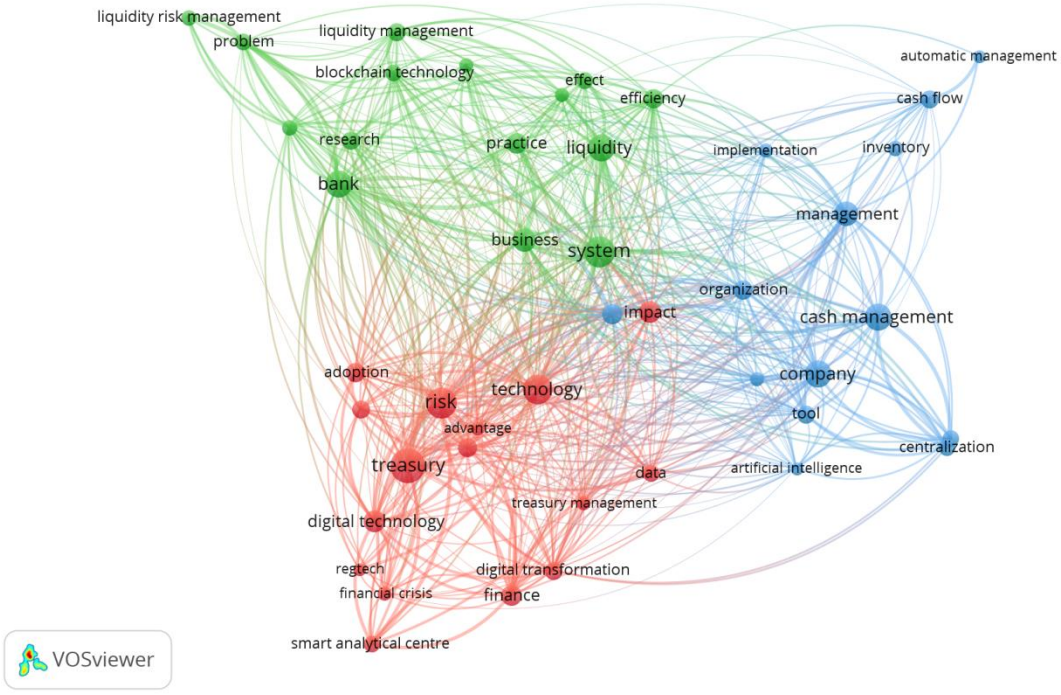

Figure 2 Words co-occurrence analysis.

There are three clearly visible clusters, highlighted with red (Cluster I), green (Cluster II), and blue (Cluster III) colors. The occurrence value in Cluster I indicates that, in general, treasury units' technology advancements and digital transformation focus on risk control; thus, digital transformation is viewed as an important and impactful adoption that can be reflected in the establishment of a smart analytical center. The occurrence value in Cluster II indicates that research geared toward banks views digitalization as a liquidity management system efficiency enhancer in terms of both risk and business parameters, which subsequently results in better customer relationships. The occurrence value in Cluster III suggests that research on corporates examines digital technology as a cash management automation tool and approaches digitalization from a managerial

perspective, aiming for information centralization and company management organization. For convenience, a summary of co-occurrence results is provided in the table below (Table 3):

Table 3 Clusters thematic focus.

Thematic Focus	No. Of words	Start of appearance
Cluster I [Red]	16	2019-2021
Treasury management transformation via the adoption of digital technology (regulatory technology in particular) and smart analytical centres advantages finance, data, and risk management, especially impactful and important during the financial crisis		
Cluster II [Green]	15	2022-2024
Digital technology impact research in banks shows enhancement of liquidity and risk management, on practice digitalization leads to better business results and customer relationships		
Cluster III [Blue]	14	2021-2023
Corporates approach digital technology as a cash management automation tool, implement artificial intelligence in inventory, approach digitalization from a managerial perspective for information and leadership centralization		

3.3. Systematic literature review

The co-occurrence analysis provides systematic insights into the current state of the art of research, addressing the main research question: "What are the views of researchers regarding treasury management digitalization?". Processed results of word co-occurrence strengthen the explanation formed in the literature. Thus, digitalization can be viewed as a risk mitigation strategy (Verno, 2019), especially in high-risk industries. Von Solms (2021) indicates that the past COVID-19 pandemic might be the catalyst that sped up the pre-COVID trend of adopting digital technology in treasury, risk, and finance, as practitioners may be more interested in being well-prepared for VUCA environment events, while Badakhshan & Ball (2022) illustrate cash management benefits of the digital twin framework adoption for such a highly disruptive environment as supply chain management. The second bank-related cluster highlights research focused on liquidity enhancement in terms of risk and profit. Hidayat et al. (2024) suggest that digital utilization is a strategic resource for increasing liquidity and financial stability, particularly in developing countries. Another study places special emphasis on the importance of fostering an innovation culture to ensure long-term resilience in the dynamic banking industry (Hristo & Escalada, 2023). As for the third cluster, for instance, Polak et al. (2019) concluded that such expressions of active digitalization as artificial intelligence and process automation have truly arrived in corporate treasury management, helping treasurers to shift towards being a strategic business partner to management. The prevailing view is that transaction processing, settlement, and administrative tasks offer minimal value and should be automated, streamlined, and simplified to allow industry practitioners to engage in higher-order decision-making and organizational development. An earlier study also highlights that treasury was historically viewed as a process-oriented cost center, but constantly anticipated a more strategic and less manual role from senior management (Montigelli, 2010). Transformation of management, leadership, and information workflows via digital technology implementation results in better centralization of decision-making, which in turn also results in better strategic developments and leadership achievement (Dolle et al., 2022). Moreover, trends for future development become more apparent with co-occurrence mapping. It can be said that the scope of application of digital technology varies greatly among researchers, which is attributed to different industries of interest. Interconnection of corporate digital innovations in treasury and banking cutting-edge digital adoptions and practices may lead to process enhancement for both treasury types. For instance, Camerinelli (2010) provides interesting interconnection between both banking and corporate treasuries, viewing them as a client and a vendor and offering an examination of corporations' expectations from a treasury management system, identifying a number of key competitive features aiming for digitalization.

3.4. Discussion

The study results demonstrate a growing interest in treasury management digitalization, as there has been a steady increase in publications and citations in recent years. The results of word relationship mapping (co-occurrence analysis) identified three clusters that show the relationships between words and strengthen the explanations provided in existing studies. Current views on digitalization are quite positive: in general, the digitalization of treasury units focuses on risk control. This is consistent with views indicating improvements in data analytics capabilities and the adoption of real-time reporting features for better risk management. These functionalities empower treasurers to execute comprehensive risk assessments and maintain continuous oversight of financial positions more easily (Jeffery, 2010). By leveraging precise, data-driven insights, treasurers are better equipped to anticipate potential risks and implement proactive strategies in regulatory and compliance

processes via Regulatory Technology (von Solms, 2020). This analytical capability is instrumental in establishing robust treasury governance.

At the same time, some distinguishing characteristics can be made between banking and corporate treasury research: the former views digitalization as a liquidity management system efficiency enhancer in terms of both risk and business parameters, while corporates approach digitalization from a managerial perspective, aiming for information centralization and company management automation. This point is in line with practitioners' perspectives on the strategic nature of the treasury function, as automation of repetitive tasks, such as data entry, transaction matching, and invoice processing, minimizes the occurrence of human errors and reallocates personnel resources towards more strategic, value-adding activities. The subsequent gains in efficiency accelerate workflows, enabling treasury staff to concentrate on complex and strategic endeavors (Wu, 2023). The integration of AI-driven systems furnishes treasurers with advanced analytical capabilities (Nanda, 2024). Such a data environment significantly strengthens strategic decision-making processes, enabling treasurers to achieve a more precise alignment of financial strategies with overarching corporate objectives and prevailing market conditions. Consequently, data-driven insights underpin more judicious decision-making across critical domains, including investment management, cash flow optimization, and policy formulation (Horváth & Szerb, 2018).

The aforementioned distinction between banks and corporates may serve as the foundation for further exploration of digitalization implications at the intersection of bank and corporate practices. Examples include, but are not limited to, enhanced data visibility and real-time information exchange within departments for internal pricing transparency, cross-market price search for external opportunities exploitation, unit economics of transactions, approach to accounts management, etc. This particular observation adds considerable value to the study results, apart from the current theoretical achievements mapping and insights synthesis provided above.

The use of bibliometric analysis in this study offers the most objective results for a systematic review, minimizing the influence of individual subjective factors. However, two significant limitations must be acknowledged. First, digitalization is a broad concept, and it is recommended that future research compare and synthesize its various related concepts or frameworks. Second, despite the fact that the study is intentionally limited to Scopus and Google Scholar as sources of scientific documents, other bibliographic databases, such as Web of Science and ProQuest, may be considered in future bibliometric studies to further enrich the analysis. The choice of Scopus over Web of Science was made because Scopus provides more comprehensive journal coverage, particularly within the social sciences, and also includes valuable conference proceedings and books. Using both would have only resulted in a higher proportion of duplicate findings initially. Meanwhile, Google Scholar stands out for its remarkably expansive database, which indexes a diverse array of scholarly materials. This includes journal articles, theses, dissertations, books, preprints, technical reports, and even various forms of 'grey literature.' Such broad coverage is particularly advantageous in quickly developing fields. Ultimately, the combined scope ensures a more thorough and interdisciplinary examination of the existing literature. Additionally, language restrictions may be eased to complete case-sensitive topics with more insights.

4. Future Perspectives

4.1. Expansion of the research

The research findings may be accompanied by in-depth qualitative studies to better understand the nuances of digitalization within different organizational structures. Future research could explore specific digital technologies, such as blockchain in treasury operations, in greater detail, well beyond general discussions, examining their impact on management and efficiency (Qizi, 2024). Also, comparative studies across different regions could provide valuable insights into how various external factors influence digital technology adoption rates in treasury. The impact of regulatory frameworks on the pace of digitalization could also be an area for further investigation, especially given the varying regulatory landscapes globally.

4.2. Practical applications

The identified positive effects of digitalization in such domains as risk control, liquidity management, and information centralization can guide practitioners in developing strategic roadmaps for their treasury departments. Banks can leverage insights into digital tools to enhance their liquidity management systems, potentially leading to improved pricing centralization, ALM forecasting, and customer relationships. Corporations can utilize the findings to prioritize digitalization initiatives that streamline cash management processes, centralize information, and empower treasurers to transition into more strategic roles within the organization.

4.3. Challenges for treasury digitalization

Implementing or continuing digitalization efforts in treasury management may face several obstacles. Apart from the aforementioned slow-changing nature of the treasury business in general, these may include resistance to change within organizations, the significant upfront investment required for new technologies, the complexity of integrating disparate systems, as well as the need for specialized skills and talent to manage digital tools. Data security and privacy concerns also

pose significant challenges, particularly as treasury operations become more interconnected and data-intensive (von Solms & Langerman, 2020). Furthermore, the rapid evolution of technology means that solutions can quickly become outdated, necessitating continuous investment and adaptation.

4.4. New methodological approaches

While B-SLR provides a comprehensive overview, future research could benefit from mixed-methods approaches. This could involve combining quantitative surveys to assess digitalization maturity levels across a sample of organizations with qualitative case studies to explore specific implementation successes and challenges in detail. Simulation modeling could be used to forecast the impact of various digital technologies on treasury performance under different scenarios.

4.5. Technological trends to consider

Recent advances in technologies like artificial intelligence and machine learning, as well as distributed ledger technology such as blockchain, are poised to significantly influence treasury management and may require examination separate from the concept of digitalization. For instance, blockchain is set to revolutionize payment processing, intercompany reconciliation, and supply chain finance by offering enhanced transparency, security, and efficiency (Shen & Wang, 2021). The growing trend of Regulatory Technology also impacts treasury by automating compliance and reporting.

4.6. Interdisciplinary of study results

Further research into treasury management digitalization could benefit from collaborations with diverse areas of knowledge. This includes interconnection with computer science, aiming for the development of more sophisticated treasury technologies and analytical models. Combining this with organizational behavior and change management perspectives can help to address the human element of digitalization and facilitate successful implementation. Economic modeling can also contribute to a deeper understanding of the economic impacts of treasury digitalization, while legal and regulatory scholars can help navigate the evolving compliance landscape. Interdisciplinary research can also narrow the gap between academic theory and practical application, fostering innovative solutions for real-world treasury challenges.

5. Final Considerations

In conclusion, this study highlights the significance of digitalization in treasury management. The bibliometric analysis reveals three key clusters that provide valuable insights into the evolving relationship between different aspects of digitalization and treasury management. While there is a general consensus that digitalization plays a vital role in improving risk control, the differences between the banking and corporate treasury sectors present a promising avenue for further research. Banks emphasize the efficiency of liquidity management, while corporations focus on centralizing information for better overall organizational management. The B-SLR approach used provides an objective and comprehensive overview, free from subjective biases, though certain limitations should be noted. As digitalization continues to shape the treasury landscape, ongoing research will be essential for understanding its full potential and guiding both banking and corporate practices toward more efficient and integrated systems.

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Ethical Considerations

Not applicable.

Conflict of Interest

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