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Notarial Practice in Contemporary Legal Services: A Systematic Literature Review

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ABSTRACT

Notarial practice has undergone significant transformation in response to the rapid advancement of digital technologies and the increasing demand for secure and efficient legal services. This study aims to analyze the evolution, thematic structure, and intellectual development of global research on notarial practice through a systematic literature review combined with bibliometric analysis. Data were retrieved exclusively from the Scopus database using a predefined search strategy, resulting in 181 relevant publications published between 2015 and 2025. Bibliometric analyses were conducted using Scopus Analyze Search Results and VOSviewer to examine publication trends, keyword co-occurrence, overlay visualization, and bibliographic coupling. The findings reveal a substantial increase in research output, particularly after 2020, indicating growing scholarly interest in digital transformation within notarial services. Keyword analysis identifies blockchain, authentication, electronic signatures, digital identity, and cryptography as the dominant research themes, reflecting a transition from conventional legal functions toward technology-enabled legal services. Bibliographic coupling further demonstrates that the intellectual structure of this field remains fragmented, with research predominantly centered on blockchain-based authentication and digital document security, while issues related to institutional governance, service quality, regulatory adaptation, ethics, and organizational readiness remain underexplored. This study contributes by providing a comprehensive mapping of the knowledge structure of notarial practice and proposes a multidisciplinary research agenda integrating legal studies, digital governance, public administration, and information technology. Future studies should emphasize the institutional and governance dimensions of digital notarial services to support the development of trustworthy, secure, and sustainable legal systems.

Keywords: Bibliometric analysis; Blockchain; Digital transformation; LegalTech; Notarial practice

INTRODUCTION

The rapid advancement of digital technologies has fundamentally transformed the provision of legal services across the world. Emerging technologies such as blockchain, artificial intelligence (AI), cloud computing, digital identity systems, and electronic signatures have reshaped the ways legal transactions are created, authenticated, stored, and verified. These technological developments have accelerated the growth of LegalTech, which refers to the application of digital technologies to improve the efficiency, transparency, accessibility, and reliability of legal services (Susskind, 2019; Vial, 2019). As governments and legal institutions increasingly pursue digital governance, legal professionals are expected to adapt traditional legal practices to meet the demands of a more connected, technology-driven society. Consequently, the digital transformation of legal services has become one of the most significant developments influencing contemporary legal systems.

Among legal professionals, notaries occupy a unique position because they are entrusted with ensuring legal certainty, authenticating legal documents, and protecting the interests of parties involved in civil transactions. In many civil law countries, notarial services constitute an essential component of legal administration, providing authenticity, evidentiary value, and

public trust in legal documents. Traditionally, these functions have relied on face-to-face verification, handwritten signatures, physical archives, and manual authentication procedures. However, technological innovation has begun to redefine these conventional practices through electronic documents, digital signatures, online verification systems, and electronic notarization. These developments provide new opportunities to enhance efficiency, reduce administrative burdens, improve accessibility, and strengthen document security, while simultaneously introducing challenges related to cybersecurity, privacy protection, legal certainty, ethical responsibility, and institutional readiness (Di Francesco Maesa & Mori, 2020; Páez et al., 2020; Vigil et al., 2015).

Blockchain technology has emerged as one of the most influential innovations supporting the modernization of notarial services. Its decentralized and immutable architecture enables secure document authentication, transparent record management, and reliable verification processes that significantly reduce the risks of document forgery and unauthorized modification (Chowdhury et al., 2018). Recent studies have demonstrated the potential of blockchain to support electronic notarization, digital certification, cross-chain communication, and identity verification in legal transactions (Lin et al., 2021; Shao et al., 2021). Likewise, the integration of blockchain with electronic identity systems has created new possibilities for establishing trusted digital legal ecosystems that enhance both operational efficiency and public confidence in online legal services (Páez et al., 2020). Nevertheless, technological innovation alone cannot guarantee successful implementation. Digital transformation also requires appropriate institutional arrangements, adaptive regulatory frameworks, organizational capabilities, and effective governance mechanisms capable of balancing innovation with legal certainty and public accountability (Osborne, 2018; Vial, 2019).

These technological developments have been accompanied by a substantial increase in scholarly interest in notarial practice. Research has expanded beyond traditional discussions of legal authentication and document certification to include blockchain applications, electronic signatures, cybersecurity, digital identity management, LegalTech, digital governance, and information systems. This growing diversity indicates that notarial practice has evolved into a multidisciplinary research field situated at the intersection of law, information technology, public administration, governance, and organizational studies. As legal systems continue to digitalize, the role of notaries is increasingly viewed not merely as document authenticators but as trusted intermediaries responsible for maintaining legal certainty within digital environments (Susskind, 2019).

Despite the expanding volume of publications, the existing body of knowledge remains fragmented. Previous studies have generally concentrated on specific technological innovations, such as blockchain implementation, electronic signatures, or digital identity verification, without providing a comprehensive understanding of how global research on notarial practice has evolved. Consequently, there is still limited evidence regarding publication trends, dominant research themes, intellectual structures, influential scholarly contributions, and emerging research directions within this field. Furthermore, technological perspectives continue to dominate the literature, whereas institutional governance, regulatory adaptation, organizational readiness, service quality, public trust, ethical implications, and interdisciplinary integration have received comparatively less attention. Such fragmentation makes it difficult to understand the broader evolution of notarial practice within the context of digital transformation and contemporary legal services.

The increasing complexity of notarial practice highlights the need for a comprehensive synthesis of existing knowledge capable of identifying major research developments and future research opportunities. Understanding the intellectual landscape of this field is essential because technological innovation is rapidly transforming legal institutions, while regulatory and organizational responses often develop at a slower pace. Mapping the evolution of

scholarly knowledge enables researchers and practitioners to recognize dominant research streams, emerging themes, underexplored topics, and opportunities for interdisciplinary collaboration. Such understanding is particularly important for supporting evidence-based policymaking and promoting sustainable modernization of notarial institutions in response to digital transformation.

Accordingly, this study aims to provide a comprehensive overview of global research on notarial practice by identifying publication trends, mapping major research themes, examining the intellectual structure of the field, and highlighting future research opportunities. Through a systematic synthesis of the existing literature, this study seeks to improve understanding of how research on notarial practice has evolved in response to technological innovation and the changing landscape of contemporary legal services.

The findings of this study are expected to contribute both theoretically and practically. From a theoretical perspective, this study contributes to the growing literature on LegalTech, digital transformation, and public service innovation by consolidating fragmented knowledge and providing a comprehensive understanding of the intellectual evolution of notarial practice. It also identifies research gaps and proposes future research directions that encourage greater integration between legal studies, information technology, governance, and public administration. From a practical perspective, the findings provide valuable insights for policymakers, legislators, notarial institutions, legal practitioners, and technology developers in designing governance frameworks and digital transformation strategies that support secure, accountable, and trustworthy notarial services. Ultimately, this study is expected to support the development of modern legal systems capable of balancing technological innovation with legal certainty, data protection, institutional integrity, and public trust.

METHODS

This study employed a Systematic Literature Review (SLR) combined with bibliometric analysis to comprehensively examine the development of research on notarial practice in contemporary legal services. The SLR approach was adopted to ensure a systematic, transparent, and reproducible process of identifying, selecting, screening, and synthesizing relevant scientific literature while minimizing potential bias throughout the review process (Page et al., 2021; Snyder, 2019). Bibliometric analysis complements the review by quantitatively mapping the evolution of scientific knowledge, enabling the identification of publication trends, thematic structures, and intellectual relationships within a research field (Donthu et al., 2021; Zupic & Čater, 2015). The Scopus database was selected as the sole source of bibliographic data because of its extensive coverage of high-quality international publications, standardized metadata, and rigorous indexing procedures, making it one of the most reliable databases for bibliometric studies (Baas et al., 2020). Furthermore, bibliometric mapping and network visualization were conducted using VOSviewer version 1.6.20, which is widely recognized for visualizing bibliometric networks and revealing the intellectual structure and thematic development of scientific research through keyword relationships and citation-based analyses (Aria & Cuccurullo, 2017; van Eck & Waltman, 2010).

The literature search was conducted in the Title, Abstract, and Keywords (TITLE–ABS–KEY) fields of the Scopus database using search terms related to *notary*, *notarial*, *notarization*, *notarial practice*, *notarial services*, and *notarial profession*, combined with terms representing the legal service context, including *legal services*, *legal practice*, *legal profession*, *access to justice*, *authentication*, and *certification*, connected using the Boolean operators AND and OR. The search was restricted to publications published between 2015 and 2025, resulting in 181 documents, which constituted the dataset for this study. Descriptive bibliometric analysis was initially performed using the Scopus Analyze Search Results feature to examine annual

publication trends, providing an overview of the temporal evolution of research in the field (Baas et al., 2020). Subsequently, the bibliographic data were exported in CSV format and analyzed using VOSviewer to perform keyword co-occurrence analysis, including network and overlay visualizations, to identify dominant research themes and their temporal evolution, as well as bibliographic coupling analysis to reveal the intellectual structure of the literature and identify future research opportunities (Aria & Cuccurullo, 2017; Donthu et al., 2021; van Eck & Waltman, 2010).

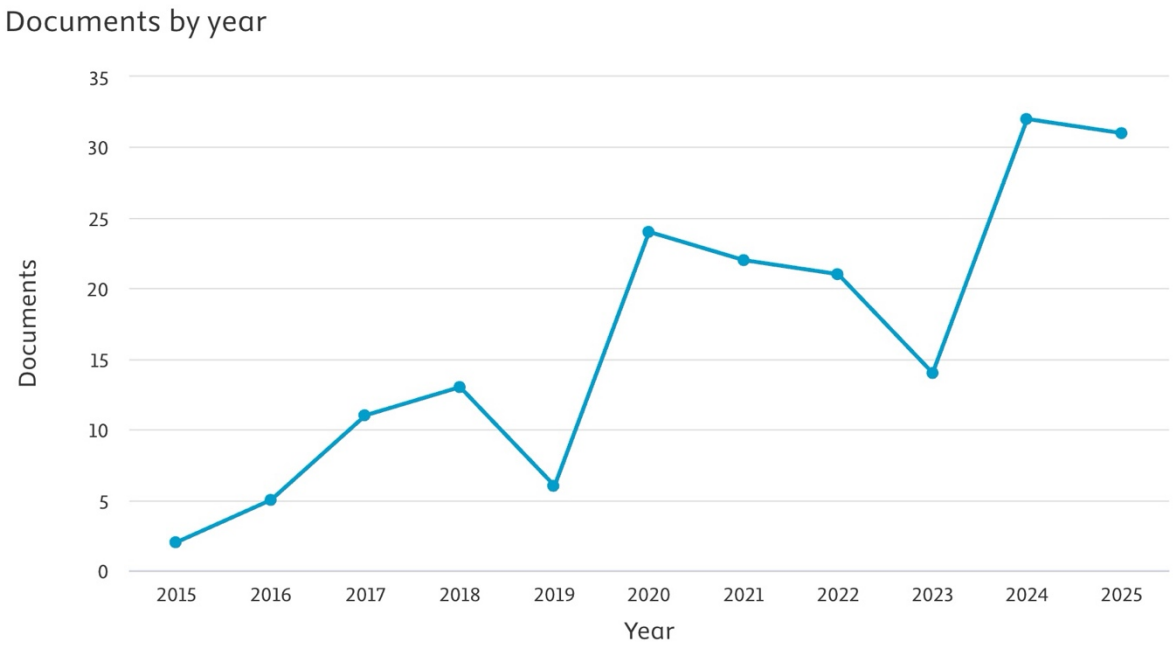
RESULT AND DISCUSSION

This section presents the bibliometric findings to address the three research questions formulated in this study. The analysis begins with the evolution of research output over time, followed by an examination of the thematic structure of the literature through keyword co-occurrence and overlay visualization, and concludes with an exploration of the intellectual structure of the field using bibliographic coupling. Together, these analyses provide a comprehensive understanding of the development, current research focus, and future directions of research on notarial practice in contemporary legal services.

Research Evolution

To address the first research question regarding the evolution of research on notarial practice, annual publication trends were analyzed using the Scopus Analyze Search Results feature. Examining publication growth over time provides insights into the maturity of the research field, identifies periods of increasing scholarly attention, and reflects how technological and institutional developments have influenced research on notarial practice.

Figure 1.
Annual Trends in Publications on Notarial Practice (2015–2025)



Source: Authors' elaboration based on Scopus database, (2026)

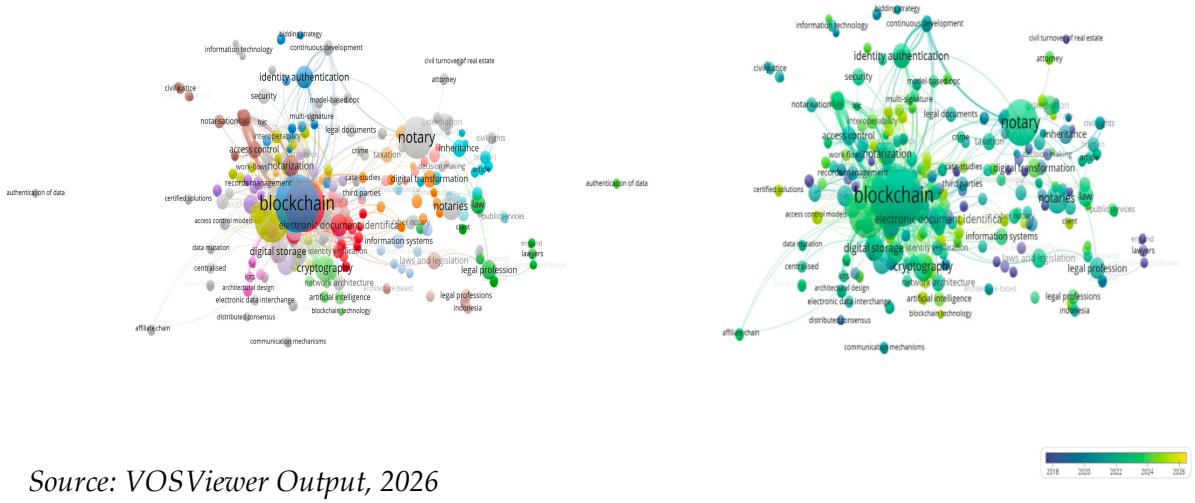
Figure 1 illustrates that research on notarial practice experienced considerable growth during the 2015–2025 period. The number of publications increased from two documents in 2015 to 31 documents in 2025, with the highest publication output recorded in 2024 (32 documents). Although publication activity fluctuated in 2019 and 2023, the overall trend demonstrates a sustained increase in scholarly interest in notarial practice within the context of contemporary legal services. The sharp increase in publications since 2020 suggests that notarial practice is no longer viewed merely as an administrative function for document authentication but has evolved into an integral component of the digital transformation of legal services. This development is consistent with the concept of digital transformation, which emphasizes that organizations and professional sectors, including the legal profession, must integrate digital technologies to enhance efficiency, transparency, security, and service quality (Vial, 2019). The observed trend also aligns with the emergence of LegalTech, which has accelerated the digitalization of legal processes and transformed the ways legal professionals perform authentication, evidence management, and legal service delivery (Susskind, 2019). In the context of notarial practice, this evolution is reflected in the growing body of research on blockchain-based notarization, electronic document authentication, digital identity systems, and technology-driven certification mechanisms designed to strengthen the integrity and trustworthiness of legal documents (Chowdhury et al., 2018; Di Francesco Maesa & Mori, 2020; Páez et al., 2020).

These developments indicate a gradual reconstruction of notarial practice from conventional approaches toward increasingly digitalized legal services. From the perspective of public sector innovation, this transformation reflects the capacity of legal institutions and the notarial profession to adapt to technological advances while responding to society's growing demand for legal services that are faster, more secure, transparent, and accountable (Osborne, 2018). Consistent with this trend, recent studies have increasingly focused on digital identity authentication, cross-blockchain communication, electronic certification, and more secure and efficient document verification mechanisms (Lin et al., 2021; Shao et al., 2021; Yang et al., 2022; Garba et al., 2023). Furthermore, earlier research on integrity, authenticity, non-repudiation, and proof of existence of digital documents has provided the conceptual foundation for the subsequent development of electronic notarization systems and secure digital archiving technologies (Vigil et al., 2015). Therefore, the continuous increase in publications over the past decade reflects not only the growing productivity of research but also a broader conceptual transformation of notarial practice toward a legal service model that is increasingly adaptive to digital technological developments. These findings suggest that the future of notarial practice will extend beyond the conventional legalization of documents toward the governance of digital legal services that integrate cybersecurity, electronic identity, system interoperability, and public trust as fundamental pillars of modern legal service delivery (Osborne, 2018; Susskind, 2019; Vial, 2019).

Major Research Themes and Practices

To answer the second research question, keyword co-occurrence analysis was conducted using VOSviewer to identify the dominant research themes and conceptual relationships within the literature. Network visualization illustrates the relationships among frequently occurring keywords, whereas overlay visualization highlights the temporal evolution of research topics, enabling the identification of emerging themes and shifts in scholarly attention over time

Figure 2.
Keyword Co-occurrence Mapping of Notarial Practice Research



Source: VOSViewer Output, 2026

Figure 2 presents the results of the keyword co-occurrence analysis, which identifies the thematic structure of research on notarial practice in contemporary legal services. The network visualization reveals that blockchain is the largest and most central node, exhibiting extensive connections with numerous related topics, including *cryptography*, *electronic signature*, *digital storage*, *electronic documents*, *identity authentication*, *artificial intelligence*, and *information technology*. The prominence of these keywords indicates that research on notarial practice has expanded beyond its traditional normative legal perspective toward the development of technology-based digital authentication mechanisms and document security systems. This finding is consistent with the concept of digital transformation, which emphasizes that organizations and professional sectors must leverage digital technologies to create more efficient, secure, and value-added processes (Vial, 2019). Within the legal sector, this trend also reflects the emergence of the LegalTech paradigm, in which digital technologies not only support legal administration but fundamentally transform authentication procedures, evidentiary processes, and legal service delivery (Susskind, 2019). This transformation is further supported by studies investigating blockchain-based notarization and document authentication (Chowdhury et al., 2018), the development of blockchain applications within legal systems (Di Francesco Maesa & Mori, 2020), and blockchain-enabled electronic identity systems designed to improve the reliability of legal document verification (Páez et al., 2020).

In addition to blockchain, keywords such as *notary*, *notaries*, *authentication*, *legal professions*, and *legal systems* form a closely connected network with various technology-related themes. This pattern suggests that international research no longer regards notarial practice merely as a document legalization function but increasingly positions it as an integral component of a digital legal service ecosystem requiring the integration of legal regulation, information technology, cybersecurity, and institutional governance. This perspective is consistent with the concept of public service innovation, which argues that transforming public services requires institutional adaptation, technological adoption, and cross-sector collaboration to deliver services that are more effective, transparent, and trustworthy (Osborne, 2018). Accordingly, the interconnections among keywords indicate that current research extends beyond technological innovation itself and increasingly focuses on how digital technologies can strengthen legal certainty, enhance public trust, and support the modernization of the notarial profession within the evolving digital legal service ecosystem.

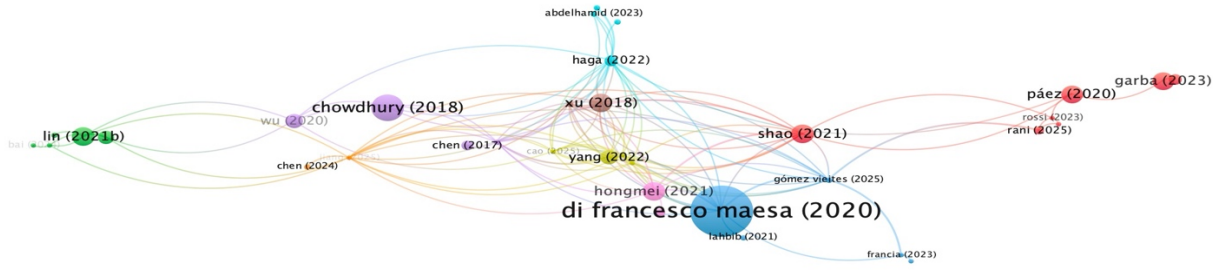
The overlay visualization further illustrates the temporal evolution of research themes between 2015 and 2025. During the early stage of the study period, research primarily focused on keywords such as *notary*, *legal profession*, *civil law*, and *authentication*, reflecting the traditional role of notaries as public officials within civil law systems. These themes emphasize issues related to legal authority, authentic deeds, evidentiary functions, and legal certainty in notarial practice. As digital technologies advanced, however, research attention progressively shifted toward more contemporary topics, including *blockchain*, *identity authentication*, *electronic notarization*, *artificial intelligence*, *digital storage*, and *cryptography*, which are represented by brighter colors in the overlay visualization, indicating more recent publications. This thematic transition demonstrates that scholarly attention has increasingly focused on the application of digital technologies to enhance information security, electronic document integrity, system interoperability, and the efficiency of legal service delivery (Vial, 2019; Susskind, 2019).

The observed thematic evolution reflects a broader paradigm shift in research on notarial practice. Whereas earlier studies primarily emphasized the normative functions of notaries as public officials responsible for authentic legal instruments, contemporary research increasingly positions notaries within a broader digital trust ecosystem, integrating digital identity, cybersecurity, blockchain technology, artificial intelligence, and electronic authentication to support modern legal services. This transition is evident in the growing number of studies addressing cross-blockchain communication, digital identity authentication, electronic certification, and technology-based document verification mechanisms (Lin et al., 2021; Shao et al., 2021; Yang et al., 2022; Garba et al., 2023). Furthermore, foundational research on integrity, authenticity, non-repudiation, and proof of existence of digital documents has established the conceptual basis for the development of more secure and trustworthy electronic notarization systems (Vigil et al., 2015). Overall, the thematic structure revealed through the keyword co-occurrence and overlay visualization analyses demonstrates that research on notarial practice has evolved from a predominantly conventional legal domain into an increasingly multidisciplinary field that integrates perspectives from law, information technology, cybersecurity, digital governance, and public service innovation.

Research Gaps and Future Directions

To address the third research question, bibliographic coupling analysis was performed to examine the intellectual structure of notarial practice research. This analysis identifies groups of publications that share common references, thereby revealing influential knowledge clusters, the development of research streams, and potential directions for future investigation.

Figure 3.
Bibliographic Coupling Analysis of Notarial Practice Research



Source: VOSViewer Output, 2026

Figure 3 presents the results of the bibliographic coupling analysis, illustrating the intellectual structure of research on notarial practice based on the extent to which publications share common references. The network visualization reveals that the literature is concentrated within several major knowledge clusters led by influential studies, particularly those of Di Francesco Maesa and Mori (2020), Chowdhury et al. (2018), Lin et al. (2021), Shao et al. (2021), and Páez et al. (2020). Among these, the cluster centered on Di Francesco Maesa and Mori (2020) is the most dominant, exhibiting the strongest bibliographic connections with other publications. This finding indicates that research on blockchain, digital document security, electronic authentication, and digital identity has become the principal intellectual foundation underpinning the development of the notarial practice literature. These findings are consistent with the concept of digital transformation, which argues that technological innovation reshapes not only organizational technologies but also business processes, governance structures, and service delivery models (Vial, 2019). Consequently, the intellectual structure of research on notarial practice suggests that technological innovation has become the primary driver of the evolution of the notarial profession in the digital era.

Nevertheless, the bibliographic coupling analysis also reveals relatively weak connections among the major knowledge clusters, indicating the existence of knowledge fragmentation within the field. Each cluster has evolved around a distinct research focus, including blockchain applications, electronic authentication, cross-blockchain communication, and digital identity systems. However, the integration of these technology-oriented studies with legal scholarship, governance, and public administration remains relatively limited. This pattern suggests that the development of the field has been driven predominantly by technological innovation rather than by multidisciplinary integration across law, information systems, and public governance. As noted by Susskind (2019), the digital transformation of legal services often progresses more rapidly than the regulatory frameworks and institutional capacities required to govern it, thereby creating a gap between technological innovation and legal implementation.

The bibliographic coupling analysis further identifies several research gaps that warrant future investigation. Most existing studies continue to concentrate on blockchain technologies, digital authentication, information security, electronic certification, and technology-based document verification mechanisms (Chowdhury et al., 2018; Di Francesco Maesa & Mori, 2020; Shao et al., 2021). In contrast, relatively limited attention has been devoted to issues such as the institutional transformation of notarial offices, legal service quality, organizational governance, human resource readiness, ethical implications, personal data protection, and regulatory harmonization for implementing digital notarial services. However, Osborne (2018) argues that successful public service innovation depends not only on technological adoption but also on organizational capacity, institutional governance, and collaboration among multiple stakeholders to create sustainable public value. Therefore, the transformation of notarial practice should not be viewed solely as a technological challenge but also as an institutional and governance issue requiring comprehensive legal and organizational adaptation.

These findings provide important directions for future research by highlighting the need for more multidisciplinary approaches that integrate perspectives from LegalTech, digital governance, cybersecurity, electronic identity, and public service innovation within a unified conceptual framework. Future studies should investigate how emerging technologies, including blockchain, artificial intelligence, digital identity, and electronic certification, can be effectively implemented in notarial practice while preserving the fundamental principles of legal certainty, personal data protection, accountability, and public trust in legal services (Osborne, 2018; Susskind, 2019; Vial, 2019). Accordingly, the intellectual structure of research on notarial practice is expected to evolve from its current technology-oriented focus toward a

more holistic paradigm that integrates legal, governance, institutional, and public service innovation perspectives as the foundation for modern notarial practice in the digital era.

CONCLUSION

This study provides a comprehensive overview of the evolution and intellectual structure of global research on notarial practice during the period 2015–2025 through a systematic literature review and bibliometric analysis of 181 Scopus-indexed publications. The findings indicate a substantial increase in scholarly attention over the past decade, particularly after 2020, reflecting the growing importance of digital transformation within legal services. The thematic analysis demonstrates that blockchain, digital authentication, electronic signatures, digital identity, and information security have emerged as the dominant research topics, illustrating a paradigm shift from traditional notarial functions toward technology-driven legal services. Furthermore, the bibliographic coupling analysis reveals that the knowledge structure of this field is still relatively fragmented. Existing studies predominantly emphasize technological innovations, particularly blockchain applications, digital certification, and electronic authentication, whereas institutional governance, organizational readiness, ethical considerations, regulatory harmonization, public service quality, and legal certainty receive comparatively limited attention. These findings indicate that current research has not yet fully integrated legal, technological, and governance perspectives into a comprehensive conceptual framework.

Theoretically, this study enriches the literature by demonstrating that the evolution of notarial practice is closely associated with digital transformation, LegalTech development, and public service innovation. Practically, the findings provide valuable insights for policymakers, legal practitioners, and professional notarial institutions in designing governance models capable of balancing technological innovation with legal certainty, data protection, public trust, and accountability. Future research should adopt multidisciplinary approaches that integrate law, information technology, digital governance, cybersecurity, and public administration to develop more comprehensive models for digital notarial services capable of addressing the challenges of contemporary legal systems.

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