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THE EMBEDDED FINANCE ECOSYSTEM: A SYSTEMATIC REVIEW AND BIBLIOMETRIC ANALYSIS

GÖMÜLÜ FİNANS EKOSİSTEMİ: SİSTEMATİK BİR İNCELEME VE BİBLİYOMETRİK ANALİZ

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Embedded Finance, Bibliometric Analysis, Digital Transformation, Sustainability

ABSTRACT

Embedded finance refers to the integration of financial services—such as payments, lending, insurance, or investing—into non-financial platforms. It allows users to access financial tools directly within digital services they already use, transforming traditional delivery. This article analyzes embedded finance literature using a bibliometric methodology to evaluate trends, knowledge gaps, and collaboration networks. The study examines 781 articles from the "Business Finance" category in the Web of Science (WoS), retrieved using the keyword "Embedded Finance." Article distribution by year, citation intensity, author collaboration, and thematic focus was analyzed via R programming. Findings show that embedded finance literature has grown rapidly in recent years, driven by digital transformation and financial technologies. Thematic focuses have shifted from traditional topics like risk management and option pricing to modern areas such as sustainability, artificial intelligence, and monetary policies. Geographical analysis highlights the central roles of the United States, China, and the United Kingdom, particularly in terms of publication volume and international collaboration intensity. Knowledge gaps remain in areas such as sustainability, financial technologies, and regulation, offering clear directions for future research.

ÖZ

Gömülü finans, ödeme, kredi, sigorta ve yatırım gibi finansal hizmetlerin finansal olmayan dijital platformlara entegre edilmesiyle, kullanıcıların bu hizmetlere günlük dijital deneyimleri içerisinde doğrudan erişebilmesini sağlayan yenilikçi bir finansal yapı olarak tanımlanır. Bu çalışma, gömülü finans alanındaki akademik literatürü bibliyometrik yöntemle analiz ederek alandaki eğilimleri, tematik gelişmeleri, coğrafi iş birliklerini ve bilgi boşluklarını ortaya koymayı amaçlamaktadır. Web of Science (WoS) veri tabanında "Business Finance" kategorisinde yer alan ve "Embedded Finance" anahtar kelimesiyle elde edilen 781 makale, R programlama dili kullanılarak yıllara göre dağılım, atıf yoğunluğu, yazar iş birliği ve tematik odaklar açısından kapsamlı biçimde incelenmiştir. Bulgular, gömülü finans literatürünün özellikle dijital dönüşüm ve finansal teknolojilerin etkisiyle 2020 sonrası dönemde önemli bir ivme kazandığını göstermektedir. Literatürdeki tematik yönelimler, geleneksel finans konuları olan risk yönetimi ve opsiyon fiyatlamasından; sürdürülebilirlik, yapay zekâ ve para politikaları gibi güncel ve çok disiplinli alanlara doğru genişlemiştir. Coğrafi analizler, Amerika Birleşik Devletleri, Çin ve Birleşik Krallık'ın özellikle yayın hacmi ve uluslararası iş birliği yoğunluğu açısından merkezi konumda yer aldığını ortaya koymaktadır. Sürdürülebilirlik, finansal teknolojiler ve düzenleyici çerçeveler gibi alanlarda süregelen bilgi boşlukları ise literatüre katkı sağlayacak gelecekteki araştırmalar için somut fırsatlar sunmaktadır.

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Introduction

The digitalization of financial services, coupled with the proliferation of technological advancements, has ushered in novel concepts and methodologies that have profoundly reshaped the financial sector. Central to this paradigm shift is the emergence of embedded finance—a transformative framework that transcends the boundaries of conventional financial systems by seamlessly integrating financial services into everyday life and business operations. By enabling functionalities such as payments, credit, insurance, and investments to be accessed through non-financial platforms tailored to user-specific needs, embedded finance contributes to both user accessibility and operational efficiency. As highlighted by Sahu (2025), embedded finance improves both accessibility and operational efficiency by integrating financial functions such as payments, lending, and inventory management directly into business workflows, enabling seamless and centralized financial operations for users and small enterprises. This evolution presents substantial opportunities, not only for individuals but also for corporations, financial institutions, and governmental entities, positioning embedded finance as a cornerstone of modern financial innovation.

The topics of modern trends that are directly associated with Embedded Finance are the financial technologies of digital transformation, and sustainability. This is enabled with the help of important technologies like AI, blockchain, and big data analytics. While Embedded Finance has received such rapid growth, a series of critical challenges remain to be surmounted: everything from regulatory policy changes through data security issues to ethical dilemmas and knowledge gaps. As noted by Aria & Cuccurullo (2017), bibliometric and systematic literature reviews are essential tools for mapping fragmented academic domains, making them especially valuable in emerging and rapidly expanding fields such as embedded finance.

The primary problem addressed by this study is the lack of comprehensive analysis of the thematic, geographical, and methodological diversity in the rapidly growing embedded finance literature. Aiming to bridge the knowledge gaps in the field, this study seeks to identify key trends, collaboration networks, and thematic focuses in the embedded finance literature using a bibliometric approach.

The objective of the research is to analyze the embedded finance literature from a holistic perspective, identifying core themes, geographical distributions, and knowledge gaps within the existing body of work. Additionally, the study aims to identify emerging research areas that could guide future studies and to enhance understanding of the academic and practical impacts of embedded finance literature.

The structure of this study is organized as follows: First, the literature review section comprehensively sets out the concept of embedded finance, the core themes in the literature, and current trends in the field. The methodology section then outlines the dataset and the bibliometric analysis methods used in this study. In the section on findings, the analysis of the data is presented, and significant insights into the literature on embedded finance are discussed. The final section concludes the findings from the study and assesses their contributions to both academic literature and practical applications. This comprehensive review will not only be a valuable resource to understand research trends and gaps in the domain of embedded finance but also is intended to guide future studies in this dynamic and fast-growing area.

Literature Review

Recently, embedded finance has garnered much attention as it has an apparently transformative power on traditional financial systems. In general, this entails an explanation of a way in which various businesses or financial services become directly integrated within another unrelated business workflow to offer access through such simple means as the provision of services related to insurance, credit, and even other means of acquiring money.

A repeated theme that arises in the literature is the way technology supports the idea of embedded finance. This, for example, has to do with the development of APIs, blockchain, and artificial intelligence. For example, Caldecott (2023) underlines the role of APIs in building interoperable systems that could make financial transactions in real time. On his part, Tuckman (2020) describes how blockchain provides safe and transparent solutions for different applications of Embedded Finance.

Another impactful area is the user experience and adoption of embedded financial services. Many studies in this respect show how seamless integration into everyday platforms such as e-commerce sites, ride-sharing apps, and social media platforms increases user convenience. Kleine et al. (2021) argue that behavioral prompts integrated into platforms increase the adoption of financial products like microloans and buy-now-pay-later plans. These findings show how deeply embedded finance is within people's daily lives.

In addition, the embedded finance is extremely economically effective. This financial system opens up opportunities for access to services, especially credit and insurance facilities that were otherwise unexploited hitherto. Law et al. (2019) discussed how such mobile phone-based payments systems as M-Pesa had brought revolution in the access to financial services, particularly in the emerging markets. It creates economic opportunities not only for people but also for small and medium enterprises. Democratization of financial services is important in enhancing financial inclusion.

The regulatory frameworks are extremely important in ensuring the sustainable development of embedded finance. Cao & Tang (2020) insist that there should be the creation of frameworks that balance innovation with protection of the consumer. They further note that the dynamic nature of the financial innovations calls for the updating of regulatory frameworks. However, the challenge remains the fact that application of the necessary regulations should not be undermining the opportunities created by technological advancement. Ethical and security concerns, in this respect, also include new technologies like blockchain or artificial intelligence as critical issues in achieving a balance that protects consumers, while promoting innovation.

Embedded finance is reshaping how business models used to work before. By embedding services, companies innovate new revenue opportunities and strengthen relationships with their customers. Zhang et al. (2022) note that online subscription-based platforms provide both insurance and credit options within their value proposition. These integrations not only enable broader access but also offer customers more holistic and needs-aligned solutions. For instance, device insurance connected within a video streaming platform or microloans embedded in a health app—each of those is an interesting financial tool targeted at users' needs directly in their everyday activities. Thus, embedded finance increases not just customer experience but also the competitive power of platforms, giving them certain competitive advantages.

A new interface between sustainability and embedded finance is being developed in the literature. Several scholars, including Roberts & Singh (2021), discuss how embedded financial products can contribute to green finance initiatives. Consequently, it is possible for companies to facilitate environmentally responsible consumer behavior by offering carbon offset options when integrating payment systems. Gundogdu (2020) discusses how Islamic finance principles can differentiate in embedded finance applications and identifies areas of Sharia compliance.

Embedded finance also happens to be quite geographically at variance—between the developed and developing world. For example, Mehta et al. (2023) document how credit facilities integrated into agricultural supply chains reduce disparities between urban and rural areas in countries such as India; Singh & Mehta (2023) go on to discuss the role of embedded finance in overcoming many of the barriers to financial services for small-scale farmers. On the other hand, embedded finance in developed markets like the United States and the United Kingdom focuses more on enhancing the user experience. These findings show how regional dynamics can create differences in what embedded finance means.

Big data analytics posts up better comprehension of user behavior in embedded finance applications. The cited materials by authors Yamada & Kato (2022) allow increasing satisfaction by the means of providing financial services at an individual level. Li et al. (2023) develop some ideas about innovations intended to provide maximum optimization of user experience with the help of AI-powered solutions integrated into digital payment systems. Simultaneously, data privacy and ethical issues are considerable themes to be answered in the literature. Brown & Taylor (2023) demand strict management policies in ensuring data safety against such kinds of risks.

The seamless integration of embedded finance relies greatly on corporate partnerships. For instance, Patel et al. (2023) elucidate how collaboration between new entrant fintech and incumbent banks serves as the catalyst for change in the sector. In another work, Weber et al. (2022) explore how embedded finance makes financial campaigns going viral on social media much more efficient. Such partnerships further the customer experience

and bring in novelty to the industry. It's this type of collaboration that will go a long way in scaling and making embedded finance sustainable.

In this perspective, scalability within embedded finance would require robust infrastructure and strategic partnerships. According to Gupta & Kumar (2022), the discussed factors provide backing for successful integrations across numerous market dynamics and populations. Further, Harris & Chen (2023) discussed how such a solution can benefit from the inclusion of blockchain and increase financial inclusion. Thompson and Lewis (2023) then go into how AI-embedded finance platforms can help diminish credit risks, discussing further in what way such a platform bears relevance to economic micro-financial stability.

Methodology

This research adopts the methodology of bibliometric analysis to rigorously investigate embedded finance's academic landscape. Instead of testing a model, the goal is to map thematic structure, intellectual evolution, and international collaborative patterns in embedded finance literature. Bibliometric methods are especially well-adapted to assessing the trend in the evolution of research over time by identifying influential publications, emerging themes, and concept clusters using quantitative measures (Aria & Cuccurullo, 2017). From this, the research seeks to uncover the growth pathway, interdisciplinary connections, and knowledge gaps in embedded finance studies.

The sample frame comprises 781 peer-reviewed journal publications from the period 1989 to 2025, sourced from the Web of Science (WoS) Core Collection database. Searching was based on the topic term "Embedded Finance" under the "Business Finance" subject. For academic relevance and rigor, types of documents including reviews, book chapters, editorials, and conference proceedings were not included. Also, early access publications were kept in order to show the most recent available research. The period to select begins in the year 1989, as this is the first stable year when such publications were indexed in WoS.

All the records were downloaded in BibTeX (.bib) form, which has full bibliographic metadata such as author details, publication source, keywords, abstracts, and citation metrics. The format is capable of supporting the R-based bibliometric analysis environment. BibTeX was then used to import the data into RStudio, which is one of the most commonly used statistical calculation platforms. Bibliometric assessment was then carried out using the Bibliometrix package, though via the biblioshiny() interface, which provides interactive graphics and exploration of the bibliometric data (Aria & Cuccurullo, 2017).

Before it was analyzed, preliminary data screening procedures were carried out to guarantee the validity of the outcomes. Duplicates and non-article objects such as reviews and proceedings were deleted in data cleaning. Despite the fact that some frequent keyword variants—like "AI" and "block chain"—were absent from the data set, standardization procedures were carried out for keywords whenever it was necessary to ensure semantic uniformity among different expressions. The process strengthened the dependability of the co-word networks and thematic structures.

A range of bibliometric methods was used to investigate thematic and structural aspects of the embedded finance literature. We used co-word analysis (Callon et al., 1983) to map major thematic clusters through keyword co-occurrence. Strategic diagrams (Cobo et al., 2011) were employed to quantify the centrality and density of themes, determining their relevance and state of elaboration in the body of literature. Multiple Correspondence Analysis (MCA) (Greenacre, 1984) was utilized in order to map the conceptual structure of the literature using semantically related clustering keywords. These analyses allowed for systematic mapping of the intellectual topology of embedded finance and helped to identify leading research directions.

These analyses were conveyed by multiple types of visualizations. Temporal trends in keyword usage and publication were shown by line graphs and bar charts. Thematic developments were illustrated by overlay maps and cluster diagrams, and strategic diagrams were used to show the centrality and effect of themes over time. International collaboration networks were charted to emphasize the geographical spread of intellectual interactions. Moreover, source frequency was analyzed to pin down the most influential journals contributing to the embedded finance literature.

Findings

The dataset used in this study provides comprehensive information on academic research related to Embedded Finance. The dataset comprises 781 documents published between 1989 and 2025, with an average age of 8.62 years. The sources used in the study encompass 178 different publication types, with a total citation count of 31,253 recorded for these documents.

Considering author collaboration, it was found that a total of 1,911 authors contributed to the field. Of these authors, 143 presented single-authored works, while there is an average of 2.56 co-authors per document. About 31.67% of the work is also prepared as the product of international collaboration. The annual growth rate reached around 5.1%, which describes the continuous and steady increase of academic production of the field during the time span.

The analyzed documents comprise altogether 2,944 keywords (DE) and 1,574 Keywords Plus (ID) published by publishers, indicating the remarkable thematic breadth and focal diversity marking the embedded finance literature. They reinforce the emerging prominence of embedded finance in both academic and practical applications, consonant with the perception that financial technologies embodying embedded finance manifest as an era-defining post-crisis paradigm in finance globally (Arner et al. 2015). Furthermore, the notable share of internationally co-authored publications highlights the global diffusion of fintech innovation, as well as the systemic role of BigTech in reshaping financial intermediation structures worldwide (Claessens et al. 2018; Frost et al. 2019).

With this information, the final objective of this study will be the analysis of thematic trends, author collaboration networks, and knowledge gaps in the literature on embedded finance. These will be useful as guiding resources for future research.

Embedded finance literature analysis has indicated a growing trend for academic publications, starting from 1989 and ending in 2025. Indeed, in 2022 and 2023, each year realized an issue of the highest number of documents, which stands at 77. While on the issue of citation density, the year that realized the highest impact in this literature was in 2004, when the average article citations were about 174. Although the volume of embedded finance publications was relatively low in the early 2000s, these pioneering studies have exhibited sustained academic influence over time, consistent with the broader observation that early-stage fintech research often sets foundational paradigms for subsequent scholarly developments (Dorfleitner et al. 2017; Haddad & Hornuf, 2019). Recently, after 2020, an exponential rise of publication is witnessed, and citation to these studies shall go up with time. The recent surge in academic publications on embedded finance reflects a significant diversification of research themes, driven by the integration of financial services into digital platforms and consumer technologies (Gomber et al. 2018). This rising academic attention corresponds with global shifts in financial service delivery and the emergence of embedded financial ecosystems (Lagna & Ravishankar, 2022).

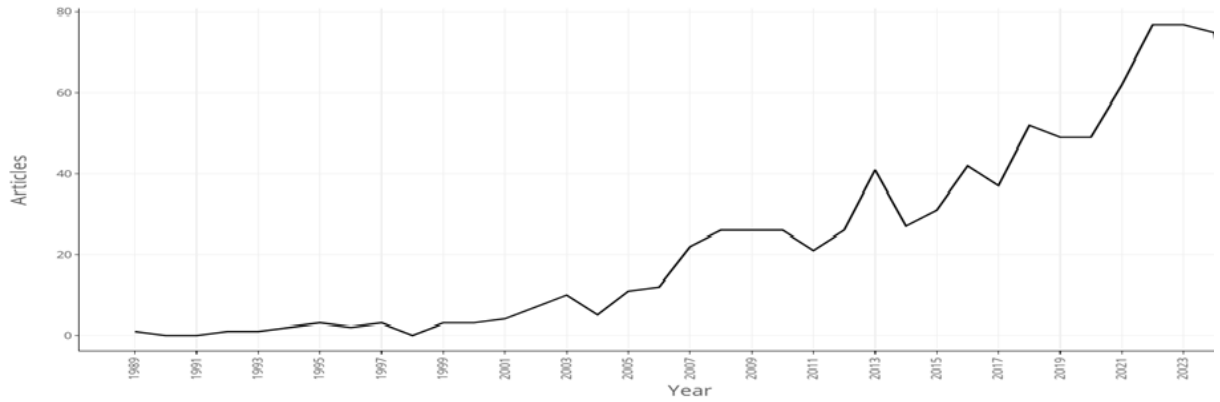

Figure 1. Trend of Embedded Finance Articles in the WoS Database Between 1989 and 2023

Figure 1 shows the trend of articles published in the field of embedded finance from 1989 to 2023. The graph highlights a steady upward trend, reflecting a growing academic interest in the subject. From 1989 to 2000, the

number of publications remained notably low, as the field of embedded finance was still in its formative stage, with only a handful of studies conducted. Beginning in the early 2000s, a gradual rise in the number of publications becomes evident. This growth saw a sharp acceleration after 2010, with a significant increase in the annual number of articles being published each year.

Within the literature on embedded finance, the two decades spanning from 2011 to 2020 stand out as the period of relentless growth. The significant growth in embedded finance literature since 2020 can be attributed to its emerging prominence in theoretical and practical applications, which is in line with research indicating post-pandemic acceleration in digital integration into finance and platform model services (Ozili et al. 2024; Zetzsche et al. 2020). Since post-2020, there was an exponential increase, reaching the peak level in 2023 so far. The result obtained could be that embedded finance has become notably crucial in theoretical as well as practical areas lately. Moreover, emergence of financial technologies, digitization, and effects of the pandemic could have impacted the surge in academic research in this subject.

Overall, the evidence indicates that embedded finance is solidifying its place as an active and growth-oriented research stream, something reinforced by more recent scholarship highlighting its strategic importance to the future orientation of financial intermediation, digital ecologies, and user participation (Lee & Shin, 2018; Milian et al. 2019). With the surge in embedded finance studies, it is therefore plausible to anticipate ongoing academic interest in the subject, particularly as researchers point out the increasing necessity for theoretical basis and interdisciplinary inquiry in investigation into finance technology (Gai et al. 2018; Milian et al. 2019).

Table 1. Analysis of Citation and Publication Trends in Embedded Finance Articles in the WoS Database Between 2015 and 2024

Year	MeanTCperArt	N	MeanTCperYear	CitableYears
2024	1,32	75	0,66	1
2023	3,81	77	1,27	2
2022	6,29	77	1,57	3
2021	15,53	62	3,11	4
2020	14,65	49	2,44	5
2019	11,8	49	1,69	6
2018	11,75	52	1,47	7
2017	12,08	37	1,34	8
2016	17,55	42	1,76	9
2015	22,68	31	2,06	10

Table 1 provides an analysis into citation and publication trends in publications about embedded finance over a period of ten years. A summary of indicators, including the average number of total citations per article (MeanTCperArt), the number of published articles (N), the average citations per year (MeanTCperYear), and citable years for every year, is provided in the table.

In 2015, the average per-article aggregate citations were 22.68, reflecting the period when supporting theoretical work was being published, which was contributing to the body of academic work. However, in subsequent years, i.e., in 2016 and 2017, the average citation rate is said to decrease, and MeanTCperArt values are reported to be 17.55 and 12.08, respectively. Reduction in average citation numbers in post-2015 years can be a measure of waning interest in earlier research, as newer research began contributing to burgeoning fintech solutions and platform-based financial services, deviating focus to earlier underpinning works (Milian et al. 2019; Puschmann, 2017).

The decline in citation density during the period 2016-2017 can be regarded as an instance of the transition dynamics in the fintech and digital finance landscape, one characterized by experimentation using technology, adaptation of models, and changing characterization by academia of sources of finance innovation (Gomber et al. 2018; Zavolokina et al. 2016). During the intermediate phase in the 2010s, embedded finance was not yet consolidated as an independent research theme, and research activity was mainly instituted to focus on general ideas of fintech and mapping out the interface in traditional finance and digital integration (Haddad & Hornuf,

2019; Gai et al. 2018). Slowing down in research activity in this phase can be attributed to other more general macroeconomic uncertainties such as post-Brexit finance conditions and changing international regulatory responses to fintech innovations, which introduced uncertainty regarding compliance under the rule of law, cross-border activity, and goverance of risks (Thakor, 2020; Zetzsche et al. 2017). Slump in high-impact publications in this formative phase is possibly an instance of underlying structural movements in the finance services sector landscape, whereby academia and industry alike were rebalancing their strategies towards digital finance and systems for platform-based services (Chen et al. 2019; Varga, 2017).

From 2020 onward, the literature has really started to show a marked change, with growing academic interest in the issues of financial crises and market uncertainties. The average citation per year increased to 2.44 in 2020, reflecting heightened engagement with these issues. By 2021, the average citations per year reached their peak at 3.11, driven by discussions on the impacts of the COVID-19 pandemic on financial systems and technological adaptation. In the consecutive years of 2022, 2023, and 2024, there is a trend of decrease in annual averages of citations to 1.57, 1.27, and 0.66, respectively. This may mean that these recently published works have not been given sufficient time to attract wide academic attention or impact.

The table below shows how research attention in embedded finance shifts almost like the wind, both in its substantive foci and citation patterns. Indeed, while the early periods were dominated by a high presence of works that were influential and foundational, in more recent times, the diversity of topics and themes that come under this domain has expanded. Variation in citation rates suggests the responsiveness of the literature to emerging global events and technological changes underpinning its constantly shifting academic relevance.

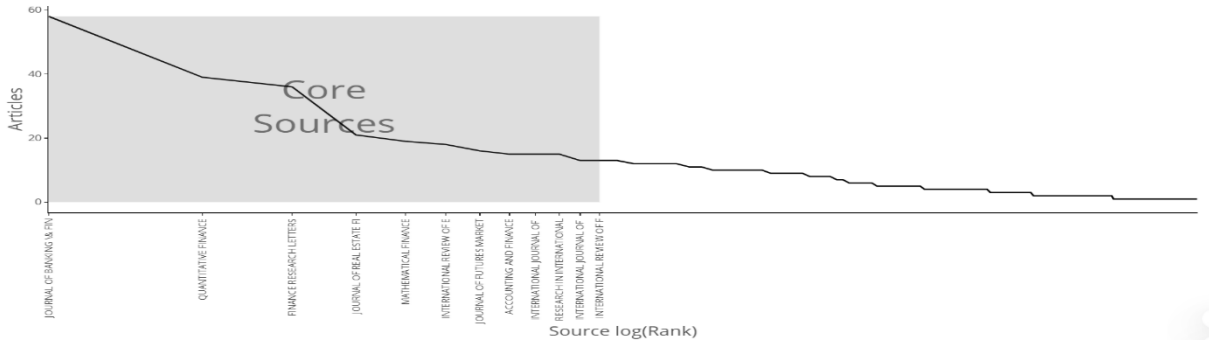

Figure 2. Distribution of Articles in Embedded Finance Literature According to Bradford's Law in WoS Database: Core Sources and Their Rank

Figure two illustrates the distribution of articles in the literature of embedded finance across journals as per Bradford's Law. Bradford's Law is a principle explaining how articles in a specific research area are distributed among journals. This law states that a large number of articles are concentrated in a few journals, while many journals contribute only a small number of articles (Bradford, 1934).

The "Core Sources" region of the graph shows those journals that are publishing most of the articles in the literature of embedded finance. These journals represent the most influential publishers within this literature and have the highest number of published articles, such as the Journal of Banking & Finance, Quantitative Finance, and Finance Research Letters.

Beyond their productivity, these core journals also have marked thematic tendencies. Journal of Banking & Finance and Journal of Risk Finance, for instance, typically touch on credit risk, asset price, and banking regulation in their publications—showing how embedded finance tools were addressed from the lens of risk. Electronic Commerce Research and Applications and Financial Innovation, by contrast, emphasize platform finance, fintech integration, and artificial intelligence (AI)-based solutions. Thematic coverage across journals, ranging from the regulation and management of risk to platform finance, reflects embedded finance scholarship's interdisciplinary character, which was commonly remarked on in research that addressed how it traverses technology, economics, and regulation (Dorfleitner et al. 2017; Gomber et al. 2018).

This shows that higher-ranking journals publish more, and lower-ranking journals publish less. This suggests that embedded finance research is concentrated in high-impact journals, whereas the others contribute less to the numbers. That embedded finance research is concentrated in fairly few high-impact journals shows broader trends in the literature base on financial innovation, where flagship publications take precedence in knowledge transmission based on their prestige, citation ability, and thematic relevance (Munoz-Leiva et al. 2019; Peterson, 2020).

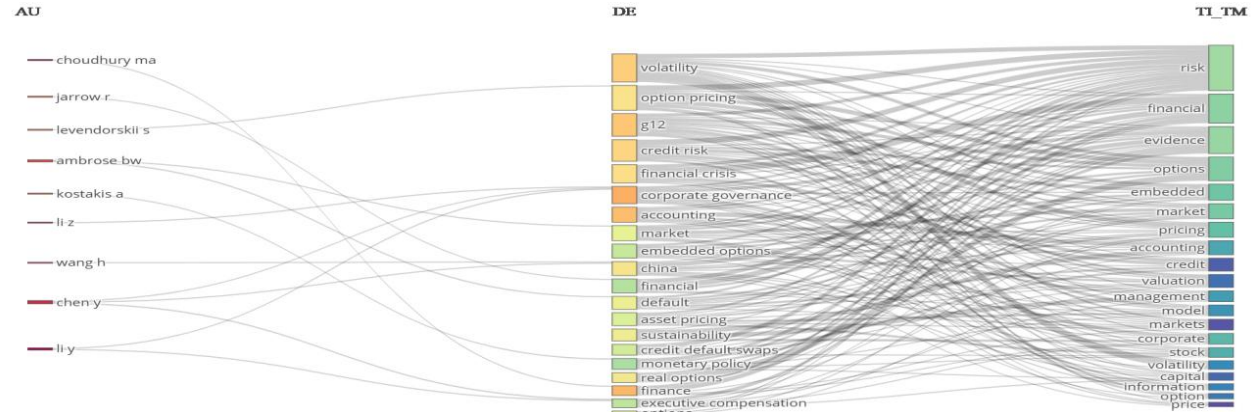

Figure 3. Relationships Among the Most Prolific Authors in Embedded Finance, Keywords, and Articles in the WoS Database

Reviewing the literature on embedded finance emphasizes the contributions of major authors, the major themes, and how these themes relate to one another. Literature in this subject is mainly based on the issues of credit risk, financial crises, and embedded options. Major authors are Chen Y. (2015), Li Y. (2022), and Jarrow R. (2007), whose writings have contributed greatly to these issues.

The thematic diversity within embedded finance literature underscores the coexistence of theoretical and practical dimensions in the field. Frequently discussed financial terms include risk, credit, market, and valuation, while sustainability and monetary policy are emerging as topics of growing interest.

The correspondence of the article titles with the keywords shows that the studies clearly bring forth the core concepts that revolve around embedded finance. Indeed, the literature focuses on key areas such as risk management, credit processes, and market dynamics. From this perspective, emerging topics are sustainability and regulatory frameworks, which continue to be explored in current literature. This thus places embedded finance as a fast-growing interdisciplinary research area with considerable potential for further research.

Table 2. Most Cited Studies and Their Impact in Embedded Finance Articles in the WoS Database

Paper	Total Citations	TC Per Year	Normalized TC
TETLOCK PC, 2008, J FINANC	1159	64,39	17,37
BISBEE J, 2004, ACCOUNT ORGAN SOC	482	21,91	2,77
PRICE SMK, 2012, J BANK FINANC	285	20,36	9,38
BLISS RR, 2004, J FINANC	283	16,16	1,63
LI K, 2021, REV FINANC STUD	265	53,00	17,06
DEMETRIDES P, 2006, INT J FINANC ECON	228	11,40	7,77
ROUTLEDGE BR, 2000, J FINANC	212	8,15	2,46
HAUGOM E, 2014, J BANK FINANC	206	17,17	10,02
LAW SH, 2013, J BANK FINANC	178	13,69	9,31
VAN DEN HEUVEL SJ, 2008, J MONETARY ECON	170	9,44	2,55

Among the cited references in the literature of embedded finance, the work of Tetlock et al. (2008) is the most influential single publication with 1,159 citations, having an average of 64.39 citations annually. Similarly, Li et al. (2021) have made a rapid impact in a short period with 265 citations and an annual average of 53.00 citations.

In reference to the scores based on the normalization of citations, the research has contributed to the literature in the long term in terms of 17.37 and 17.06, respectively. Bisbe & Otley (2004) and Price et al. (2012) are other research works that have contributed to embedded finance literature as reflected by their 482 and 285 citations, respectively. These observations show that embedded finance is an emerging topic, and the research under review offers great grounds for future theoretical and practical progress in the subject.

Figure 4. Prominent Keywords in Embedded Finance Articles in the WoS Database

The below Wordcloud represents the 35 most prevalent keywords from the WoS articles on embedded finance. Central keywords are "corporate governance," "finance," "accounting," and "real options," which, notionally, suggest that embedded finance links corporate management, financial decision making, and valuation practices. That prominent concepts including corporate governance and financial decision making play central roles shows the mounting academic profile embedded finance is gaining as a tool impacting firm-level strategy, as well as broader market behavior, as examined in recent studies on fintech integration into corporate finance management (Cojoianu et al., 2020).

Added to this, "risk management," "financial crisis," "credit risk," and "volatility" all imply an emerging concern about uncertainty in finances and the role embedded finance plays in mitigating such risks. Use and prevalence of keywords such as 'financial crisis,' 'credits risk,' and 'volatility' in embedded finance literature reflect the fact that scholars have increasingly focused on how digital monetary tools assist in curtailing systemic risks and rendering finances more robust in situations of economic uncertainty (Goldstein et al. 2019; Bamia & Bamia, 2025).

It is confirmation of the introduction to more recent concepts which are spot on to newer concepts such as "machine learning", "deep learning" and "sustainability" as to refer to the newest emerging technologies and challenge the research scope in the subject field of Embedded Finance to be addressed includes. Incorporating artificial intelligence technologies into embedded finance denotes departure from conventional finance structures, as recent studies put more focus on utilizing the application of tools based on AI to solve sustainability issues and refine ESG-related finance decision-making (Giudici & Wu, 2025; Pavlidis, 2025).

These technologies are not simply theoretical add-ons but play functional roles in embedded finance services. To illustrate, artificial intelligence is increasingly prevalent in embedded lending platforms to determine creditworthiness through the examination, in real time, of behavioral and transaction patterns. Deep learning processes underpin fraud detection tools within mobile payment networks, facilitating predictive analytics to enhance operating security. Embedding AI technologies into embedded finance is illustrative of the sector moving from static service provision towards dynamic, adaptive financial systems capable of real-time learning and decisioning—an aspect more prominent in sustainable finance and smart system research (Giudici & Wu, 2025; Pavlidis, 2025).

The alignment of regional keywords, including "China," with more technical and specific terms, including "option pricing" and "credit default swaps," offers another such indication of the research sectoral and geographical focus. Just as researchers examine region-specific reference systems and market tools, researchers examine the broader international implications of embedded finance as well. The thematic heterogeneity seen across embedded finance literature is an indication of the theoretical scope and practical application expansion taking place in the field, which is a finding supported by studies emphasizing how fintech innovations are changing the way finance is delivered through pluralistic mechanisms that are both technical and strategic (Gozman et al. 2018).

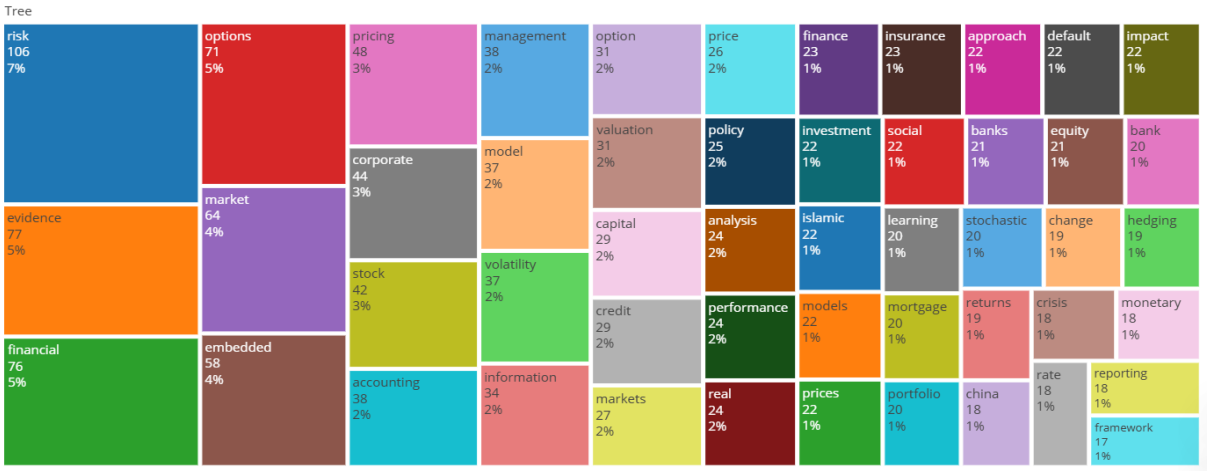

Figure 5. Most Commonly Used Words in the Titles of Embedded Finance Articles in the WoS Database

The repetition of certain words in article titles—i.e., 'risk,' 'finance,' and 'market'—is an indicator that signifies core priorities in embedded finance research to reinforce points that highlight how thematic keyword examination uncovers structural key points in new subareas in finance (Aria & Cuccurullo, 2017; Donthu et al. 2021). Most significant, at 7%, is the word "risk" to highlight that interest is very high towards valuing and managing risks of financial instruments. Following is the word "evidence" (5%), then "financial" (5%), which lets one decipher the meaning of offering proof to theoretical methods and robustifying practical research, indicating the extensive scope of embedded finance in the midst of finance services. Option terms such as "options" (5%) and "market" (4%) happen to highlight the significance of options pricing and market forces in finance markets.

The prevalence of the term 'embedded' appearing in the title of recent finance research is marking the concept as central to contemporary finance research, supplemented by research that identifies embedded finance as a core concept that marks finance integration into other non-financial platforms (Zetzsche et al. 2020; Lee & Shin, 2018). Phrases such as policy at 2% and accounting at 2%, and policy at 3% and accounting at 3%, exhibit how this new concept affects accounting processes and corporation governance. Likewise, phrases such as policy at 2% and credit at 2%, and policy at 3% and credit at 3%, highlight how this new finance paradigm affects the regulatory frameworks, monetary policies, and the behavioral response to credits. The range of frequent words in embedded finance literature, such as in the areas of risk management, finance markets, corporation practices, and sustainability, highlights the breadth of the subject as well as the linkage to other finance and organization areas (Nasution & Sibuea, 2024; Wahyuni et al., 2024).

The prevalence of words such as "risk," "financial options," and "embedded" in most article titles on embedded finance indicates that most topics relate to how one is to handle the corresponding financial risk or learn about the finance markets and incorporate finance into certain aspects. The prominence of terms such as 'corporate governance' and 'policy' in embedded finance literature reflects its transformative effect on internal organizational structures and external regulatory frameworks—an evolution increasingly acknowledged in industry research on embedded finance value networks and risk architecture (Deloitte & Institute of International Finance, 2023; Gerhardstein et al. 2023). Besides, the growth in interest in sustainability shows that embedded finance is increasingly important to tackle current global issues, proving its relevance in traditional and modern financial contexts.

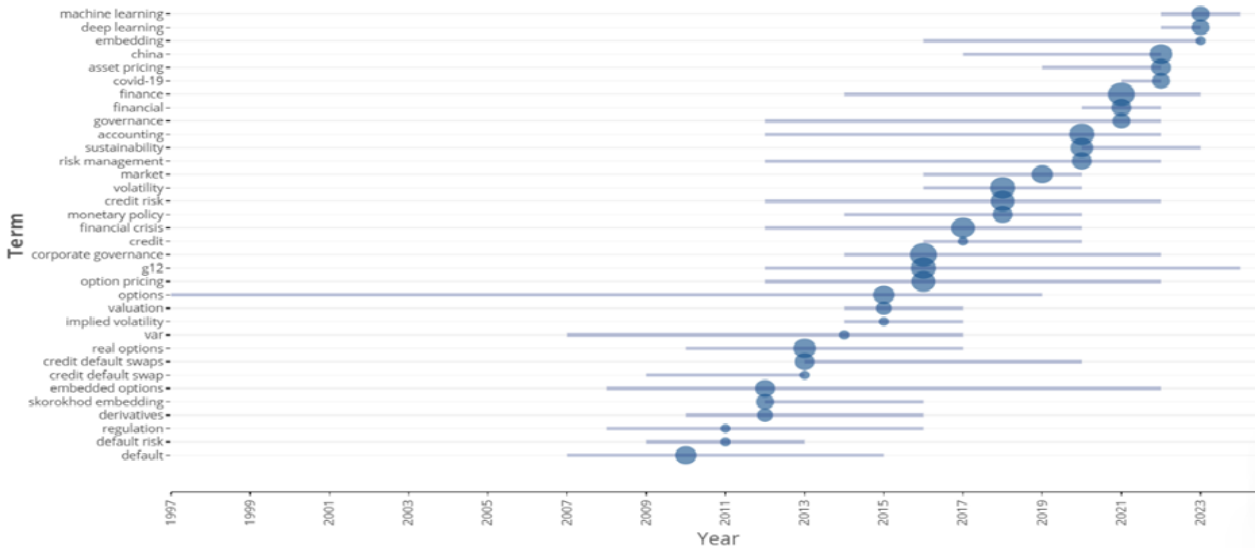

Figure 6: Usage Intensity of Keywords in Embedded Finance Articles in the WoS Database by Year

The clear intensity of the usage of terms in the literature on embedded finance over the years eloquently shows how the field has been changing over time. In the period from 2000 to 2010, the literature was mostly focused on such terms as option pricing, volatility, corporate governance, and credit risk. This period was characterized by a concentration of theoretical works connected with financial risk management and market dynamics.

Starting from the year 2010 up to 2020, the influences of financial crises drove more highlighted usages of words such as "market" and "risk management." In addition, recent trends toward more specialized domains of application have the effect that, in recent decades, studies have addressed fairly practical solutions, not necessarily first-of-a-kind theoretical configurations for the domains of embedded options and credit default swaps.

In the recent past, in the period 2020-2023, there has emerged an integration of themes in literature owing to social and technological change. In recent studies on embedded finance, integration of themes such as artificial intelligence, deep learning, and topics related to the pandemic is an indication of how the topic is embracing international developments in society and technology (Anagnostopoulos, 2018). Alternatively, the growing applicability of terms such as monetary policy and sustainability is an indicator of the growing involvement of environmental sustainability and regulatory policy in this topic. This review generally shows that the trend in the literature regarding embedded finance moves from more conventional themes, such as market dynamics and risk management, to more contemporary themes, including sustainability and artificial intelligence.

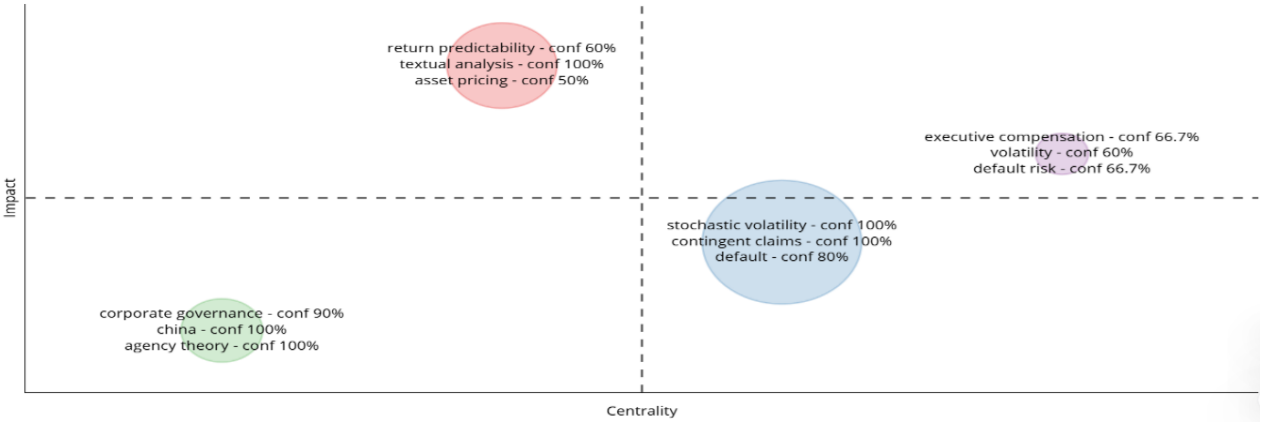

Figure 7. Grouping of Terms Used in Embedded Finance Articles in the WoS Database Based on Impact and Centrality

The grouping of the terms in the literature on embedded finance by impact and centrality shows the importance of different thematic areas and their role in the field. Executive compensation, volatility, and default risk—all terms of high impact and high centrality—have not only created a broad influence but also act centric among other themes. These terms also reflect the strong connection of embedded finance with corporate practices and financial risk management.

High-impact and low-centrality terms include very specific topics, such as return predictability, textual analysis, and asset pricing. These terms are niche topics, representing areas such as the analysis of texts and mechanisms of pricing in finance.

Those that are low impact but high centrality include stochastic volatility, contingent claims, and default. They are highly discussed within the literature but their overall impact is limited. Such terms fall within supporting or technically oriented studies.

By considering first the position within the four clusters, concepts on corporate governance, agency theory, and China embody the category of low impact/low centrality—therefore concentrated in restricted areas and thus with a scarce influence on literature drawn from it wholesomely. These themes should fit into understanding those managerial and regional dimensions that account for the phenomenon at stake in all its peculiarity, with potential meanings embodied into the context by embedded finance.

This pattern reveals that low-centrality themes such as "corporate governance" and "agency theory" remain influential within specialized or regional research contexts but have limited integration across broader embedded finance discussions. These concepts, while foundational in corporate finance, are often applied in interpretive or theoretical frameworks rather than in operational embedded finance models. As noted by Alabdullah & Al-Sartawi (2023), the low centrality of corporate governance and agency theory in embedded finance literature can be explained by their limited interdisciplinary applicability and weak alignment with the operational and innovation-oriented nature of modern fintech ecosystems. In contrast, topics like "return predictability" gain high centrality and impact due to their methodological adaptability in data-driven investment algorithms and AI-integrated risk forecasting, making them more relevant for the embedded finance domain's technological evolution.

Table 3. Frequency, Centrality, and Impact Levels of Terms Used in Embedded Finance Articles in the WoS Database

label	group	freq	centrality	impact
return predictability - conf 60% textual analysis - conf 100% asset pricing - conf 50%	1	63	0,372	1,585
stochastic volatility - conf 100% contingent claims - conf 100% default - conf 80%	2	105	0,410	1,164
corporate governance - conf 90% china - conf 100% agency theory - conf 100%	3	47	0,344	1,078
executive compensation - conf 66,7% volatility - conf 60% default risk - conf 66,7%	4	35	0,494	1,334

In this analysis of the literature on embedded finance, the levels of frequency, centrality, and impact of various thematic areas have been considered. Group 1, comprising return predictability, textual analysis, and asset pricing, has secured an important place in the literature with a total frequency of 63. This group has a high impact level of 1,585 and focuses primarily on specific and niche topics. While it has a centrality score of 0.372, showing its low connection with other sets, the high impact factor suggests that it may host high-impact studies. This would imply that narrow domains, such as financial market predictability and asset pricing, which are influential albeit narrow, play a major role in the literature.

The terms that constitute this second group include stochastic volatility, contingent claims, and default; the latter recurring thematically in most of the literature. This same group has the highest repetition rate of 105, a centrality score of 0.410, showing strong connections with other topics in the literature, and an impact level recorded at 1,164. Group 2 is the basis of almost all studies related to financial risk management and uncertainties since it holds a central position in the literature. This proves that topics of financial risks and

uncertainties attract broad interest in theoretical and applied research and are of core importance for the literature.

Group 3 is the other highly frequent theme grouping, which includes themes such as corporate governance, China, and agency theory; its frequency is lower at 47 but uniquely contributes an impact level of 1,078. This group holds a centrality score of 0.344, meaning it has limited links with other themes. However, focusing on regional and corporate studies, this group represents deep research in specific contexts. Inclusion of China underlines the importance of regional studies in embedded finance, implying that research in specific regional and corporate contexts, while distinctive, contributes in a more narrow way to the wider literature.

Group 4 encompasses themes such as executive compensation, volatility, and default risk, among others. Though smaller in volume than other groups, with a frequency of 35 representatives within the papers, an impact level of 1,334 and a centrality score of 0.494 grant it a strong position. The Corporate Finance and Risk Management group focuses on corporate finance and risk management; hence, it forms a very important foundation for both theoretical and applied research. It indicates that corporate finance and risk management, while being less studied, bear great importance in literature due to their high impact.

This analysis therefore provides a solid framework for understanding the thematic diversity of the literature on embedded finance and the roles different groups have played within that literature. Particular attention has been paid to the connections and impacts of each group to underline the importance of comprehensive studies that address theoretical and practical perspectives on embedded finance. This will mean that a wide range of research areas on embedded finance is covered within this literature, with each area contributing to the literature from various perspectives.

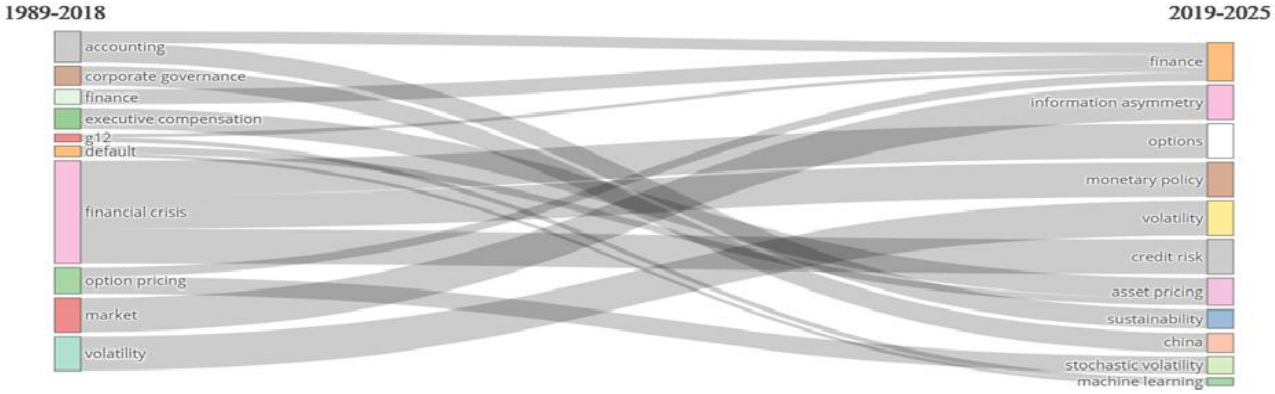

Figure 8. Thematic Evolution and Periodic Shifts in Focus in Embedded Finance Articles in the WoS Database from 1989 to 2025

Thematic development of the embedded finance literature shows clear thematic shifts between the 1989-2018 and 2019-2025 periods. In the former period, the literature focused on basic financial topics like option pricing, volatility, corporate governance, and default. These themes focus on the theoretical and practical analysis of uncertainty and risk management in financial markets. In particular, with the responses to global crisis, themes like financial crisis and market became current while accounting and executive compensation, which also relate to corporate governance and financial reporting, too, entered the literature during that era.

From 2019 to 2025, the themes of literature have significantly changed. Influenced by technological innovations, machine learning and stochastic volatility became more dominant, reflecting the growing impact of financial technologies within the field. Furthermore, sustainability, monetary policy, and credit risk reveal further investigation of financial systems within environmental, social, and regulatory perspectives. Also, the emergence of themes such as information asymmetry and China reflects a greater importance of regional and structural differences in embedded finance research.

Some of the themes, such as volatility, option pricing, and finance, show continuity between the two periods. These themes represent areas of ongoing academic interest in more traditional areas of finance, such as risk management and pricing. Whereas most of the prevailing themes are somewhat new, emerging thematisms such as machine learning, sustainability, and information asymmetry are an indication of the expansion the literature

has for modern topics revolving around technological innovation, environmental concern, and the management of information. Thereby suggesting an embedded finance that evolved from incorporating both classical finances and contemporary innovative topics, ensuring a wide scale of research analysis in this area of study.

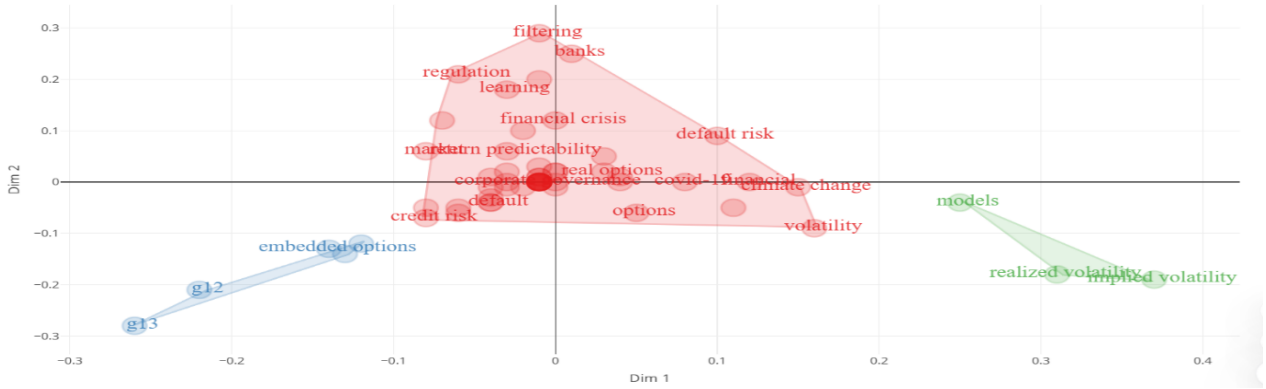

Figure 9. Thematic Distribution and Relationships in Embedded Finance Articles in the WoS Database

This MDS analysis shows how the themes are grouped within the embedded finance literature and their relationships. Carried out for three main clusters, this analysis represents the theoretical foundations, applied research, and technically specialized studies in the literature.

The first cluster includes topics such as G12, G13, and embedded options, representing the theoretical infrastructure. The contribution these themes have made to establish and develop financial theories and models usually finds a place in more abstract frameworks of literature. The themes coalesce into broad application-oriented topics of financial crisis, credit risk, corporate governance, and real options. These act as bridging agents between pure theoretical works to applied research in occupying the centrality in literature.

The third cluster focuses on more technical and specific themes related to implied volatility, realized volatility, and models. This cluster is associated with the measurement of market volatility and financial modeling studies.

This analysis clearly shows the interdisciplinary nature of embedded finance literature and how themes are interconnected. The thematic groupings bring to the fore both the theoretical underpinning and applied works, while new approaches such as technological innovations and risk management represent an expanding dimension of the literature. This thus shows that there is a rich and complex research field of embedded finance, combining in itself both a traditional and modern approach.

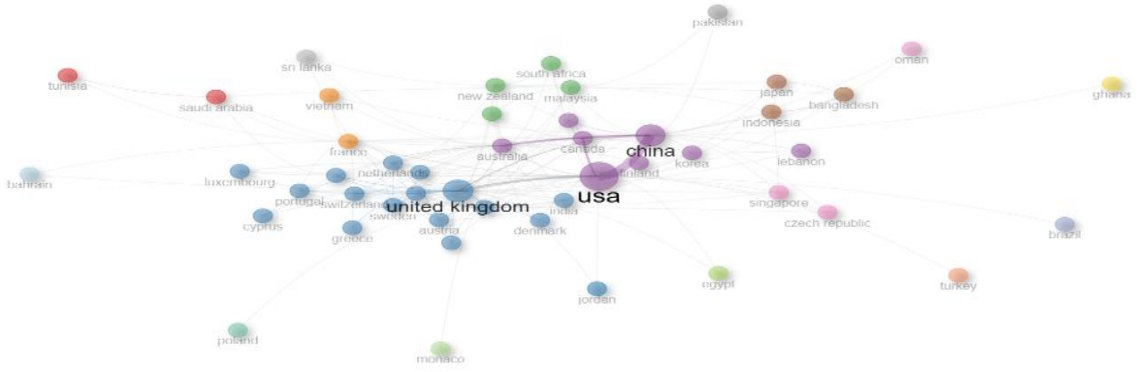

Figure 10. International Collaboration Network in Embedded Finance Articles in the WoS Database

The figure above depicts a visual representation of international collaboration in the literature network on embedded finance. More clearly, the various countries engage in scholarly exchanges within a shared thematic scope, as revealed by network analysis. A critical outcome of this analysis is the identification of dominant contributors to the field. As emphasized by Duan (2024), the United States occupies a dominant position in embedded finance research networks, marked by high publication output and extensive international

collaboration, making it the central node in global scholarly exchanges on fintech and embedded financial systems.

The second most proximate important node is China, which indicates good academic cooperation between the two nations. This represents the leadership and international influence of the USA and China in the realm of embedded finance research. The United Kingdom also figures relatively near the center of the network, showing a good connection with other European countries such as Netherlands, Switzerland, and Germany. A bibliometric study by Afjal (2023) underscores the interdisciplinary interest in European FinTech and financial inclusion, foregrounding the role of cross-regional research alliances towards facilitating economic growth and financial access.

Amongst the Asian nations, there is representation by India, Japan, and Singapore through more restricted yet significant ties. They are reflected through their contributions to the embedded finance literature, in addition to indicating that more cooperative work in this region could be fruitful. Those areas comprise South Africa, Egypt, and Turkey as outliers to an extent through participation in specific studies. They have more peripheral standings, though, and fewer links. Indeed, this gives an indication of the embedded finance research being less developed or kept on a more minor scale in the nations represented here. However, despite their peripheral network positions, developing countries such as Turkey, South Africa, and Egypt exhibit specific thematic strengths worth noting. For instance, while there has been increased involvement by Turkey in embedded finance through the fast-developing fintech industry and the introduction of digital banking systems, regulatory harmonization is still in its initial stages. Likewise, South Africa has ventured into embedded lending concepts among the underbanked, while Egypt has focused on digital wallets and basic banking. As underlined by Del Sarto & Ozili (2025), while emerging markets tend to play peripheral roles in international networks, their localized innovations—founded on localized needs and financial inclusion initiatives—make valuable contributions to the diversification and pragmatic applicability of embedded finance. More rigorously investigating the contribution such emerging markets can make to region-specific applications and policy structures is an option for future studies.

China's robust position in the embedded finance literature is, to a large extent, based on the fact that it was the first to lead in the digital finance ecosystem. The developments in fintech powerhouses, including the likes of Ant Group and Tencent, have placed China at the forefront in the embedding of finance into non-financial platforms. In addition, the regulatory endorsement by the Chinese government on the trials for central bank digital currency (CBDC) as well as for data infrastructure overhauling has stimulated extensive studies on embedded finance uses in the Chinese market. A bibliometric review conducted by Afjal (2023) puts China as one of the foremost fin tech research contributors, not just based on volumes of publications, but also through theme advancements that bring together digital finance services and general economic development objectives.

In summary, the below description portrays a central role for nations such as the USA, China, and the United Kingdom, coupled with intense academic collaboration among them in embedded finance research. Peripheral role is played by other nations when engaging in an emerging academic discipline. According to Haddad & Hornuf (2019), fintech and embedded finance research portrays different intensities of international collaboration and regional power, with advanced economies typically leading the quantity and the network centrality in international academic production.

Conclusion

This research has fully examined the academic body in embedded finance literature and outlined the major thematic, methodology, and geographical trends in this domain. Current studies show that embedded finance scholarship has evolved extensively, marked by the inclination toward interdisciplinary themes, more international cooperative work, and the expression reflecting the international nature of finance innovation (Zetzsche et al., 2020).

The rate of growth in the embedded finance literature for the period from 1989 to 2025 is estimated to be 5.1%, though one can notice accelerated growth in this rate after the year 2020, fueled by digitalization and the effects of financial technologies. The COVID-19 crisis sharply accelerated the take-up of digitalised finance solutions and brought into sharp focus the role played by technology adaptation in the finance sector, which subsequently

stimulated research and practical interest in embedded finance (Feyen et al., 2021). No longer was this growth restricted to research alone, as it has accelerated the contributions of embedded finance solutions in practical domains as well..

The embedded finance research has moved from traditional finance themes, whereby subjects such as option pricing and risk management were once the focus, to contemporary issues, including artificial intelligence and sustainability. Initial research focused on laying theoretical underpinnings, whereas recent studies have moved towards applicative issues such as environmental concerns and technology innovations. Embedded finance has become an exciting area that converges conventional finance concepts into advanced technologies, capturing an overall shift towards how digital platforms have embedded financial services (Puschmann, 2017).

The United States, China, and the United Kingdom have also featured prominently in the literature in collaborative international endeavors. Interconnected academic relationships are forged among these nations, which have contributed heavily. Embedded finance has become increasingly an international research topic, spreading across the globe and across disciplines, as evidenced by the escalation in international publications and collaborative research networks (Haddad & Hornuf, 2019).

Authors such as Chen Y, Li Y, and Jarrow R have attracted interest for their research in areas such as credit risk, financial crises, and embedded options. Their work underlies the literature, both practically and theoretically. For example, Tetlock et al. (2008) proposed a new methodology through text mining methods to measure the predictive value of financial news, setting the foundation for sentiment-driven market prediction. In contrast, Li (2021) examined how embedded microprocessor-based wireless data acquisition systems can be used to aid in early assessment mechanisms in detecting financial risks. Through the convergence of sensor networks and the monitoring of financial data, this research shows how embedded technologies are converging more toward finance analytics. As noted by SAP Fioneer (2023), recent research in embedded finance shows multidisciplinary growth by bridging innovation from technology to finance with risk management, which highlights the field's sophistication and practical usefulness. Moreover, the growth in citation density shows that these publications have fueled academic impact and the exchange of knowledge.

Some of the contemporary issues that have, in recent times, become more pivotal in the embedded finance literature include sustainability, policy, and innovation. Some of the ongoing knowledge gaps in these areas present potential avenues for research. Literature regarding ESG dimensions indicates that embedded finance does not just provide financial value but value to society as well. As Luca (2025) emphasizes, embedded finance solutions, when integrated into infrastructures such as APIs and cloud computing, greatly facilitate the optimization and scalability concerns of finance systems.

In addition to these general themes, there are several detailed gaps in the body of research that call out to scholars. Specifically, there is little investigation into how embedded finance intersects with environmental, social, and governance (ESG) metrics in day-to-day bank operations. Similarly, research exploring the regulatory fragmentation of embedded financial services across multiple legal systems is still thin on the ground. Finally, emerging markets have inadequate coverage in terms of embedded model adoption difficulties and integration into local finance infrastructure. According to Nicoletti (2021), identifying gaps in embedded finance research offers strategic potential to create more inclusive and robust finance systems, particularly by addressing concerns around ESG integration and regulatory heterogeneity.

Although it provides an extensive literature review about embedded finance, the study has certain limitations that must be taken into consideration in order to place it in perspective. First, the study is based solely on the Web of Science (WoS) Core Collection database. Although WoS is highly regarded and is commonly used, it does not cover all publications, especially if they are included in Scopus, SSRN, or regional databases. That can result in incomplete coverage of the literature and the introduction of selection bias. Secondly, citation metrics such as citation numbers are time-dependent; new publications have not yet had time to gain sufficient citations, and hence, their scholarly contributions can get underestimated. Moreover, bibliometric methods mainly provide quantitative information and can miss out on subtle conceptual advances and new crossovers across disciplines. Future research can combine content analysis or expert-informed thematic coding to have richer qualitative information.

The literature on embedded finance is, therefore, at the constant edge of evolution, with enormous potentiality for both academics and practitioners. This study has elaborated on the linkages between the theoretical underpinnings and practical aspects of embedded finance. According to Thakor (2020), the evolution of financial innovation—especially through themes like sustainability, AI, and risk management—demands continued academic inquiry to ensure these advancements are effectively integrated into evolving financial ecosystems. The present study will, therefore, serve as a broad-based guideline toward further research and, by implication, enhanced understanding of the dynamic character of embedded finance.

Declaration of Conflicting Interests

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Statements of Publication Ethics

We hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' Contribution Rate

This study is single-authored, and the contribution rate is 100%.

Ethics Committee Approval Information

In this study, no method requiring the permission of the "Ethics Committee" was used.

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GENİŞLETİLMİŞ ÖZET

Finansal hizmetlerin dijitalleşmesi ve teknolojik ilerlemelerin artışı, finans sektöründe köklü değişimlere yol açan yenilikçi kavramlar ve metodolojilerin gelişimini desteklemiştir. Bu bağlamda gömülü finans, finansal hizmetlerin günlük yaşam ve iş süreçlerine entegre edilmesiyle geleneksel finansal sistemlerin sınırlarını aşan, yenilikçi bir çerçeve olarak öne çıkmaktadır. Gömülü finans; ödeme, kredi, sigorta ve yatırım gibi hizmetleri, kullanıcı ihtiyaçlarına göre özelleştirilmiş platformlar aracılığıyla sunarak erişilebilirliği ve operasyonel verimliliği artırmaktadır. Bu çalışma, gömülü finans literatüründe tematik, coğrafi ve yöntemsel çeşitlilik konusundaki bilgi boşluklarını doldurmayı amaçlamakta ve bu hızlı büyüyen alanı sistematik bir şekilde incelemek üzere bibliyometrik analiz yöntemlerini kullanmaktadır.

Çalışmanın temel amacı, gömülü finans literatürünü kapsamlı bir perspektiften ele alarak mevcut araştırma eğilimlerini, tematik odak noktalarını, coğrafi dağılımları ve bilgi eksikliklerini ortaya koymaktır. Ayrıca, bu çalışma, gelecekteki araştırmaları yönlendirebilecek yeni araştırma alanlarını tanımlamayı ve gömülü finansın akademik ve pratik etkilerini anlamayı hedeflemektedir. Araştırma, Web of Science (WoS) veritabanından elde edilen 781 akademik belgeyi analiz ederek, 1989 ve 2025 yılları arasında yayımlanan çalışmalardan oluşan kapsamlı bir veri setini incelemiştir. Çalışmada kullanılan yöntemler, bibliyometrik analiz için yaygın olarak tercih edilen Bibliometrix paketi ve biblioshiny arayüzünden yararlanılarak gerçekleştirilmiştir. Analiz sürecinde anahtar kelimeler, yazarlar, yayın türleri, atıf sayıları ve uluslararası iş birlikleri gibi unsurlar detaylı bir şekilde incelenmiştir.

Analiz sonuçları, gömülü finans literatürünün yıllık ortalama %5,1 oranında büyüdüğünü ve özellikle 2020 sonrasında büyük bir ivme kazandığını göstermiştir. COVID-19 pandemisi döneminde dijital dönüşüm ve finansal teknolojilere artan ilgi, bu büyümeyi tetiklemiştir. 2023 yılı, bu alanda en fazla sayıda yayının yapıldığı yıl olarak kaydedilmiştir. Ayrıca, literatürde tematik eğilimlerin zamanla değişim gösterdiği belirlenmiştir. Erken dönem çalışmalar genellikle risk yönetimi ve opsiyon fiyatlaması gibi klasik finans konularına odaklanırken, son yıllardaki araştırmalar sürdürülebilirlik, yapay zekâ ve büyük veri analitiği gibi modern temaları ele almıştır. Bu durum, gömülü finansın geleneksel finans teorilerinden teknoloji ve çevresel etkiler gibi daha geniş bir perspektife evrildiğini ortaya koymaktadır.

Çalışma bulguları, gömülü finans literatürünün uluslararası düzeyde önemli bir akademik iş birliği içerdiğini göstermektedir. Özellikle ABD, Çin ve Birleşik Krallık gibi ülkeler, literatüre en fazla katkı sağlayan ülkeler arasında yer almakta ve bu ülkeler arasında güçlü akademik bağlantılar bulunmaktadır. Bununla birlikte, Hindistan, Türkiye ve Japonya gibi ülkelerin de bu alandaki katkıları giderek artmaktadır. Literatürde öne çıkan anahtar kelimeler arasında "risk yönetimi," "sürdürülebilirlik," ve "yapay zekâ" gibi temalar yer almaktadır. Bu temalar, gömülü finansın risk yönetimi ve finansal süreçlere entegre edilmiş sürdürülebilir çözümler gibi çeşitli alanlardaki uygulama potansiyelini vurgulamaktadır.

Gömülü finans literatüründe öne çıkan bir diğer önemli bulgu, bölgesel ve sektörel farklılıklardır. Örneğin, gelişmiş ülkelerde yapılan araştırmalar daha çok kullanıcı deneyimini geliştirmeye odaklanırken, gelişmekte olan ülkelerdeki çalışmalar finansal hizmetlere erişim ve finansal kapsayıcılığı artırma konularını ele almıştır. Hindistan ve Kenya gibi ülkelerde mobil ödeme sistemleri, kırsal kesimdeki bireylerin ve küçük ölçekli işletmelerin finansal hizmetlere erişimini artırmada önemli bir rol oynamıştır. Diğer yandan, gelişmiş ülkelerdeki çalışmalar, gömülü finansın kullanıcı dostu özelliklerinin ve inovatif hizmet modellerinin geliştirilmesi üzerine yoğunlaşmıştır. Gelişmiş ülkelerdeki bu odaklanma, teknolojik altyapının güçlü olması ve kullanıcıların daha karmaşık hizmetlere talep göstermesi ile ilişkilendirilebilir. Buna karşın, gelişmekte olan ülkelerdeki çalışmalar, finansal hizmetlere erişimi genişletme ve ekonomik eşitsizlikleri azaltma üzerine yoğunlaşmaktadır. Bu bağlamda, bölgesel farklılıkların gömülü finans uygulamaları üzerindeki etkisi, literatürde giderek daha fazla araştırılmaktadır.

Çalışmada kullanılan bibliyometrik analiz yöntemleri, gömülü finans literatüründeki ana temaları ve araştırma boşluklarını belirlemeyi sağlamıştır. Özellikle, sürdürülebilirlik ve çevresel etkiler gibi konuların gömülü finans literatüründe giderek daha fazla yer bulduğu gözlemlenmiştir. Ayrıca, literatürde yapay zekâ, blockchain teknolojisi ve büyük veri analitiği gibi teknolojilerin finansal süreçlere entegrasyonu üzerine yapılan çalışmaların arttığı belirlenmiştir. Bu teknolojiler, gömülü finansın operasyonel verimliliğini artırmak ve kullanıcı deneyimini optimize etmek için kritik bir rol oynamaktadır. Blockchain, özellikle şeffaflık ve güvenlik konularında çözümler sunarken, yapay zekâ ve büyük veri analitiği, kişiselleştirilmiş hizmetlerin sağlanmasında kilit teknolojiler olarak

öne çıkmaktadır. Bu teknolojilerin, finansal sistemlerde verimliliği artırırken, aynı zamanda müşteri memnuniyetini de üst seviyelere çıkardığı görülmektedir.

Araştırma sonuçları, gömülü finansın teorik temelleri ile uygulamalı alanlar arasındaki bağlantıyı güçlü bir şekilde ortaya koymaktadır. Literatürde öne çıkan yazarlar arasında Chen Y., Li Y., ve Jarrow R. gibi isimler, finansal krizler, kredi riski ve gömülü seçenekler gibi konularda önemli katkılar sağlamıştır. Bu yazarların çalışmaları, literatürün hem teorik hem de pratik açıdan gelişimine büyük katkı sağlamıştır. Ayrıca, sürdürülebilirlik, düzenleyici politikalar ve teknolojik yenilikler gibi modern temaların, gömülü finans literatüründe artan önemi vurgulanmıştır. Literatürdeki bu çeşitlilik, gömülü finansın çok disiplinli bir alan olduğunu ve finansal hizmetlerin geleceğini şekillendirdiğini göstermektedir.

Sonuç olarak, bu çalışma gömülü finans literatürüne dair kapsamlı bir inceleme sunarak, bu alandaki bilgi boşluklarını doldurmayı ve gelecekteki araştırmalar için yol gösterici bir çerçeve oluşturmayı amaçlamaktadır. Gömülü finans literatürü, klasik finans teorileri ile modern teknolojik yeniliklerin bir araya geldiği dinamik bir alan olarak dikkat çekmektedir. Sürdürülebilirlik, düzenleyici politikalar ve yapay zekâ gibi modern temalar, gelecekteki araştırmalar için önemli fırsatlar sunmaktadır. Gömülü finansın, finansal sistemlerin etkinliğini artırmanın yanı sıra toplumsal ve çevresel değer yaratma potansiyeli de göz ardı edilemez. Bu bağlamda, gömülü finans literatürüne yönelik daha kapsamlı ve disiplinler arası çalışmalar, bu alandaki bilgi birikimini derinleştirecek ve yeni araştırma alanlarının keşfedilmesine katkı sağlayacaktır.