Payment Market and Pricing: A Bibliometric Review

Breno C. Sena[1], Flávio L. Carvalho[1] & Andrei A. Albuquerque[1]

[1] Federal University of São Carlos, Sorocaba, Brazil

Correspondence: Breno C. Sena, Federal University of São Carlos, Sorocaba 18090, Brazil. Tel: 551-698-186-3354. E-mail: brenosena_1996@hotmail.com

Abstract

The objective of this article is to analyze the scientific production about payments market and pricing, identifying the stage of publications, the most productive countries and journals, influential authors, and seminal documents, research clusters, and opportunities for future research. The methodology used to achieve this goal was a bibliometric analysis, using data from the Scopus and Web of Science. With 75% of the published records appearing between 2010 and 2021, this analysis revealed that the field is emergent. The impacts discussed are (i) the growth in the number of papers; (ii) the democratization of access to payment services; (iii) the relevance of pricing in payment processes; and (iv) the agents involved in payments transaction flow. The results show that few studies investigate payments market and pricing, making it an important topic for future research (allied with the identified hot topics) and the major contribution of this paper.

Keywords: payments market, card payment, service pricing, financial services, financial institutions

1. Introduction

Means of payment play a fundamental role in the economy as they enable the exchange of goods, products, and services among people, companies, and institutions. The methods by which payments are made has been undergone constant transformation since the dawn of civilizations, influenced by the specific characteristics and advances of each period (Furini, 2020).

The Brazilian card system, a notable example of this transformation, began in the late 1960s and saw a great popularization and expansion in the 1990s (Perez & Brusch, 2018). Since then, the country has experienced a consistent advance in the market of electronic payment methods. The volume of purchases through payment instruments such as credit and debit cards grew over 500% in a decade, accounting for more than twenty thousand transactions per minute, with an annual turnover that exceeds R$ 1.5 trillion, as reported by the Brazilian Association of Credit Card and Service Companies (ABECS, 2018). Between 2019 and 2020, there was a notable 28% increase in the number of fintech companies in Brazil alone, totaling 771 companies, out of which 190 were focused on the payments industry (Larghi, 2020). The term *fintech* stands for financial technology and refers to companies that develop digital financial products, distinguishing themselves from traditional sector companies through their extensive use of technology (Nubank, 2021).

This paper aims to present a bibliometric review of the literature related to pricing and means of payment, with a focus on comprehending the global scenario of publications and identifying existing research opportunities. The study was conducted using the bibliometric research methodology, which applies statistical and mathematical methods in the analysis of scholarly works (Pritchard, 1969).

The research study found no works of bibliometric nature among the 448 articles identified using the Scopus and Web of Science databases in the period under analysis. Therefore, in addition to its importance due to the exponential evolution in card payments in the last decade (Wright, 2003), the present study is also justified for providing an overview of the scientific production related to the theme of means of payment and pricing, and for presenting an overview of the main research opportunities related to the theme.

The article is organized as follows: Section I presents the introduction; Section II the theoretical framework that supports the discussion; Section III describes the methodology; Section IV presents the data related to card payments in Brazil, along with graphical and descriptive analyses of the information obtained; and Section V contains a summary of the results, the conclusion, and a presentation of the main research opportunities (hot topics).

2. Literature Review

The world has undergone a transformation, transitioning from an era where transactions primarily relied on physical cash to one dominated by electronic and predominantly digital transactions. The implementation of cashless payment policies has merged as a catalyst for economic development and the gradual shift towards a digital economy (Sreenu, 2020). Empirical studies have discussed the advantages experienced by countries that actively promote cashless payments and embracing the concept of a cashless economy (Raj et al., 2021). Financial services play a pivotal role in stimulating economic development and enabling individuals to break free from poverty by facilitating investments in areas such as health, education, and business. Recent research is shedding light on the benefits of promoting financial inclusion, which is marked by the widespread use of digital financial services and technology in the financial routine of the population (Demirgüç-Kunt et al., 2020).

The Fourth Industrial Revolution, based on digital technologies, has brought about an unprecedented change in socio-economic models. The concept of digital transformation of the economy, or development of the digital economy, centers around the following pillars: (a) the development of digital businesses, (b) digital transformation for traditional businesses, (c) the growth of digital finance, and (d) the expansion of e-commerce (Hang et al., 2021).

Digital transformation has become an unavoidable trend, requiring banks and other financial institutions to tackle challenges, cultivate competitive advantages, proactively adapt to the new evolving social context, adjust their business models, integrate technology into their operations, and digitize business processes in the direction of automation and intelligence. Several factors contribute to a digital economy, including banking digitalization, electronic payments, e-commerce, online platforms, digital channels, and digital service technologies (Zamaslo et al., 2021).

Different agents participate in all the processes, from the payment to the receipt of a given financial value (Alexandrova-Kabadjova et al., 2019). In the Brazilian context, these agents include the card brand, issuer, acquirer, payment facilitator, merchant, and cardholder. The governance of these relationships is based on agreements among the parties, regulations by government agencies, and an elevated level of technology; collectively, these factors contribute to the smooth functioning of the world financial system (Videira et al., 2016).

There are countless ways to do payments. In the Brazilian scenario, the following stand out methods stand out: paper money, bank cheques, debit and credit cards, electronic transfers (DOC and TED), digital wallets, contactless cards (also known as Near Field Communication or NFC), instant payments (PIX), and payments via QR code scanning. Electronic payment instruments are not only convenient, practical, and secure (Santos & Pereira, 2019), but they also play a crucial role in stimulating economic growth. In emerging markets like Brazil, the positive impact of electronic payments may be conservative and potentially underestimated. However, the results of previous research highlight the significant contribution that transition to electronic payments has made to economic growth and suggest that policies promoting the adoption of electronic payment instruments would benefit economic development in the country (Zandi et al., 2016).

In recent years, the Brazilian payment industry has witnessed a series of interventions by legislative bodies, the Central Bank of Brazil, and the Brazilian antitrust system (Perez & Brusch, 2018). One of the central issues in the current Brazilian market context concerns the relationship between consumers and merchants, enabling commercial transactions via card. The growth in this payment method is substantiated by data released by the Bacen, indicating an 87% increase in the number of cards issued from 2010 to 2020, rising from 392 million to 735 million cards by the end of the analyzed period. This volume is divided between debit and credit cards (99% and 70%, respectively) (Bacen, 2021), as shown in Table 1.

Table 1. Number of cards issued in Brazil from 2010 to 2020

Payment Modality	Cards Issued 2010	Cards Issued 2020	Increase (%)
Debit	228	454	99%
Credit	165	281	71%
Total (Debit + Credit)	392	735	87%

Source: Prepared by the authors based on data from Bacen, 2020.

Regarding the card modality, the key agents involved in the payment process include card network, consumers, cardholders, issuers, merchants, and acquirers. Acquirers, as payment service providers, play a pivotal role in

card payments (Welte & Molnar, 2021). Among the numerous companies that issue cards to the millions of consumers in the country (Bacen, 2021), several brands prominently participates in the Brazilian market, including Visa (with 30% market share), Mastercard (44% market share), Elo (21% market share), Hipercard (1% market share), American Express (0.5% market share), Diners Club (0.5% market share) and others (3% market share) (Alexandrova-Kabadjova et al., 2019).

Success in the payment process is determined by the smooth operating of a dynamic flow that commences when the customer/cardholder makes a purchase using a card at a merchant's point of sale. The payment is then assessed and processed by the acquirer, the company responsible for the card machine (or point of sale), which acts as an intermediary between the merchant, the card brand, and the card-issuing bank. If the information is validated – meaning there is no risk of fraud for any of the parties involved – and if the customer has an available balance (for debit transactions) or sufficient credit limit (for credit transactions), the payment is successfully completed.

Several agreements are based on or incorporate established pricing policy. Pricing, therefore, serves as a valuable tool to steer customers towards profit maximization (Dzienziol et al., 2002) and to ensure that companies remain profitable and competitive in their operating context. In the means of payment market, particularly the card market, pricing has become a key aspect for companies, especially in countries where this sector is experiencing significant expansion. Different pricing policies apply to each market agent. For instance, between issuers/brands and cardholders, the latter receive varying fees and rewards programs based on their card usage and credit risk. In the relationship between card brands and acquirers, acquirers must pay different interchange fees to banks, depending on the category (Basic, Intermediate, Premium, and Corporate), economic segment, and payment method, in addition to other costs attributed to the acquirer, such as variable transactions authentication costs with the card brands, taxes like PIS, COFINS and ISS, depreciation expenses, costs, marketing, and fixed organization costs. Typically, this pricing structure is passed on to merchants (Perez & Brusch, 2018) through commission fees or Merchant Discount Rate (MDR).

As this topic gains increasing relevance and complexity, the bibliometric methodology can play a collaborative role in systematizing the research studies conducted thus far and addressing issues to be explored in future studies. This contributes to the gradual development of scientific knowledge (Vouga & Amatucci, 2015).

Using a bibliometric research methodology, the current study aims to provide support for scientific production by (i) highlighting the most cited researchers, papers, and institutions; (ii) identifying the countries that have developed more research related to the object of the search (Barboza et al., 2016); and (iii) identifying the primary opportunities for academic development in the analyzed theme.

3. Method

3.1 Bibliometric Analysis

This study employs bibliometric research as its methodology, aiming to analyze the existing literature on a specific topic and uncover the primary researchers and countries associated with the development of the research subject. Using various tools, this method enables us to quantify crucial information through indicators and summarize the principal institutions, most influential authors, the researchers most frequently cited, and co-authorship networks (Okubo, 1997).

The articles considered in this survey were identified by two of the main online databases for academic papers, Scopus and Web of Science, which are universally recognized and widely utilized platforms that support this type of research (Harzing & Alakangas, 2016).

The bibliometric methodology holds significance across all fields of study and remains an essential tool in the analysis of scientific production, the data examined such studies reveal the level of progress within each of knowledge (Souza & Faria, 2011). This research methodology, along with the analysis and integration of various tools comprising this type of study, assumes importance because scientific knowledge is cumulative and cooperative, constructed from research outcomes that address gaps to be explored in the future (Vouga & Amatucci, 2015).

3.2 Conducting the Bibliometric Study

The bibliometric study was conducted in five distinct steps. Firstly, on May 10, 2021, the Scopus and Web of Science (WoS) search platforms were employed to search for papers. The second step involved data extraction, file treatment, and use of the Mendeley software for reading and organizing the papers. In the third step, the information of Mendeley software for both databases were consolidated using Excel, and duplicates were eliminated using the RStudio software. The fourth step encompassed the creation of a graphic visualization of

the information using VOSviewer and the Bibliometrix software, which were subsequently analyzed to facilitate the bibliometric review. Finally, the last step involved assessing the papers with the greatest impact on the network map and in the interpretation of the research.

Figure 1 illustrates the flow used to prepare the research, spanning from the objectives, keywords employed in the search, search tools and data analysis, culminating in the quantitative results obtained.
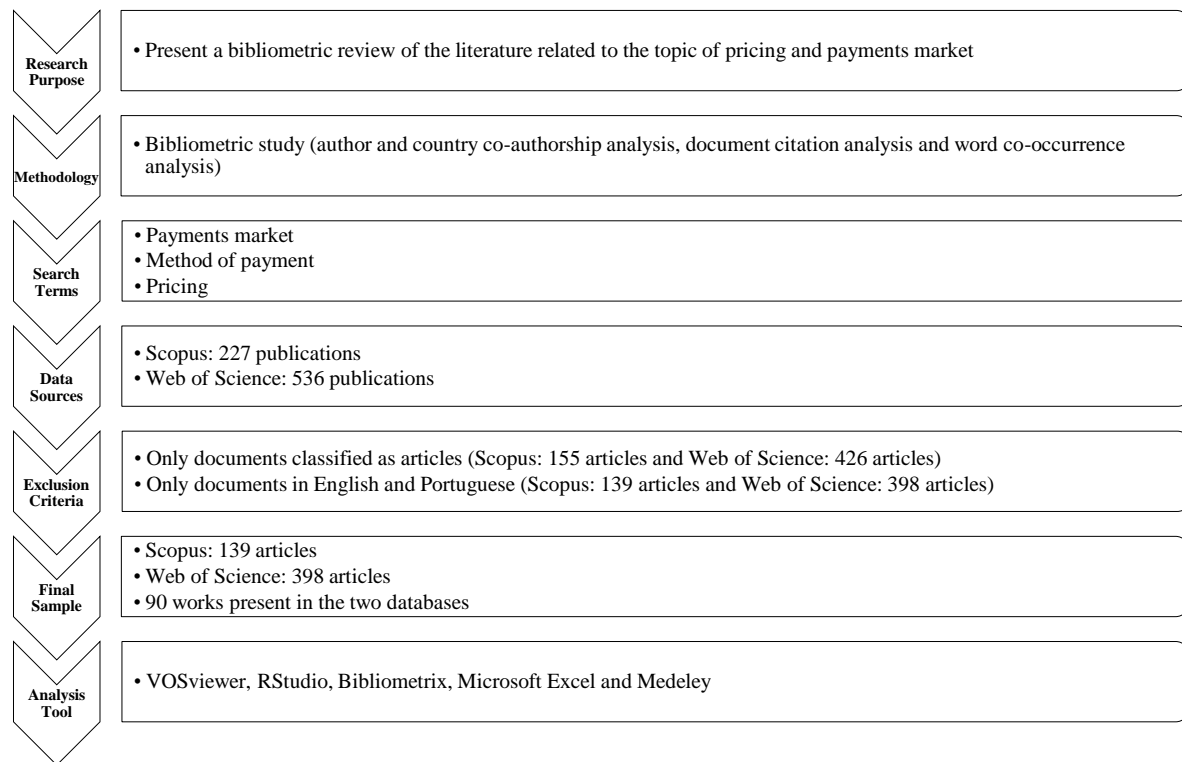
Research Purpose	• Present a bibliometric review of the literature related to the topic of pricing and payments market
Methodology	• Bibliometric study (author and country co-authorship analysis, document citation analysis and word co-occurrence analysis)
Search Terms	• Payments market • Method of payment • Pricing
Data Sources	• Scopus: 227 publications • Web of Science: 536 publications
Exclusion Criteria	• Only documents classified as articles (Scopus: 155 articles and Web of Science: 426 articles) • Only documents in English and Portuguese (Scopus: 139 articles and Web of Science: 398 articles)
Final Sample	• Scopus: 139 articles • Web of Science: 398 articles • 90 works present in the two databases
Analysis Tool	• VOSviewer, RStudio, Bibliometrix, Microsoft Excel and Medeley

Figure 1. Steps followed in the study

Source: Prepared by the authors.

3.2.1 Initial Settings

Web of Science is a multidisciplinary database that indexes several journals and allows the identification of citations and references, in addition to providing the h-index of searches; on the other hands, the Scopus platform indexes peer-reviewed academic journal titles, open-access journal titles, conference proceedings, trade publications, book series, scientific content web pages, and office patents (Piveta et al., 2018).

The analysis of the obtained data was performed using the VOSviewer and Bibliometrix tools. These tools facilitate the synthesis and graphical representation of information, including coauthorship analysis (involving authors and countries), document citation analysis, and word co-occurrence analysis. Additionally, certain graphical representations were generated using data related to card payments in Brazil, sourced from Bacen, covering the past decade (from 2010 to 2020).

3.2.2 Search Strategy

The bibliometric analysis started with keyword searches for the study, focusing on *payments market*, *payment method*, and pricing. These searches were conducted directly on the Scopus and Web of Science (WoS) platforms. Boolean terms were employed as follows: TS= ("Payments Market") AND TS= ("Method of Payment") AND TS= ("Pricing"). Records were filtered only by documents classified as articles. Language was limited to English and Portuguese.

3.2.3 Data Collection and Analysis Development

The data collection was conducted on May 10, 2021, initially a sample of 227 documents from the Scopus platform and 536 documents from the WoS platform. To enhance the bibliometric analysis, specific search

criteria were applied. The first filter excluded documents not classified as articles, resulting in a total of 155 documents from Scopus and 426 from WoS. Subsequently, the records were limited to the English and Portuguese languages, resulting in 139 scientific publications from Scopus and 398 from WoS. Three types of analysis were conducted using VOSviewer software: one focused on the keyword network, another on the country coauthorship network, and a third on the citation network. Additionally, the Bibliometrix software was used to prepare a graph illustrating the variation in term usage during the study period.

4. Results

4.1 The Brazilian Card Market

The Brazilian payments market has witnessed a significant surge in the adoption of innovative technologies. Electronic payment methods have proliferated in the country, now accounting for approximately 75% of payments in retail transactions (Perez & Brusch, 2018). Payments via credit and debit cards showed substantial growth between 2010 and 2020 in several variables analyzed, including card issuance (a growth of 87% – Figure 2), card activation, and volume of financial transactions (Bacen, 2021).
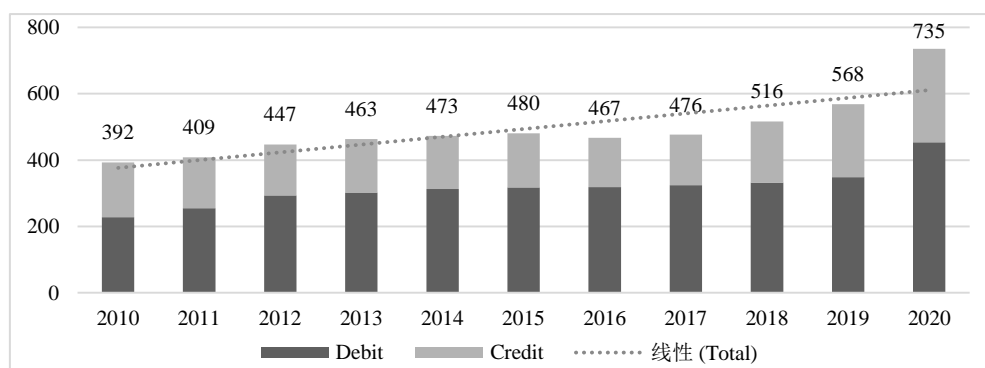

Figure 2. Number of cards issued in Brazil from 2010 to 2020

Source: Prepared by the authors based on data from Bacen, 2020.

When analyzing the volume of financial transactions made using debit and credit cards (Figure 3), a linear increase is evident, reflecting a 256% growth in transaction volume from 2010 to 2020. Notably, the debit modality exhibited remarkable growth, with a 303% increase compared to the 213% increase observed in the credit modality.
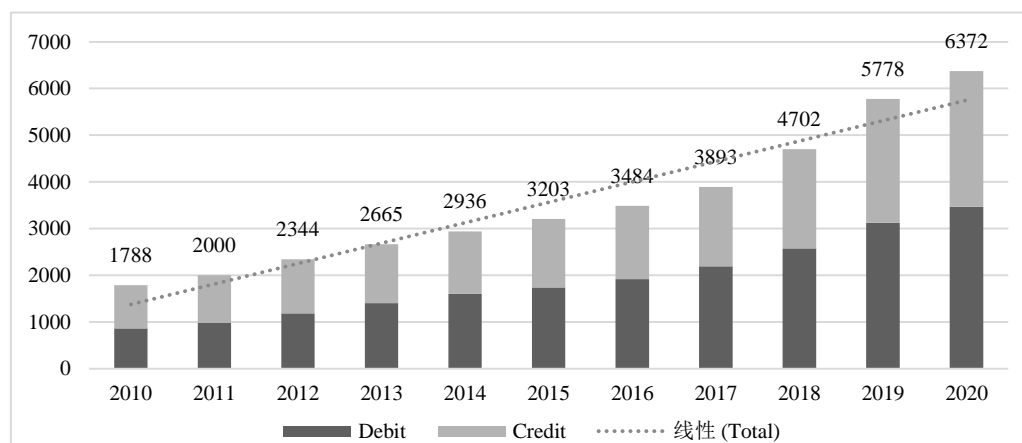

Figure 3. Number of card transactions in Brazil from 2010 to 2020

Source: Prepared by the authors based on data from Bacen, 2020.

4.2 Number of Publications

Figure 4 presents a Venn diagram displaying the number of articles focus on pricing and payment methods. These articles were retrieved from the Scopus and Web of Science databases, highlighting the overlap between the two sources.

The count of articles in Scopus (n = 139) is less than in WoS (n = 398). After removing the 90 overlapping articles, the search yielded a total of 448 articles. Interestingly, both databases contained a considerable number of unique articles: 49 in Scopus and 308 in WoS.
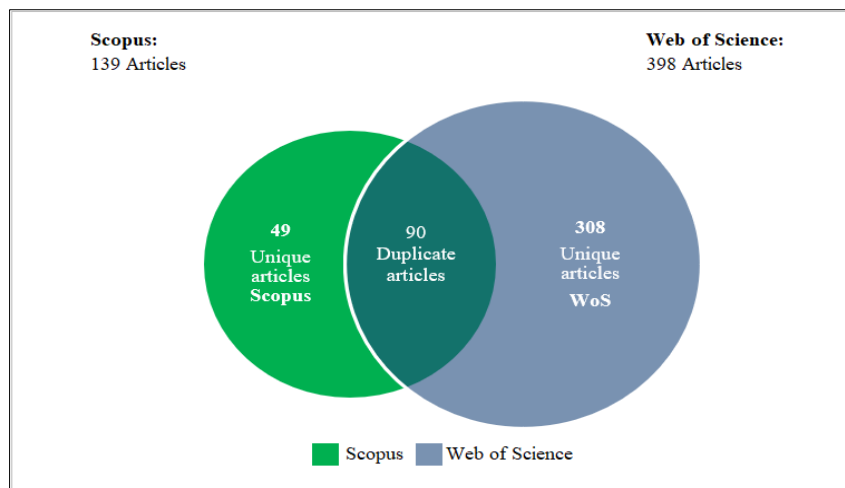

Figure 4. The Venn diagram of the articles

Source: Prepared by the authors based on data from Scopus and Web of Science, 2021.

4.3 Time Analysis

Figure 5 illustrates the temporal distribution of publications throughout the analyzed period, categorized by database (Scopus and Web of Science). A noticeable trend is the linear growth in the volume of articles related to pricing and means of payment in WoS. In 2020, there were 45 publications, representing a 25% increase compared to the previous year. On the other hand, Scopus experienced its peak in publications in 2018 with 15 publications. When evaluating the number of articles published up to early May 2021 and extrapolating to estimate the publications until December 2021 using a proportionality rule, we anticipate 18% increase in publication volume compared to 2020. This growth is distributed as a 31% growth from Scopus and a 15% increase from WoS.
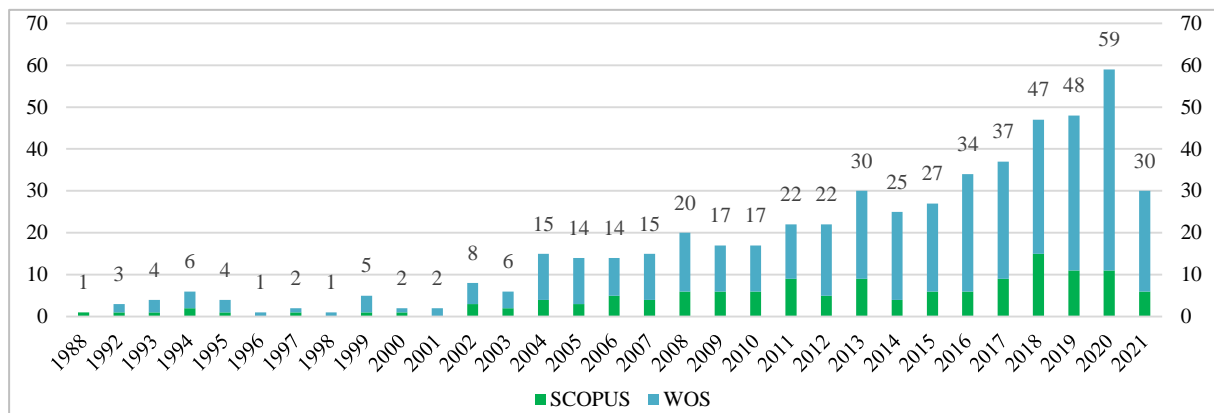

Figure 5. Evolution of publications from 1988 to 2021

Source: Prepared by the authors based on data from Scopus and Web of Science, 2021.

4.4 Analysis by Publication Area

The analyzed papers belong to various fields of study, suggesting the possibility that some papers may incorporate the terms (title, keywords, or text) without direct relevance to pricing and means of payment. Table 2 illustrates that most works are concentrated in the domains of Business, Economics and Social Sciences, with a notable number of papers also stemming from fields of Engineering, Health Services, and Energy. Therefore, future research pertaining to this study's subject should target areas associated with payments and the pricing

market, evaluating the existing works within each of these domains. The most pertinent works are likely to be found in the realms of Business, Economics and Social Sciences, or even within technology-related areas.

Table 2. Publication of documents by study area

Study Area	Scopus	Web of Science
Business, Economics and Social Sciences	93	156
Engineering	33	72
Health Care Science Services	33	58
Energy	30	23
Mathematics	25	20
Computer Science	19	17
Environmental Science	12	37
Agricultural and Biological Sciences	3	14
Operations Research Management	0	22
Science Technology	0	17
Other	6	0
Total	**254**	**436**

Source: Prepared by the authors based on data from Scopus and Web of Science, 2021.

4.5 Analysis by Country of Publication

The visual representations shown here were created using the VOSviewer software, which enables a graphical assessment of key information related to keywords co-occurrence, the number of publications per country, and the most cited documents within the scope of this study's research theme. The size of the circles in the figures is proportionate to the frequency of each analyzed variable, while the colors of the circles correspond to the publication year (please refer to provided scale in each figure).

Figure 6 illustrates the global distribution of research papers. The size of the circles reflects the level of contribution by each country. Most articles on the researched topics originate from the United States, China, England, Iran, and Canada, indicating that most studies have been conducted in developed nations. It is worth noting China as an exception, as it, despite being a developing country, is one of the world's leading economies today (Jugend et al., 2020) and is actively involved in recent research in this field.

In contrast, Brazil had only four documents that matched the defined search terms and criteria, none of which was related to pricing and means of payments. The identified articles were: "Price computation in electricity auctions with complex rules: an analysis of investment signals" (Vazquez et al., 2017), "Survival Factors for Subcontractors in Economic Downturns" (Oviedo-Haito et al., 2014), "Ecosystem services and biogeochemical cycles on a global scale: valuation of water, carbon and nitrogen processes" (Watanabe & Ortega, 2011) and "Optimal contract pricing of distributed generation in distribution networks" (Lopez-Lezama et al., 2011).

It is therefore evident that there is a need, especially in Brazil, for further research analyzing pricing and its impacts on the use of cards as means of payment in emerging economies.
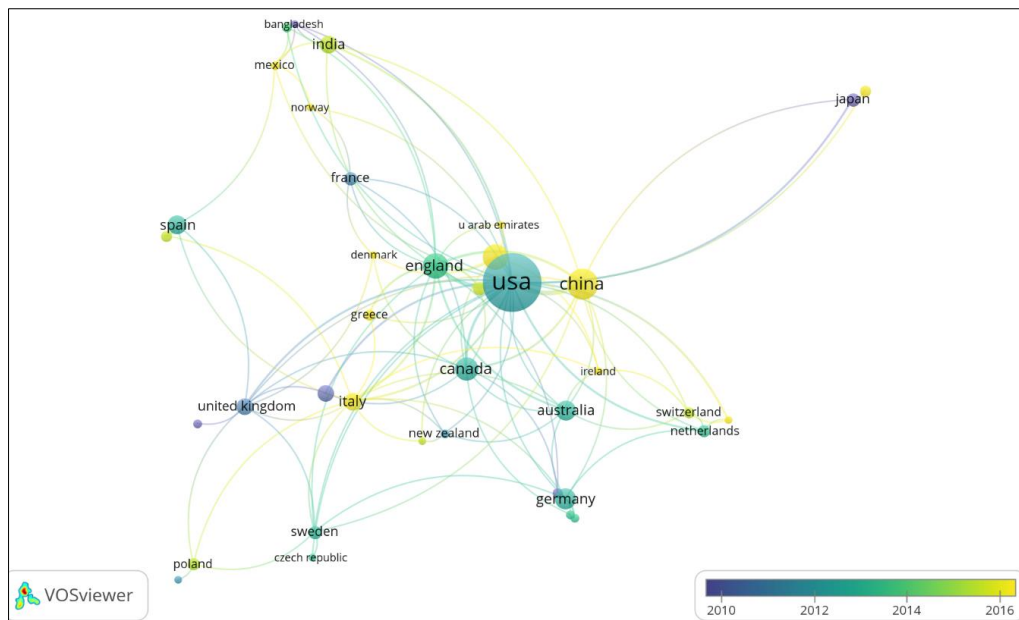
Figure 6. Co-authorship network by country

Source: Prepared by the authors in VOSviewer based on data from Scopus and WoS, 2021.

4.6 Co-Word Analysis

Figure 7 has been generated by amalgamating the authors' keywords and the keyword index with at least seven occurrences. It presents words organized into clusters, encompassing a wide array of terms. In this description, the yellow cluster signifies recent studies closely tied to subjects related to costs, competition, and trade. Another significant body of research appears to be clustered around topics such pricing, markets, management, and performance. Two additional clusters are evident, which one strongly linked to health-related research and the other associated with mathematical models and energy markets.

Overall, while specific dimensions can be identified, it ś also apparent that several clusters have similar terms. Therefore, it can be argued that research into pricing and means of payment may encompass a variety of perspectives within the same research study.
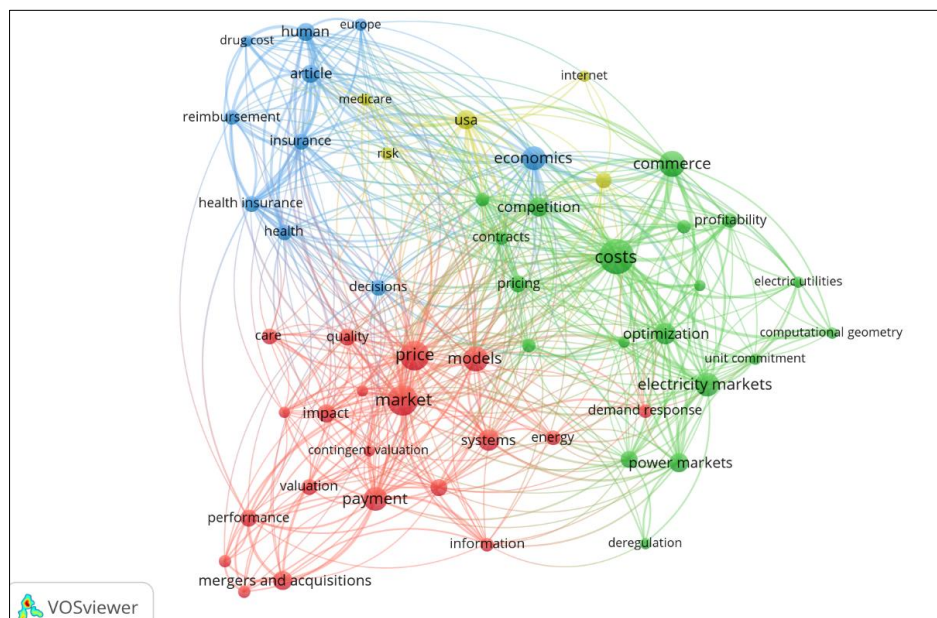

Figure 7. Word co-occurrence network

Source: Prepared by the authors in VOSviewer based on data from Scopus and WoS, 2021.

4.7 Citation Analysis

Figure 8 illustrates the citation network concerning the theme of pricing and means of payment. Noteworthy papers, based on their substantial number of citations, include Rhodes-Kropf et al. (2005), presenting 460 citations, Borenstein et al. (2002), 418 citations, El-Khattam et al. (2004), 295 citations, Spangenberg and Settele (2010), 196 citations, and Vendrell-Herrero et al. (2017), 191 citations. These papers span various research areas, with a primary focus on pricing of energy distributors, environment aspects, and financial management, particularly of mergers and acquisitions.

The most frequently cited paper, "Valuation waves and merger activity: The empirical evidence", aims to comprehend and categorize valuation errors that impact corporate merger activities, characterizing the main deviations in this process (Rhodes-Kropf et al., 2005). The second most cited work "Measuring market inefficiencies in California's restructured wholesale electricity market", introduces a method for decomposing wholesale electricity payments (Borenstein et al., 2002). This work laid the foundation for research in the energy sector related to payments, costs, and price optimization models (Luh et al., 2006).

The remaining papers presented in the citation network are connected to the development and application of various pricing methods, cost reduction, optimization, and mathematical modeling in diverse markets. Their focus extends to the energy market, the production sector, and healthcare domains.
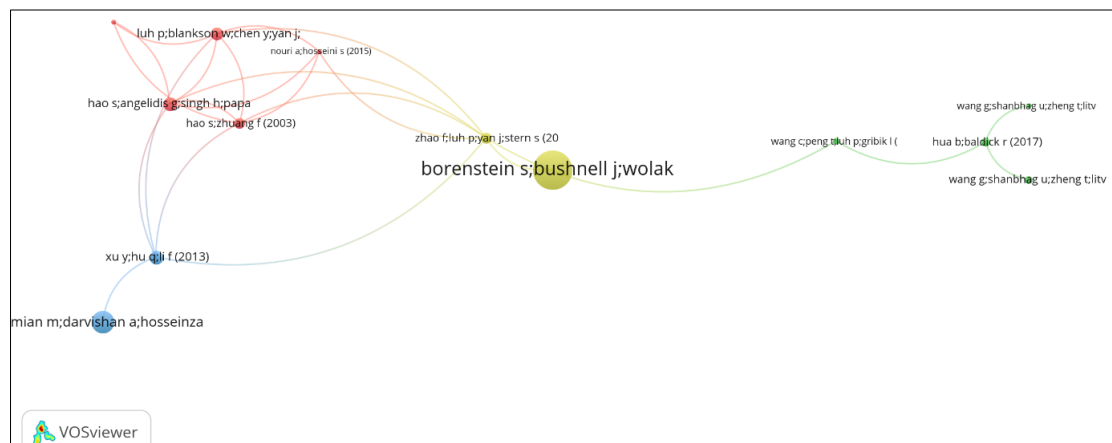

Figure 8. Document Citation Network

Source: Prepared by the authors using VOSviewer based on data from Scopus and WoS, 2021.

4.8 Journal Analysis

The primary sources with the highest number of articles do not predominantly feature articles related to the scope of the search, primarily because they belong to different areas (such as energy and health). Table 3 provides an overview of the journals with the most substantial number of documents from each database. The Journal *IEEE Transactions On Power Systems* emerges as the leading source, with 35 documents.

Table 3. Publication of documents by journals

Journal	Scopus	WoS	Total
IEEE Transactions On Power Systems	13	22	35
Energy Policy	2	7	9
American Journal of Managed Care	1	7	8
Health Services Research	1	6	7
Electric Power Systems Research	2	5	7
Value In Health	1	6	7
PharmacoEconomics	3	4	7

Source: Prepared by the authors based on data from Scopus and Web of Science, 2021.

4.9 Hot Topics Analysis

Figure 9, generated using the Bibliometrix software, illustrates the frequency of words in publications over the

analyzed period. It is evident that the research themes have evolved over years. In 2012, words related to the health sector predominated. Subsequently, the terms like "competition", "costs", and "optimization models", associated with the energy distribution sector, took the lead up to 2014. From 2015 to 2017, we most frequent terms included "economics", "market", "management" and "pricing", and are potentially reflecting the global evolution of the payments market. Finally, present day research is focused on terms "payments", "pricing models", "systems" and "impact evaluation", highlighting companies' pursuit of efficient pricing models, effective price management, and financial efficiency (cost reduction).
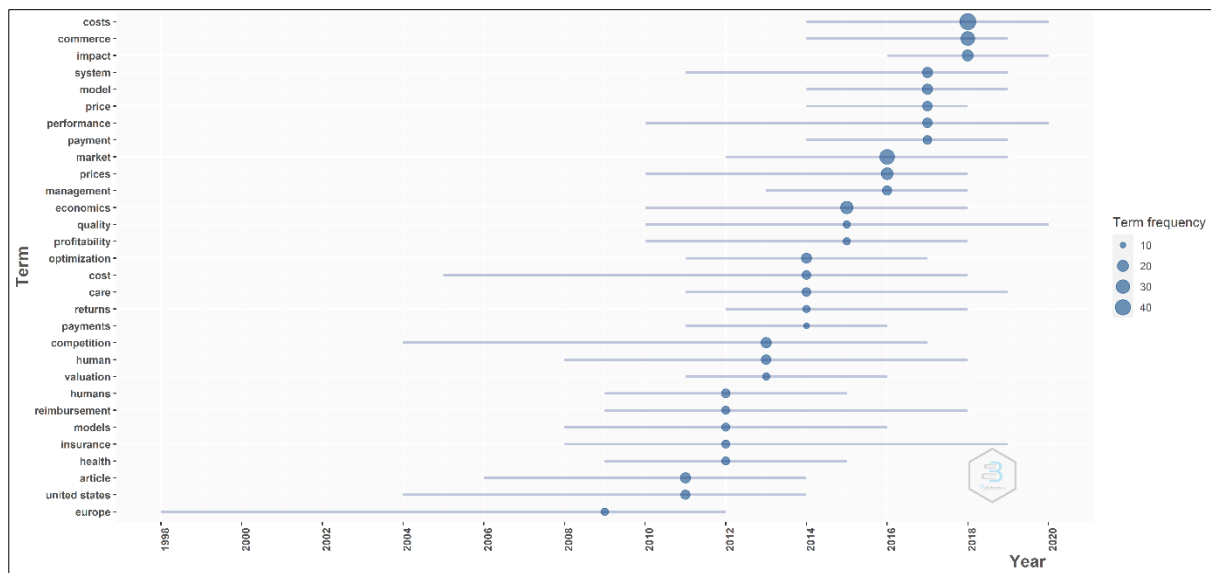

Figure 9. Use of terms over the years from 1998 to 2020

Source: Prepared by the authors using Bibliometrix based on data from Scopus and WoS, 2021.

In addition to presenting scientific activity indicators, this study also examined certain scientific impact indicators, specifically the h-b and m indexes. These indicators, contribute to the identifying hot topics, which are crucial for guiding future research related to the initial theme of the study. Quantification the impact and relevance of individual scientific contribution is essential in this type of investigation, allowing for an analysis of researchers and the comparison of their achievements (Hirsch, 2005). The h-b index, considered an extension of the h-index, is defined by organizing citations in descending order and dividing the h-b index by the number of years under consideration (n) (Banks, 2006).

The h-b and m indexes were employed to identify potential areas for future research, often referred as "hot topics". These indicators were applied to ten most frequently occurring words, as illustrated in Table 3:

Table 3. m-Index (evolution of the h-b index)

m-Index	Classification
$0 < m \leq 0,5$	This might be of particular interest to researchers within a specific niche or a relatively small academic community.
$0,5 < m \leq 2$	It could emerge as a "hot topic" in research, especially if the community is substantial, or if the topic and its combinations exhibit particularly intriguing characteristics.
$m \geq 2$	It is considered a "hot topic". It is a unique topic reaching beyond its own research area. It is likely to have unique application effects and characteristics.

Source: (PIVETA et al., 2018).

After excluding the terms *Pricing*, *Market*, *Price* and *Payments* (which were part of the initial search), we identified the most frequently words (Table 4). When ranked by m-index in descending order, the most significant terms for future research include Costs, System, Model, Impact, Performance, Optimization, Information, and Management. Depending on the research's focus, different approaches can be explored to address the following questions:

1). What is the impact of the costs associated with financial transactions in each payment method?

2). How can pricing models and systems in payment agreements be optimized for the benefit of all stakeholders?

3). What is the influence of technological advancements and payment instruments on financial inclusion, and how can this progress be accelerated?

Table 4. Application of the m-index in the words with the highest level of occurrence

Words	Occurrence	Publication	Citation	h-Index	Years (1990-2021)	M
Pricing	11	398	6.331	41	32	1,28
Market	51	398	6.331	41	32	1,28
Price	44	398	6.331	41	32	1,28
Payments	23	398	6.331	41	32	1,28
Costs	39	203	3.737	33	32	1,03
System	24	148	1.696	25	32	0,78
Model	31	167	2.083	21	32	0,66
Impact	19	82	1.099	18	32	0,56
Performance	14	60	1.342	17	32	0,53
Optimization	10	51	1.193	16	32	0,50
Information	15	74	1.204	16	32	0,50
Management	15	68	1.138	16	32	0,50

Source: Prepared by the authors based on data from Scopus and Web of Science, 2021.

5. Conclusions

This paper aimed to present a bibliometric review of the literature related to pricing and means of payment, with a specific focus on understanding the global scenario of publications and identifying key research opportunities.

The analysis of articles from Scopus and Web of Science databases, spanning the period from 1990 to 2021, has yielded three major contributions to the field of payment methods research. First, it offers a comprehensive overview of the existing literature on the subject, highlighting the intricate relationships and processes involved in card-based payments. Second, it highlights the significant expansion of research related to means of payment and pricing, along with the underlying factors driving this growth. Finally, it reveals that there is a gap in the literature, articles that comprehensively address the interconnection between the payments market, means of payment and pricing, as many works tend to examine these concepts in isolation.

The findings pointed the urgent need for future discussions and research in this field, especially considering ongoing changes and transformations in the payments market. Understanding the implications of these developments for businesses and consumers is an important aspect. In terms of theoretical implications, it is observed that the use of terms such as *payments market*, *method of payment*, and *pricing* is on the rise in the Web of Science database, while the trend in the Scopus database is more irregular. Additionally, although a considerable number of publications fell within the realms of business, economics, and social sciences, this category represents only 35% of the sample. This highlights the importance of researchers in these domains evaluating the consequences of advancements in payment methods on markets, companies, society, and the overall economy.

In summary, the global scenario of publications in this research field has exhibited substantial growth in recent years, with most research fitting under the categories of business, economics, and social science. Key countries contributing to co-authorships include the United States, China, England, Iran, and Canada. A noticeable trend is the linear growth in the volume of articles related to pricing and means of payment. When studies are categorized by keywords into clusters, it's possible to observe four main clusters: the first focuses on costs, competition, and trade; another centers on pricing, markets, management, and performance; the third cluster is associated with health-related research; and, finally, the fourth cluster is associated with the energy market. Among the highly cited papers, those authored by Borenstein et al. (2002), El-Khattam et al. (2004), Spangenberg and Settele (2010), and Vendrell-Herrero et al. (2017) cover a wide range of research domains, with a primary emphasis on energy distributor pricing, environmental factors, and financial management, especially in the context of mergers and acquisitions. The most frequently cited papers on the topic of pricing and means of payment are those authored by Rhodes-Kropf et al. (2005) and Borenstein et al. (2002). One investigates valuation errors impacting corporate mergers, while the other introduces a method for analyzing wholesale electricity payments.

This study has identified important research papers, highlighted the geographical distribution of research, and identified important research gaps. The most influential papers in this field cover a wide range of areas, showing the need for more focused exploration of the economic implication of payment methods and pricing. Consequently, it is important to explore the connection between the payment market, payment methods, and economic development within the context of developing economies. This study also identified a significant research gap related to the impact of electronic payment methods on financial inclusion, shedding light on an area ripe for exploration.

This paper presents some limitations regarding its scope. It focuses exclusively on articles containing specific keywords, and the databases used had a limited number of publications. Therefore, a recommendation for future research on this topic, considering databases with a more extensive collection of articles from various the countries may be recommended.

Funding

References

ABECS. (2018). *Mercado de Meios de Pagamento: Guia Prático*. Retrieved from https://api.abecs.org.br/wp-content/uploads/2019/11/Cartilha-da-Abecs-sobre-o-Mercado-de-Meios-de-Paga mento.pdf

Alexandrova-Kabadjova, B., Barahona, I., & Juarez, A. (2019). The overlapping network of the payment cards market: The case of Mexico. *2018 10th Computer Science and Electronic Engineering Conference, CEEC 2018 - Proceedings*, 66-70. https://doi.org/10.1109/CEEC.2018.8674181

Bacen. (2021). *Instrumentos de Pagamento (Dados Estatísticos)*. Retrieved from https://www.bcb.gov.br/estatisticas/spbadendos

Banks, M. G. (2006). An extension of the Hirsch Index: Indexing scientific topics and compounds. *Scientometrics*, *69*(1), 161-168. https://doi.org/10.1007/s11192-006-0146-5

Barboza, M. M., Sousa, W. D. de, Nascimento, J. C. H. B. do, Bernardes, J. R., & Santos, J. S. dos. (2016). O Perfil Da Pesquisa Bibliométrica Publicada Nas 19 Edições Do Congresso Brasileiro De Custos. *ABCustos*, *10*(2). https://doi.org/10.47179/abcustos.v10i2.336

Borenstein, S., Bushnell, J. B. J. B., & Wolak, F. A. (2002). Measuring market inefficiencies in California's restructured wholesale electricity market. *American Economic Review*, *92*(5), 1376-1405. https://doi.org/10.1257/000282802762024557

Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2020). The Global Findex Database 2017: Measuring Financial Inclusion and Opportunities to Expand Access to and Use of Financial Services. *The World Bank Economic Review*, *34*(Supplement_1), S2-S8. https://doi.org/10.1093/wber/lhz013

Dzienziol, J., Eberhardt, M., Renz, A., & Schackmann, R. (2002). Multi-channel pricing for financial services. *Proceedings of the Annual Hawaii International Conference on System Sciences*, *2002-Janua*(c), 10. https://doi.org/10.1109/HICSS.2002.994175

El-Khattam, W., Bhattacharya, K., Hegazy, Y., & Salama, M. M. A. (2004). Optimal investment planning for distributed generation in a competitive electricity market. *IEEE Transactions on Power Systems*, *19*(3), 1674-1684. https://doi.org/10.1109/TPWRS.2004.831699

Furini, I. (2020). Mercado de meios de pagamento no Brasil: visão história e tendências globais. *Faculdade de Ciências Econômicas, 21*(1).

Hang, Dr. N. T., Huy, D. T. N., Hien, D. T., & Nam, V. Q. (2021). IOT Impacts and Digital Transformation at Listed Vietnam Banks. *Webology*, *18*(Special Issue 04), 773-784. https://doi.org/10.14704/WEB/V18SI04/WEB18164

Harzing, A. W., & Alakangas, S. (2016). Google Scholar, Scopus and the Web of Science: a longitudinal and cross-disciplinary comparison. *Scientometrics*, *106*(2), 787-804. https://doi.org/10.1007/s11192-015-1798-9

Hirsch, J. E. (2005). An index to quantify an individual's scientific research output. *Proceedings of the National Academy of Sciences of the United States of America*, *102*(46), 16569-16572. https://doi.org/10.1073/pnas.0507655102

Jugend, D., Fiorini, P. D. C., Armellini, F., & Ferrari, A. G. (2020). Public support for innovation: A systematic review of the literature and implications for open innovation. *Technological Forecasting and Social Change*, *156*(December 2019), 119985. https://doi.org/10.1016/j.techfore.2020.119985

Larghi, N. (2020). *Número de fintechs no Brasil cresceu 28% no último ano, maioria é de pagamentos*. Retrieved from https://valorinveste.globo.com/objetivo/empreenda-se/noticia/2020/08/25/numero-de-fintechs-no-brasil-cresceu-28percent-no-ultimo-ano-maioria-e-de-pagamentos.ghtml

Lopez-Lezama, J. M., Padilha-Feltrin, A., Contreras, J., & Muñoz, J. I. (2011). Optimal contract pricing of distributed generation in distribution networks. *IEEE Transactions on Power Systems*, *26*(1), 128-136. https://doi.org/10.1109/TPWRS.2010.2048132

Luh, P. B., Blankson, W. E., Chen, Y., Yan, J. H., Stern, G. A., Chang, S. C., & Zhao, F. (2006). Payment cost minimization auction for deregulated electricity markets using surrogate optimization. *IEEE Transactions on Power Systems*, *21*(2), 568-578. https://doi.org/10.1109/TPWRS.2006.873104

Nubank, R. (2021). *O que é fintech e por que esse termo ficou tão popular?* Retrieved from https://blog.nubank.com.br/fintech-o-que-e/

Okubo, Y. (1997). Bibliometric Indicators and Analysis of Research Systems: Methods and Examples. *OECD Science, Technology and Industry Working Papers*. https://doi.org/10.1787/208277770603

Oviedo-Haito, R. J., Jiménez, J., Cardoso, F. F., & Pellicer, E. (2014). Survival Factors for Subcontractors in Economic Downturns. *Journal of Construction Engineering and Management*, *140*(3), 04013056. https://doi.org/10.1061/(asce)co.1943-7862.0000811

Perez, A., & Brusch, C. (2018). *A Indústria de Meios de Pagamento no Brasil: Movimentos recentes*.

Piveta, M. N., Scherer, F. L., Carpes, A. D. M., Trindade, N. R., Rizzatti, A. B., & Dos Santos, M. B. (2018). A contribuição da visão baseada em recursos para o estudo da internacionalização: uma análise bibliométrica da produção científica entre os anos de 2007 e 2016. *Internext*, *13*(2), 43. https://doi.org/10.18568/1980-4865.13243-58

Pritchard, A. (1969). Statistical bibliography or bibliometrics? *Journal of Documentation*, *24*(4), 348-349.

Raj L., V., S., A., & K., A. (2021). Role of perceived countries' advantages of cashless economy in behavioral intentions of using cashless transactions: An empirical analysis. *Journal of Indian Business Research*, *13*(3), 413-433. https://doi.org/10.1108/JIBR-06-2020-0186

Rhodes-Kropf, M., Robinson, D. T. D. T., & Viswanathan, S. (2005). Valuation waves and merger activity: The empirical evidence. *Journal of Financial Economics*, *77*(3), 561-603. https://doi.org/10.1016/j.jfineco.2004.06.015

Sancho, R. (2002). *Indicadores bibliometricos utilizados en la evaluacion de la ciencia y la tecnologia. Revision bibliografica*.

Santos, F. R., & Pereira, C. da S. (2019). Do Escambo Ao Pagamento Por Meio Eletrônico: Análise Do Mercado De Cartões No Brasil. *Revista Geografia Em Atos*, *3*(10), 187-208. https://doi.org/10.35416/geoatos.v3i10.6079

Souza, C. D., & Faria, I. L. (2011). Indicadores bibliométricos de produção científica: Contribuições para políticas públicas na Citricultura Brasileira. *Simpósio Nacional de Tecnologia e Sociedade*.

Spangenberg, J. H., & Settele, J. (2010). Precisely incorrect? Monetising the value of ecosystem services. *Ecological Complexity*, *7*(3), 327-337. https://doi.org/10.1016/j.ecocom.2010.04.007

Sreenu, N. (2020). Cashless Payment Policy and Its Effects on Economic Growth of India. *ACM Transactions on Management Information Systems*, *11*(3), 1-10. https://doi.org/10.1145/3391402

Vazquez, C., Hallack, M., & Vazquez, M. (2017). Price computation in electricity auctions with complex rules: An analysis of investment signals. *Energy Policy*, *105*, 550-561. https://doi.org/10.1016/j.enpol.2017.02.003

Vendrell-Herrero, F., Bustinza, O. F. O. F., Parry, G., & Georgantzis, N. (2017). Servitization, digitization and supply chain interdependency. *Industrial Marketing Management*, *60*, 69-81. https://doi.org/10.1016/j.indmarman.2016.06.013

Videira, R., Macedo, C., Holzheim, L., Boar, L., & Ramos, M. (2016). Setor de Cartões de Crédito. *ESPM, 1*(1), 1-54.

Vouga, G., & Amatucci, M. (2015). O que é bibliometria? Uma introdução ao Fórum. *Revista Eletrônica de Negócios Internacionais*, *10*, 1-5. https://doi.org/10.18568/1980-4865.1021-5

Watanabe, M. D. B., & Ortega, E. (2011). Ecosystem services and biogeochemical cycles on a global scale: Valuation of water, carbon and nitrogen processes. *Environmental Science and Policy*, *14*(6), 594-604. https://doi.org/10.1016/j.envsci.2011.05.013

Welte, A., & Molnar, J. (2021). The market for acquiring card payments from small and medium-sized Canadian merchants. *Business Economics*, *0123456789*. https://doi.org/10.1057/s11369-021-00213-8

Wright, J. (2003). Optimal card payment systems. *European Economic Review*, *47*(4), 587-612. https://doi.org/10.1016/S0014-2921(02)00305-7

Zamaslo, O., Kovalenko, V., & Lozynska, O. (2021). Digital Transformation Level Indicators of Banks. *Baltic Journal of Economic Studies*, *7*(2), 77-82. https://doi.org/10.30525/2256-0742/2021-7-2-77-82

Zandi, M., Koropeckyj, S., Singh, V., & Matsiras, P. (2016). *The Impact of Electronic Payments on Economic Growth*. Retrieved from https://usa.visa.com/dam/VCOM/download/visa-everywhere/global-impact/impact-of-electronic-payments-on-economic-growth.pdf

Copyrights