

# Integrative Review of International Publications about Open Banking

Vinicius Dezem<sup>1</sup>, Renard Pereira Martins<sup>2</sup>, Marcelo Macedo<sup>1</sup>, Marlise There Dias<sup>1</sup>,  
Débora Cardoso da Silva<sup>1</sup>

<sup>1</sup>Programa de Pós-Graduação em Engenharia e Gestão do Conhecimento, Universidade Federal de Santa Catarina, Florianópolis, Brasil

<sup>2</sup>Programa de Pos-Graduação em Administração, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brasil

Email: [viniciusdezem1@gmail.com](mailto:viniciusdezem1@gmail.com), [renardmartins@gmail.com](mailto:renardmartins@gmail.com), [marcelo5369@gmail.com](mailto:marcelo5369@gmail.com), [marlise.dias@ufsc.br](mailto:marlise.dias@ufsc.br), [debora.cardosos@hotmail.com](mailto:debora.cardosos@hotmail.com)

**How to cite this paper:** Dezem, V., Martins, R. P., Macedo, M., Dias, M. T., & da Silva, D. C. (2023). Integrative Review of International Publications about Open Banking. *Modern Economy*, 14, 551-568.

<https://doi.org/10.4236/me.2023.145030>

**Received:** March 30, 2023

**Accepted:** May 21, 2023

**Published:** May 24, 2023

Copyright © 2023 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

Open Banking is an emerging and relevant topic in the banking industry that has been explored worldwide. This refers to an initiative aimed at promoting the integration of banking systems through an open platform, allowing different financial institutions to share their clients' data and services in a secure and standardized manner. Given the relevance of the subject, there is a need to understand scientific publications on the topic and highlight their contributions to the Science of Administration. In this sense, this article aims to conduct an integrative analysis of the literature on Open Banking. This work involved a structured process of selection and integrative analysis based on four databases, which resulted in 425 works. These studies underwent a filtering process, resulting in a portfolio of 26 articles aligned with the subject and representing the current state of the topic from the researcher's perspective. The results indicate that the studies are focused on topics such as system integration, data security, and operational models, mainly related to the initial phases of Open Banking implementation. Additionally, the study highlights the lack and need for studies focused on corporate and business aspects, such as competition strategies, management models, and strategic positioning in this new market.

## Keywords

Open Banking, Integrative Review, Competitiveness

## 1. Introduction

The financial sector has been affected by the global adoption of emerging tech-

nologies and changes in customer preferences. Data sharing is transforming the banking structure, with FinTech companies being established as one of the most significant innovations in the last decade. These companies are reducing costs for consumers, improving service quality and creating a more diversified and sustainable outlook for the sector (Melnychenko et al., 2020). FinTech challenges existing banking routines, transforms traditional businesses, and increases customer expectations for their relationship with financial institutions.

In addition to mobile banking and Internet banking, customers can now interact with financial institutions through intermediary apps, such as financial managers and brokers, allowing them to compare products based on their own requirements and manage their accounts without having to use their bank (Premchand & Choudhry, 2018).

Open Banking is an innovative model for the financial sector that allows customers to securely share their data with other banks and third parties, enabling them to make the best financial decisions, always respecting their individual profiles. However, Open Banking may lead to a decrease in bank profitability, reducing the margin between interest rates on credit and deposits. To maintain their market positions, banks collaborate with non-banking institutions to develop financial technology tools that can optimize individual business processes and improve customer service.

With the emergence of new ideas in finance and technology, banks must evaluate the impact of these changes on their activities. Banks will have to propose superior and more agile offers to their customers in a highly competitive environment while also allowing them to manage their financial affairs effectively. In summary, technological changes and customer preferences are reshaping the financial sector, and banks must adapt to these changes to maintain their competitive positions (Premchand & Choudhry, 2018; Melnychenko et al., 2020).

In the complex and uncertain context of the banking industry's future, this study's central question is how to identify the most relevant characteristics of scientific publications on Open Banking. The main objective of this study is to conduct an integrative literature review of Open Banking.

This objective will be achieved through the following specific objectives: 1) identifying which stages of the Open Banking implementation flow the articles focus on, 2) determining which philosophical approaches are applied by the authors, and 3) examining the existing literature to identify the concepts of Open Banking used.

It is worth noting that the type of review to be carried out is an integrative review. An integrative review is a method that summarizes past empirical or theoretical literature to provide a more comprehensive understanding of a particular phenomenon. This research method aims to trace an analysis of the knowledge already built in previous research on a particular topic and enables the synthesis of various studies already published, allowing the generation of new knowledge based on the results presented by previous research (Botelho et al., 2011; Broome, 2006).

Given the lack of studies on the topic, the potential of this work is relevant due to its scientific and practical contribution, as it aims to contextualize methodologies used in the banking sector that can be incorporated into organizational studies and strategic decisions in the industry, particularly in the search for the state of the art of this specific topic.

In addition to this introductory section, this study presents a theoretical framework for Open Banking, as well as the methodology, results, and conclusions.

## 2. Theoretical Foundation of Open Banking

The regulation of the payments sector began with the publication of the Electronic Money Directive, which was later replaced by Electronic Money Directive II in 2009. In 2007, the Payment Services Directive (PSD) was adopted to restructure and harmonize the payments market in the European Union. These regulations have created new entities, Electronic Money Institutions, and Payment Institutions, which, after obtaining appropriate licenses from supervisory authorities, have the right to provide payment services together with traditionally functioning credit institutions, such as banks (Mersch, 2020).

On October 8, 2015, the European Parliament adopted a new directive that would replace PSD starting January 13, 2018, but only entered into full force on September 14, 2019. The Revised Payment Services Directive 2 (PSD2) sets a framework for innovation in retail payments and establishes rules for third-party payment service providers. PSD2 aims to enhance consumer protection and increase security for payment services (Mersch, 2020). Additionally, the PSD2 included, in the previously binding list of services that can be provided by credit and payment institutions, payment initiation services and account information services (Stranieri et al., 2021).

These services represent a challenge to the traditional banking model because they allow external entities, called third-party providers, to obtain information and initiate payments for the consumer payment accounts operated by these banks. Therefore, the PSD2 Directive represents the regulatory establishment of a new business model, which is called “Open Banking”. This new business model provides an incentive to accelerate innovation in the payment services market and to create new opportunities for startups and FinTech companies.

Open Banking has created opportunities for banks to serve their customers according to each individual’s profile, which increases competition among banks and service providers and helps customers obtain better services at a reduced cost. Open Banking also offers customers ease of choice, allowing them to switch between service providers and bringing a new perspective on how customers obtain banking services from banks or any other financial service provider. Thus, customers are the central focus of the Open Banking concept, and data sharing and banking integration aim to facilitate access to bank records by third parties, such as payment service providers, FinTech companies, and other banks (Muk-

hopadhyay & Ghosh, 2021).

This model is expected to break down barriers to traditional financial services and encourage new players to offer innovative services that will change the relationship between customers and banks. Previously, the relationship between customers and banks was based on a unilateral approach, where banks focused on products rather than their customers. However, with the advent of PSD2, banks were motivated to share their databases with other institutions to create a new competitive environment. With these data and increased market competitiveness, Open Banking paves the way for the development of products and services that can help customers and companies in their businesses (Ünsal et al., 2020).

From the perspective of benefits to companies, Xu et al. (2020) describe Open Banking as a system that allows users, including small businesses, to share their data securely through a platform that personalizes financial products and employs open banking rules. Companies will be able to develop new applications, and banks will obtain concessions of data from different sources, which benefits the design and sale of their products (Ünsal et al., 2020). It should be emphasized that such data management from multiple sources requires high technological capacity and poses a challenge for institutions.

There are several difficulties in designing an open banking system. Firstly, mutual authentication is difficult to manage transparently. Because the essential resource in Open Banking is the right to access user data and must be carefully considered, the invocation of confidential data must be registered in an organized manner. Secondly, the data source allows users to audit and track data in case of misconduct or system attacks. When this information is not available, large banks have a significant advantage, as they have access to low-cost innovations. It is important to ensure transparency in data provenance to avoid market imbalances and to protect user privacy (Xu et al., 2020).

With this challenging conception, Xu et al. (2020) suggest three main points to be managed with the advent of Open Banking:

- Business model: For commercial banks, Open Banking breaks the traditional profit model. Data transparency allows banks to have public access to data. Although they can profit from the new model, it is difficult to define an incentive regulation that meets all the bank requirements.
- Data security: The traditional banking system is closed, and users' confidential data circulate internally among the banks. With the popularization of Open Banking, third-party institutions may visit users' private data for commercial purposes.
- Technical risk: Owing to data sharing between multiple institutions, confidential information is more likely to be hacked or visited without authorization. Frequent data access may also result in data interception.

In this study, Open Banking is understood as a new market dynamic that allows customers of financial products and services to share their information among

different institutions and move their bank accounts from different platforms, not just through the bank's application or website. The main objective is to bring innovation to the financial system, promote competition, and improve the offer of financial products and services to consumers (BACEN, 2021).

### 3. Data Collection Procedures—Integrative Review

According to Botelho et al. (2011) and Broome (2006), the integrative review process requires explicit and well-structured stages, as described below:

#### **1st stage: Identification of the topic and selection of the research question**

The initial stage establishes a theoretical and practical reasoning about the definitions that the researchers intend for the study, establishing the phenomenon to be analyzed (problem) and the research question (Mendes et al., 2008). For this study, the following research question was established: What are the most relevant characteristics of scientific publications on Open Banking?

Following the definition of the research question, the keywords representing the topic, databases, and search strategy were detailed (with this strategy being considered a technique or a set of rules to make possible the encounter between a formulated question and the information stored in a database) (Lopes, 2002).

#### **2nd stage: Establishment of inclusion and exclusion criteria**

After the initial definitions of the topic and research problem, the search for academic studies related to the research topic began in the databases. Inclusion and exclusion criteria must be identified in the study (being clear and objective) and as the researcher builds knowledge, their perception can evolve and facilitate the development of the study (Botelho et al., 2011).

Open Banking, a significant topic, has yet to be thoroughly examined in academic research, likely due to its novelty. Given the relatively nascent stage of this subject, it is crucial to seek a comprehensive understanding to maximize the potential findings. The present study employed four databases, selected based on their academic prominence and anticipated yield of relevant results. Simultaneous usage of these databases was employed, as the research was conducted on a single day.

The literature search was conducted using only the keywords "Open Banking" due to their broad scope and potential to yield the most comprehensive results. Additional keywords were not included as their use could have resulted in a reduced number of results and thus potentially impacted the overall findings.

It is important to note that language and date filters were not employed during the search process. Furthermore, only academic papers were considered, as the research required a scientific review.

Following the search definitions, the search string "Open Banking" was applied in each database, aiming to validate it and search for possible new terms associated with the researcher's interests. Table 1 presents the choices of the

**Table 1.** Search process choices.

String Research "Open Banking"	
Scopus	56 results
Web of Science	21 results
Science Direct	85 results
Emerald	263 results
Total	425

Source: Authors of the research (2022).

search process.

Open Banking, a significant topic, has yet to be thoroughly examined in academic research, likely due to its novelty, it started in 2018. Given the relatively nascent stage of this subject, it is crucial to seek a comprehensive understanding to maximize the potential findings. The present study employed four databases, selected based on their academic prominence and anticipated yield of relevant results. Simultaneous usage of these databases was employed, as the research was conducted in a single month, November 2022.

Ensuring that all relevant papers have been identified can be a challenging task, especially as the field of study continues to grow and attract new research. However, by utilizing four comprehensive databases and employing a single keyword, the likelihood of missing important papers is minimized.

Not obtaining new inputs for the search process, a database of raw articles was generated, which represented the scientific status quo of the topic based on the adopted search criteria, and the identification of pre-selected studies was initiated. Here, a low number of articles on the topic can be observed because simple but high-amplitude keywords were used.

### **3rd stage: Identification of the pre-selected and selected studies**

The database of raw articles was exported to Endnote software, and duplicate articles were excluded. Using these data, the titles were read to establish the first qualitative selection criterion. If the title, abstract, and keywords were not sufficient to define the selection, full publication of the article was sought.

The filtering process considered the following selection criteria:

1) Duplicate articles were excluded from the total database, leaving 310 articles.

2) The titles, abstracts, and keywords were read to identify articles that offered greater adherence to the theme of "Open Banking" from a banking perspective. The relevance of the study objective and results indicated in the abstract were also verified, leaving 119 articles.

3) Finally, the selected articles were read in their entirety, seeking content that represented advances in the field of study.

After the completion of this procedure, a table was created with the selected studies for integrative review. In this study, 26 articles aligned with the theme

and representing the state of the art of Open Banking were selected.

#### 4th stage: Categorization of the selected studies

This stage allows for the categorization and organization of information extracted from publications. The information collected from the articles should include data such as sample size, number of subjects, methodology, measurement of variables, analysis methods, and the theory or concepts used. To facilitate this procedure, the researcher used instruments that allowed for the segregation and categorization of content, including a synthesis matrix (Klopper et al., 2007).

Klopper et al.'s (2007) synthesis matrix contains verbal information, connotations, summaries, and notes, and broadly presents information on aspects of the investigation, allowing the researcher to provide an overview of the data related to the performance of certain items. The matrix was consolidated as a tool for interpreting and constructing integrative review writing. To provide greater transparency to this understanding, **Table 2** presents a model of a synthesis matrix that will be used in this work.

This step is similar to the data analysis step and is performed in traditional scientific research. To analyze the information collected from scientific articles, it is necessary for the researcher to create analytical categories that allow for the ordering and summarization of each study. This categorization is done descriptively, where the researcher indicates the most relevant data for the study (Broome, 2006).

Such data can be categorized in different ways, one of which is the listing of the variables. Valid studies that approached the research topic and discarded

**Table 2.** Example of used synthesis matrix.

Subject	Title 1	Title 2	Title 3
Customer Perspective	Open Banking and inclusive growth in India	An empirical study on the intention to use Open Banking in India	Open Banking and PSD2: The promise of transforming banking by “empowering customers”
Systems Integration	Innovation in Open Banking: Lessons from the recent wave of payment institutions that have been authorized to provide payment initiation and account information services	Banking integration in ASEAN-6: An empirical investigation	Blockchain-based framework for managing customer consent in Open Banking
Data and security	PPM: A Provenance-Provided Data Sharing Model for Open Banking via blockchain	The security of access to accounts under the PSD2	Open Banking and electronic health records

Source: Authors of the research (2022).

those that did not address the guiding question defined by the researcher. With this list of variables, the researcher had access to the essence of the articles, allowing for a greater understanding of the topic and a clear visualization of possible research gaps.

#### **5th stage: Analysis and interpretation of results**

These articles underwent brief bibliometric analysis. This bibliometric analysis highlights the most relevant methods, tools, and scientific approaches in this context. Thus, the researcher, guided by the findings, interpreted the data and identified existing knowledge gaps and suggested agendas for future research in the same way as pointed out in the work of [Botelho et al. \(2011\)](#).

#### **6th stage: Presentation of the review and synthesis of knowledge**

This review allows readers to understand the procedures adopted by the researcher to arrive at the definitions presented. And in the same sense, the integrative review allows readers to evaluate the relevance of the procedures employed in the preparation of the review. This review will be presented below, in Section 4—Results.

## **4. Results**

In this section, the main results obtained in the integrative literature review will be presented. **Table 3** shows the list of the 26 articles that compose the Final Bibliographic Portfolio and their respective objectives.

From the detailed description of each article presented in **Table 3**, one can observe a plurality of concerns among the authors when dealing with the Open Banking theme. Many researchers have focused on aspects related to data management and information security. All the studies presented were published in 2019 (some in 2021), which reinforces the novelty of the theme. However, it also highlights the lack of applied studies from a strategic perspective, which would allow researchers and banking segment managers to expand their understanding of differentiation alternatives in highly competitive environments.

One of the factors that exacerbate this deficiency is the stage of Open Banking implementation worldwide. While some countries already share data, and the first impacts on the market are emerging, others are still in the early stages of operational planning. **Figure 1** presents the implementation stages of Open Banking in Brazil, from which it is possible to expand the understanding of the current stage of the studies found.

The first stage involves planning for standardized sharing of data between institutions. Therefore, it is necessary to adopt robust and secure technological tools. Robust tools are needed to support the stable and fast flow of data, whereas secure tools ensure that customer data are protected by effective encryption. As the responsibility for such sharing lies with the institutions, the number of studies with objectives and methods focused on privacy and system operability justifies the need for robust and secure tools. In this sense, the following works stand out: “OBBC: A Blockchain-Based Data Sharing Scheme for Open Banking”, “An Empirical Study on the Intention to Use Open Banking in India”,



**Table 3.** Matrix of synthesis of the final bibliographic portfolio.

Article	Objective
A study of customers' perception of Islamic banking in Oman	Evaluate the customers' perceptions about Islamic banks and the opportunities of Open Banking in Oman.
A conservative approach for online credit scoring.	Present a new credit scoring system to identify loans with low credit risk.
Innovation in Open Banking: Lessons from the recent wave of payment institutions that have been authorized to provide payment initiation and account information services	Analyze the population of companies that have been authorized to provide payment initiation or account information and payment services.
Data sharing and interoperability: Fostering innovation and competition through APIs	This aims to provide an overview of the main initiatives to enable data access throughout the domestic market, and to highlight the crucial role that APIs will play in this scenario.
An extensive formal security analysis of the OpenID Financial-grade API	Develop a precise model, including different profiles for read and write data access, different flows, different types of clients, and different combinations of security features, capturing the complex interactions in a network-based environment.
Open Banking emergent roles risk and opportunities	What are the functions, challenges, and risks that retail banks will undergo through open API initiatives, and how will they change?
Banking integration in ASEAN-6: An empirical investigation	Present measures of open banking and the degree of integration across capital flows.
Towards secure open banking architecture: An evaluation with OWASP	Propose a practical web application system architecture, identifying relevant attacks, analyzing the risk considering the OWASP Top 10 list.
Studying Open Banking platforms with open source code	Explore open source-based Open Banking platforms, software whose source code is publicly available and can be freely modified and distributed.
Federated learning for Open Banking	Discuss the possible challenges for implementing the considered learning in the context of open banking and corresponding resolutions.
Nudging data privacy management of Open Banking based on blockchain	Propose a privacy framework on blockchain consisting of three components: a privacy classification method based on data characteristics, a novel filter-based collaboration, and a data confirmation disclosure scheme for customer strategies.
Industry 4.0 and its implications for the financial sector	Examining the impact of digitization process in the financial sector.
Dominant ideas of financial technologies in digital banking	The aim of the research is to define dominant ideas of financial technologies in the digital banking market.
Designing model for quality services in digital banking	Review the literature presenting the evolution of the banking system in recent decades, functions and requirements for change towards FinTech technology and propose a digital service quality model.
Blockchain-based framework for managing customer consent in Open Banking	To review the relationship between blockchain and Open Banking.

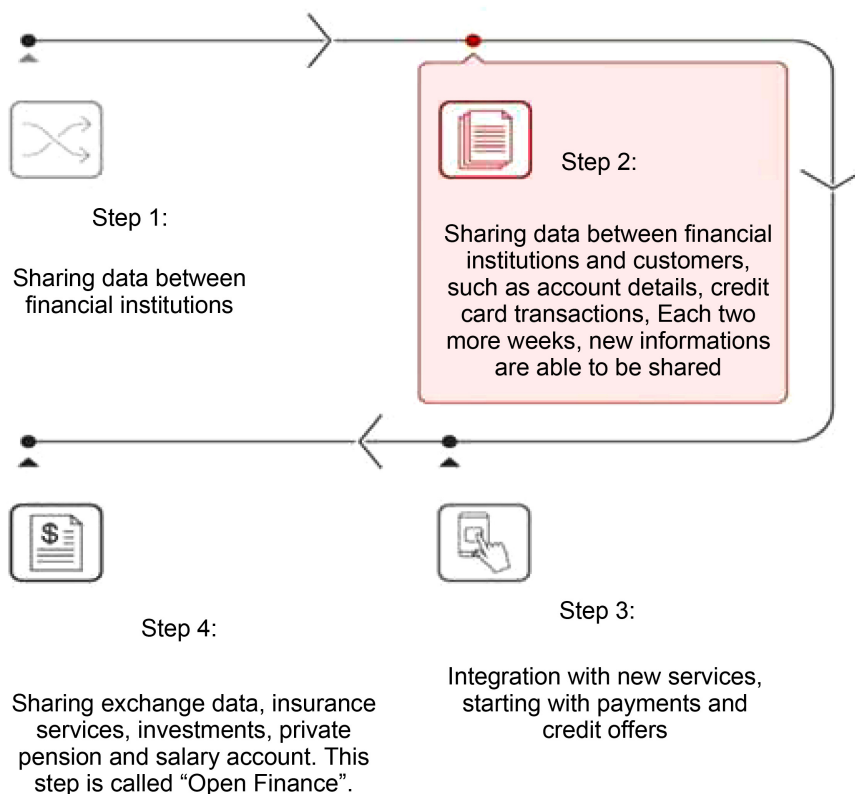
**Continued**

The impact of Payment Services Directive 2 on the PayTech sector development in Europe	To determine the impact of PSD2 on the number of new PayTech companies established and explain the factors driving the distribution of PSD2-licensed entities in EU countries.
Open Banking and APIs for transformation in banking ( Proceedings of the 2018 International Conference on Communication, Computing and Internet of Things)	This article explains why open API is the foundation of open banking, demonstrating that value creation using APIs is a building block of open banking and the challenges faced by banks in implementing the banking sector.
Open Banking and inclusive growth in India	This article explores how open banking system facilitates financial inclusion and consequently leads to economic development of a nation.
An empirical study on the intention to use Open Banking in India	Identify the intended usage of open banking system among customers in an emerging economy such as India.
Open Banking and PSD2: The promise of transforming banking by “empowering customers”	To illustrate how a customer-centric approach could potentially provide better regulatory policy decisions.
Open Banking and electronic health records	Compare Open Banking with electronic health models and medical records to illustrate that healthcare will be enhanced by third-party providers accessing patient data.
Building a FinTech ecosystem: Design and development of a FinTech API gateway	Discuss the design and development of an API Gateway FinTech in terms of business needs and technical challenges.
Blockchain-based data privacy management with Nudge theory in Open Banking.	Propose a new management framework based on blockchain technology for the financial sector.
The security of access to accounts under the PSD2	Identify to what extent access to payment initiation service providers and account information service providers’ accounts balance the development of the payment services market.
PPM: A Provenance-Provided Data Sharing Model for Open Banking via blockchain	Propose a Provenance-Provided Data Sharing Model (PPM) via blockchain to meet open banking requirements.
OBBC: A blockchain-based data sharing scheme for Open Banking	Conceptualize a blockchain-based data sharing scheme for Open Banking called OBBC, where API information can be stored on a blockchain.

Source: Authors of the research (2022).

“Blockchain-Based Framework for Managing Customer Consent in Open Banking”, “Dominant ideas of financial technologies in digital banking”, “Studying Open Banking platforms with open source code”, and “Towards Secure Open Banking Architecture: An Evaluation with OWASP”.

Continuing with the implementation process model, the second stage allows the exchange of information between customers and institutions. Given the relevance of this stage, it is already possible for customers to obtain personalized solutions based on their profile and for institutions to reduce the risk of their operations by providing more information about their customers. Articles such as “Building a FinTech ecosystem: Design and development of a FinTech API gateway”, “Blockchain-based data privacy management with Nudge Theory in Open Banking”, and “A Conservative Approach for Online Credit Scoring”



**Figure 1.** Stages of open banking in Brazil. Source: BACEN (2021).

direct research towards proposing models of action based on this stage of the implementation process. The first refers to the need to adapt products based on inputs received from customers, while the latter two structure credit risk assessment models with attractive accuracy indices in relation to the best risk-return.

Phase 3, still being developed in Brazil, increases the complexity of transactions and, in addition to integrating information, allows for the use of direct payment systems with relevance to Pix, an operation that instantly sends values directly between customers, 24 hours a day, 7 days a week. In Europe, with the advancement of DSP2, this stage has surpassed, thus justifying researchers' concern with payment systems, as found in the following articles: "A Conservative Approach for Online Credit Scoring"; "Open Banking: emergent roles, risk, and opportunities"; "The Impact of Payment Services Directive 2 on PayTech Sector Development in Europe"; "Building a FinTech Ecosystem: Design and Development of a FinTech API Gateway"; "The Security of Access to Accounts under PSD2"; and "PPM: A Provenance-Provided Data Sharing Model for Open Banking via Blockchain".

The last stage of Open Banking implementation promotes the perspective of "Open Finance" open finance, in which all financial products and services can be integrated (whether they are insurance, foreign exchange operations, investments, or credit cards). From the analysis of the selected articles, the lack of publications that provide contributions related to this stage of implementation is

evident as it represents the highest level of maturity to be achieved. In this flow, various factors can be explored, such as the study “Open Banking and inclusive growth in India”, which aims to explore how open banking facilitates financial inclusion and, consequently, leads to the economic development of a nation. Other factors, such as customer adherence to digital technologies, banking, micro-finance, and competitive strategies for financial institutions, could also be explored, but studies with these perspectives have not yet been conducted.

#### 4.1. Open Banking Concepts Adopted in the Articles

Open Banking is a standardized financial data sharing system. In a single integrated and secure platform, different financial institutions have access to customer data to offer personalized and more advantageous products and services for each case. The essence will enable the creation of personalized products and services with attractive prices for the customer’s needs, based on consumption, income and financial transactions data.

Of the 26 articles analyzed in the Bibliographic Portfolio, only 8 clearly positioned which concept of Open Banking was adopted, according to **Table 4**.

Some authors take a perspective focused on information technology and the changes it will bring to the banking system. From this viewpoint, Open Banking can be considered as a set of protocols that define how software components communicate with each other. This enables one company to easily access the data collected by another company. APIs are defined to strengthen the interoperability between different participants and facilitate the exchange of data flows or datasets between account holders and institutions (Borgogno & Colangelo, 2019).

Stranieri et al. (2021) believe that it is this exchange that will emerge as the main differentiator for financial services, attributing innovation not only in the technological area, but also in the legislation governing the market. Consequently, a globally coordinated process has emerged for changes that benefit consumers and other stakeholders. The result is an ecosystem that encourages new participants to continuously develop personalized, low-cost, and convenient products and services for their customers (Stranieri et al., 2021). In addition to the convenience and possibility of cost reduction in operations, Wolters and Jacobs (2019) reinforce that an Open Banking platform guarantees security in data sharing and operation execution.

Open Banking aims to provide a platform that secures personal financial data shareable with security. More specifically, third-party service providers employ open banking rules and secure standards so that companies can instantly develop new proposals to their customers. These applications aim to potentially obtain data from different sources, which would benefit the design and sale of their products (Xu et al., 2020).

According to Kellezi et al. (2019), these products may be marketed by third parties, provided they are properly enabled to operate. In other words,

**Table 4.** Articles that present Open Banking concepts.

Concept	Authors
Open Banking emerges from protocols that define how software components communicate with each other. APIs are crucial in this process, enabling one company to easily access data collected by another company and are defined to strengthen interoperability among different participants and facilitate the exchange of data flows.	Borgogno and Colangelo (2019)
PSD2 gives customers ownership of their data, and Open Banking allows third-party providers and bank API developers to emerge, thereby promoting innovative solutions for the financial sector.	Kellezi et al. (2019)
Open Banking can maximize customer benefits through the sharing of financial data, but it also poses many challenges and difficulties, such as differences in data management between banks, financial companies, and individuals. Concerns regarding privacy prevent users from sharing and exchanging data with interested parties.	Ma et al. (2018)
The Open Banking model provides an example of technological and legislative innovation in the financial services sector, representing a globally coordinated process of change that benefits consumers and other stakeholders.	Stranieri et al. (2021)
PSD2 prioritizes the development of the payment services market based on data sharing, considering strict regulations on bank account security and user privacy.	Wolters and Jacobs (2019)
Open Banking is a system that allows users to share data securely between different banks, providing a platform that can make personal financial data accessible to multiple institutions while maintaining security. Specifically, third-party server providers use open banking rules and unique standards.	Xu et al. (2020)
Open Banking is a platform cooperation model that uses application programming interfaces (APIs) to share data between financial institutions and third-party providers to enhance customer experience. In addition to business challenges such as regulations, the biggest problems are data security and privacy protection. Ensuring data security and privacy in the process of sharing data between banks and third parties is the main challenge for Open Banking.	Zhang et al. (2020)

Source: Authors of the research (2022).

third-party providers with developer access to bank APIs promote a mix of innovative solutions in the financial sector. However, several cybersecurity problems arise from the exposure of bank data to third-party vendors through an API.

Open Banking is a mode of platform cooperation that uses open Applications and Programming Interface (API) technology to perform data sharing between

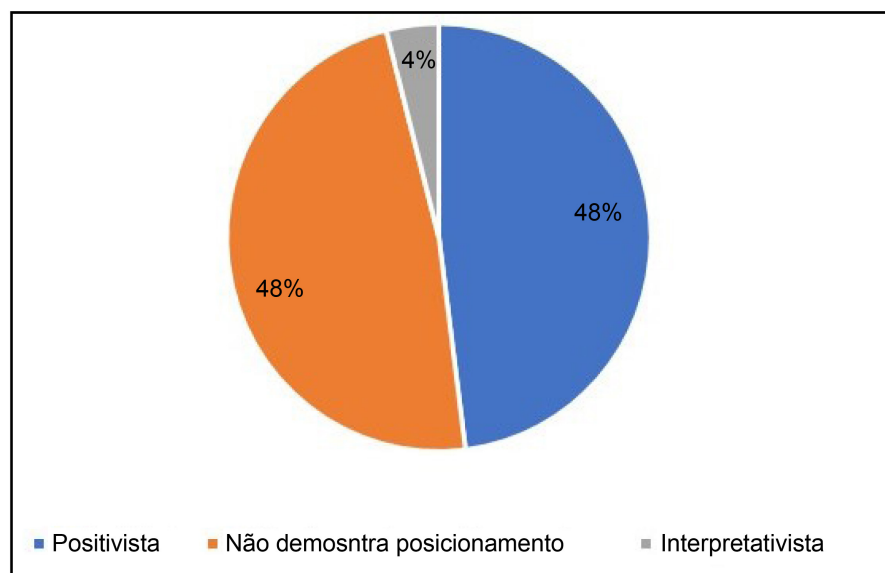
institutions and third-party providers to improve customer experience. Currently, in addition to business challenges such as supervision, another major obstacle is the security and protection of data privacy (Zhang et al., 2020).

Countries with independent financial institutions are moving towards Open Banking, which can maximize customer benefits through financial data sharing. According to Ma et al. (2018), Open Banking faces many challenges and difficulties, such as differences in data management among banks, financial companies, and individuals. Thus, the possibility of new solutions for the supply and contracting of financial products and services, which are more integrated, personalized, and accessible, is further expanded, always with the consumer at the center of decisions.

#### 4.2. Scientific Paradigm

The first analysis factor in the question of the scientific paradigm used refers to the approach used by the authors in the works. Approaches are worldviews that influence the way researchers perceive the research context and make them value certain aspects over others. The adoption of a certain approach thus ends up interfering with the entire research work, and consequently with its results (Marafon et al., 2012).

From the works presented, it is clear that the majority use a positivist scientific approach, that is, it is influenced and guided by rationalism, where the researcher selects the model that will be used for the evaluation to be developed, considering the existing literature on the subject (science) and/or the knowledge of specialists (yours or others) as the main sources of the variables that compose the study. **Graph 1** presents the classification of articles according to the adopted paradigms.



**Graph 1.** Classification of articles according to the scientific paradigm adopted. Source: Authors of the research (2022).

Only one article has established an interpretive perspective. By adopting interpretivism, we seek to support the construction of a model of value judgment based on work hypotheses. Since the social world has a little explicit ontological condition, the social reality does not exist in a concrete way and it is about the results of subjective experiences of the actors, building a society understood by the bias of the participant of the action, instead of the bias of the observer (Morgan, 1980).

## 5. Conclusion

With Open Banking, financial products and services are expected to be delivered to consumers at greater speed, convenience, and security. In addition to the possibility of integrating the provision of financial services into a consumer's digital journey, conditions are provided for the emergence of business models that place customers at the center. These new models, which may involve price, product, and service comparators, enable consumers to have greater visibility and control over their financial lives, as well as access to personalized products and financial conditions that are more advantageous and suitable to their needs, interests, and goals.

In the context of a focus on consumers and the benefits that can be obtained with the new concept of open finance, it is necessary to have a broad understanding of Open Banking in the world and what scientific publications exist on the subject that can guide researchers and managers involved in this new market dynamic.

The main objective of this study was to conduct an integrative literature review on the topic of "Open Banking". This objective was broken down into three specific objectives: 1) to identify which stages of Open Banking implementation flow the articles focus on, 2) to identify which philosophical approaches are applied by the authors, and 3) to search the existing literature on the concepts of Open Banking.

The 26 articles identified as members of the final Bibliographic Portfolio were selected through a structured process of identification and filtering, considering only the search command "Open Banking" on four relevant databases. Given the novelty of the topic, only 425 studies were found, with at least 95% of the publications after 2019.

From the final Bibliographic Portfolio, the first analysis was conducted to identify the objectives and methods used by the authors and their relation to the stage of Open Banking implementation. It was found that all 26 studies focused on the initial two stages, which correspond to the sharing of data between institutions, where financial institutions make data available in a standardized way. In this phase, information about their customer service channels and products and services, including the rates and fees of each offered item, should be made available. In the next phase, consumers will be able to share their data (registrations, account transactions, information about cards, and credit operations) with

the institutions of their choice.

The article “Open Banking and Inclusive Growth in India” stands out, which proposes exploring the benefits of an open banking system for financial inclusion and, consequently, the economic development of a nation. This objective reinforces the strategic vision of the authors and motivates other researchers to follow similar paths in different contexts.

It should be noted that there is a gap in publications related to strategic factors, such as customer adherence to digital technologies, banking, microfinance, and competitive strategies for financial institutions. These perspectives could be explored; however, no studies were found with this focus, which represents a research opportunity and contribution to the scientific community.

Regarding philosophical approaches, it was found that 48% of the analyzed articles did not present a clear definition of the adopted scientific paradigm, and since they are studies related to technological issues, they did not explore a position on the topic. Another 42% of the studies used a positivist approach, proposing models that could be replicated in different contexts, that is, an optimal solution to a problem that was identified in the market or in the literature. Only one article established an interpretive point of view and, by adopting interpretivism, sought to support the construction of a model of value judgments based on working hypotheses.

This survey of the philosophical approaches used by the authors contributes to the understanding of the theoretical bases that underlie research on the subject. Thus, there is an opportunity to explore strands that consider the social reality and subjective experiences present in this study context.

Eight studies with defined concepts were located based on the identification of concepts adopted by researchers, and eight studies with defined concepts were located. Most of these focus on definitions associated with technology, system integration, security, and data sharing. These concepts are relevant in the analyzed context and contribute to the development of the topic but limit researchers' views on the operational context of Open Banking.

The definition adopted in this study was conceived by the Central Bank of Brazil based on the logic of complete integration and customer focus–Open Finance. More comprehensive than Open Banking, a large part of the new projects of the Central Bank is outside the traditional banking world. There is a part of decentralized finance that will be connected along with Open Banking, remembering that Pix connects to Open Banking, which connects to digital currency. All of this is part of a more digital framework in the future, where these products will navigate transversely with a much lower intermediary cost.

It is crucial to emphasize that no similar research has been conducted as presented in this paper. The authors from this Portfolio, have conducted extensive research on various topics such as technology, system integration, security, and data sharing. This paper makes a significant contribution by presenting novel findings in these areas, which could potentially open up new avenues for further re-



search in the field.

In this scenario, the adoption of interpretive perspectives in the construction of new studies is relevant, especially for their potential contribution in complex environments with multiple actors. Finally, the concept of Open Finance implemented in Brazil will impact the market in a revolutionary way and has not yet been explored in scientific terms. Given the relevance of the market impacts associated with this concept, its analysis through a scientific lens will significantly contribute to the construction and sharing of knowledge.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- BACEN (Banco Central Do Brasil) (2021). *Estabilidade Financeira/Open Banking*. <https://www.bcb.gov.br/estabilidadefinanceira/openbanking>
- Borgogno, O., & Colangelo, G. (2019). Data Sharing and Interoperability: Fostering Innovation and Competition through APIs. *Computer Law & Security Review*, 35, Article ID: 105314. <https://doi.org/10.1016/j.clsr.2019.03.008>
- Botelho, L. L. R., Cunha, C. C. A., & Macedo, M. (2011). O método da revisão integrativa nos estudos organizacionais. *Gestão e Sociedade*, 5, 121-136. <https://doi.org/10.21171/ges.v5i11.1220>
- Broome, M. E. (2006). Integrative Literature Reviews for the Development of Concepts. In B. L. Rodgers, & A. A. Castro (Eds.), *Revisão Sistemática e Meta-Análise*. W.B. Saunders Company.
- Kellezi, D., Boegelund, C., & Meng, W. (2019). Towards Secure Open Banking Architecture: An Evaluation with OWASP. In J. Liu, & X. Huang (Eds.), *Network and System Security. NSS 2019. Lecture Notes in Computer Science* (Vol. 11928, pp. 185-198). Springer. [https://doi.org/10.1007/978-3-030-36938-5\\_11](https://doi.org/10.1007/978-3-030-36938-5_11)
- Klopper, R., Lubbe, S., & Rugbeer, H. (2007). The Matrix Method of Literature Review. *Alternation*, 14, 262-276.
- Lopes, I. L. (2002). Estratégia de busca na recuperação da informação: Revisão da literatura. *Ciência da Informação*, 31, 60-71. <https://doi.org/10.1590/S0100-19652002000200007>
- Ma, S. L. et al. (2018). Nudging Data Privacy Management of Open Banking Based on Blockchain. *2018 15th International Symposium on Pervasive Systems, Algorithms and Networks (I-SPAN)* (pp. 72-79). IEEE. <https://doi.org/10.1109/I-SPAN.2018.00021>
- Marafon, A. D., Ensslin, L., Ensslin, S. R., & Lacerda, R. T. (2012). Revisão sistêmica da literatura sobre avaliação de desempenho na gestão de P&D. *Revista Gestão Industrial*, 8, 1-43. <https://doi.org/10.3895/S1808-04482012000300001>
- Melnychenko, S., Volosovych, S., & Baraniuk, Y. (2020). Dominant Ideas of Financial Technologies in Digital Banking. *Baltic Journal of Economic Studies*, 6, 92-99. <https://doi.org/10.30525/2256-0742/2020-6-1-92-99>
- Mendes, K. D. S., Silveira, R. C. C. P., & Galvão, C. M. (2008). Revisão integrativa: Método de pesquisa para a incorporação de evidências na saúde e na enfermagem. *Texto & Contexto-Enfermagem*, 17, 758-764.

<https://doi.org/10.1590/S0104-07072008000400018>

- Mersch, Y. (2020). *An ECB Digital Currency—A Flight of Fancy?* Speech at the Consensus. In *Consensus 2020 Virtual Conference*.
- Morgan, G. (1980). Paradigms, Metaphors, and Puzzle Solving in Organization Theory. *Administrative Science Quarterly*, 25, 605-622. <https://doi.org/10.2307/2392283>
- Mukhopadhyay, I., & Ghosh, A. (2021). Blockchain-Based Framework for Managing Customer Consent in Open Banking. In M. Chakraborty, M. Singh, V. E. Balas, & I. Mukhopadhyay (Eds.), *The “Essence” of Network Security: An End-to-End Panorama. Lecture Notes in Networks and Systems* (Vol. 163, pp. 77-90). Springer. [https://doi.org/10.1007/978-981-15-9317-8\\_3](https://doi.org/10.1007/978-981-15-9317-8_3)
- Premchand, A., & Choudhry, A. (2018). Open Banking & APIs for Transformation in Banking. *2018 International Conference on Communication, Computing and Internet of Things (IC3IoT)* (pp. 25-29). IEEE. <https://doi.org/10.1109/IC3IoT.2018.8668107>
- Stranieri, A., McInnes, A. N., Hashmi, M., & Sahama, T. (2021). Open Banking and Electronic Health Records. *Proceedings of the 2021 Australasian Computer Science Week Multiconference* (pp. 1-4). Association for Computing Machinery. <https://doi.org/10.1145/3437378.3437397>
- Ünsal, E., Öztekin, B., Çavuş, M., & Özdemir, S. (2020). Building a Fintech Ecosystem: Design and Development of a FinTech API Gateway. *2020 International Symposium on Networks, Computers and Communications (ISNCC)* (pp. 1-5). IEEE. <https://doi.org/10.1109/ISNCC49221.2020.9297273>
- Wolters, P. T. J., & Jacobs, B. P. F. (2019). The Security of Access to Accounts under the PSD2. *Computer Law & Security Review*, 35, 29-41. <https://doi.org/10.1016/j.clsr.2018.10.005>
- Xu, Z. et al. (2020). PPM: A Provenance-Provided Data Sharing Model for Open Banking via Blockchain. *Proceedings of the Australasian Computer Science Week Multiconference* (pp. 1-8). Association for Computing Machinery. <https://doi.org/10.1145/3373017.3373022>
- Zhang, Q., Zhu, J., & Ding, Q. (2020). OBBC: A Blockchain-Based Data Sharing Scheme for Open Banking. In X. Si et al. (Eds.), *CBCC 2019: Blockchain Technology and Application*, (Vol. 1176, pp. 1-16). Springer. [https://doi.org/10.1007/978-981-15-3278-8\\_1](https://doi.org/10.1007/978-981-15-3278-8_1)