A Bibliometric mapping of peer-to-peer lending research based on economic and business perspective

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\textbf{ABSTRACT}

This study aims to conduct a bibliometric analysis on peer-to-peer lending literature published in Scopus indexed journals from an economic and business perspective. The data were processed and analyzed using VOSviewer software. To the best of authors’ knowledge, this is the first paper that conducts a bibliometric analysis of the peer-to-peer lending literature using VOSviewer. The results of study showed the most popular authors, countries, organizations and keywords. Moreover, this study also discovered trending topics from recent publications. A direct benefit of this study is to provide input for stakeholders, businessmen and investors to identify important issues regarding peer-to-peer lending and directions for further researchers.

1. Introduction

In line with the rapid development of banking sectors, many other non-bank financial services are starting to emerge (Gianfrate and Lorenzato, 2018; Oh and Rosenkranz, 2020). One of which is peer-to-peer lending. Peer-to-peer lending, also known as debt-based crowdfunding, is a non-bank financial service provider and legal entity that provides credit facilities to individuals or institutions without involving the intermediation of financial institutions (Chen et al., 2014; Carolan, 2019; Muhammad et al., 2021). Along with the development of financial technology, lending schemes by peer-to-peer lending are currently carried out through a digital platform called the marketplace (Oh and Rosenkranz, 2020).

Based on a report from the Indonesian Financial Service Authority (2021), there are three parties involved in the scheme of peer-to-peer lending: investor or lender, peer-to-peer lending company, and borrower. The borrower can access the loan application and fill the registration form through the digital platform provided by a peer-to-peer lending company. Information regarding loan application has been provided on the platform, such as the nominal of loan principal, estimated rate, and maturity. Then the application will be selected, and it will be approved if the prospective borrower meets the qualification required by the lenders and peer-to-peer lending system. The scheme of peer-to-peer lending can be seen in Figure 1 below.

The transcendency of peer-to-peer lending is the efficiency and speed of the loan application process (Patwardhan, 2018). The first peer-to-peer lending named Zopa from England and Prosper from the USA were founded in 2005 (Ziegler and Shneor, 2020). The establishment of peer-to-peer lending was motivated by the high number of unbanked populations (Suryono et al., 2021). Generally, the geographical differences and the unavailability of credit bank history caused a lack of bank trust to provide credit access to all societies (Suryono et al., 2019). Moreover, the fact that banks require collateral for most loans granted and strict credit selections make it more difficult for all people to access bank loans (Rahman et al., 2017; Nugraheni and Aziza, 2020). Peer-to-peer lending was formed to provide alternative loans for unbanked people. Therefore, this funding platform was established to give solutions for people who have difficult access to banks or other financial institutions (Suryono et al., 2021). In addition, the digitalization of peer-to-peer lending also makes it easier for people to access since those who need loans do not need to come directly to the office (KPMG Indonesia, 2018).
Digitalization has led to tremendous changes in the face of financial services market. Alternative financing models such as peer-to-peer lending have a role in complementing the bank loans but not replacing them (Bilan et al., 2019). What differentiates peer-to-peer lending and bank lie in the operational activity of peer-to-peer lending which only focused on the loan segment without collecting funds from society as banks did (Rosavina et al., 2019). One of the financial inclusion aspects is public access to convenient and affordable financial services, and peer-to-peer lending has a significant role in promoting financial inclusion by providing better loan access to unbanked populations -parties who need it the most (Oh and Rosenkranz, 2020). Through collaboration with many aspects of financial services, peer-to-peer lending also can be a booster for economic and financial digitalization. The transparency and accessibility offered by peer-to-peer lending are the significant factors driving the rapid growth of the credit market in midst the proliferation of credit disbursed by banks (Soriano, 2017).

SMEs are businesses that contribute significantly to the economy in many countries but are often treated differently regarding credit risk than other entities (Malakauskas and Lakstutiene, 2021). The biggest challenge still faced by SMEs over the last decades is the difficulty in getting access to financing, especially from banks. Therefore, this financing scheme is very suitable to support the development of MSMEs (Small and Medium Enterprises). Several studies have proven that peer-to-peer lending funding contributes to the development of MSMEs (Coakley and Huang, 2020; Pan et al., 2021; Pizzi et al., 2020). In their study, Coakley and Huang (2020) revealed that the more excellent ratio of peer-to-peer lending to total assets is in line with the increasing working capital expenditures which indicates an increase in the production scale. Moreover, Pan et al. (2021) show that peer-to-peer lending contributes to increasing supply chain efficiency and encourages the entrepreneur to increase their investment in product research and development. Furthermore, Pizzi et al. (2020) confirm that peer-to-peer lending can stimulate SMEs’ transition into a sustainable business model. This funding platform also can increase financial access for SMEs (Abbasi et al., 2021).

Following the rapid growth of peer-to-peer lending, this study intends to map the development of peer-to-peer lending research indexed on the Scopus database from the first time peer-to-peer lending was formed to 2021. This study focuses on economic and business areas considering that, so far, research related to peer-to-peer lending has focused more on technology developments. Thus, this bibliometric study will be dissecting the structure of peer-to-peer lending literature in terms of market analysis, management, business, and other relevant issues related to economic and business areas. A previous bibliometric study by Climent, Grima, and Soriano (2018) has been carried out on the literature related to crowdfunding published in the Tomson Reuters Web of Science, including the peer-to-peer lending model. However, the study focused more specifically on the financial return aspect. Hence, our study focuses on mapping the literature related to peer-to-peer lending by providing broader and new insights on the growth of publications from a different database source, namely Scopus. In addition, to the best of authors’ knowledge, this is the first study which presents a bibliometric analysis on the literature of peer-to-peer lending based on economic and business aspects specifically.

There are at least two reasons that make this study so important. First, by knowing the research development on peer-to-peer lending field, this study can identify the research gap and current issues that are widely discussed by researchers around the world. Second, this paper might give benefits to other researchers by proposing the potential topics to be studied further. Using bibliometric analytical technique by Pritchard (1969), this study collected all publications related to peer-to-peer lending from Scopus.com. Our study focus on bibliometric analysis of the peer-to-peer lending literature with a modern approach using statistical software, namely VOSviewer. The important things discussed in this bibliometric analysis are related to co-authorship and co-occurrence using VOSviewer software that specifically focus on the topic of peer-to-peer lending.

The main purpose of conducting a bibliometric study is to analyze the previous collection of literature related to a particular topic in order to produce objective findings (Tepe et al., 2022). This study aims to provide a rigorous methodological examination of the literature on peer-to-peer lending from an economic and business perspective. To show that this study contributes new and relevant information to the development of the relevant literature, the results must be defined according to the research question. In this study, literature related to peer-to-peer lending based on an economic and business perspective is targeted for structural categorical analysis. The three research questions that are the main focus to be answered in this study include:

RQ1. How has the literature of peer-to-peer lending from an economic and business perspective developed between 2009 and 2021?
RQ2. What are the most salient authors, organizations and countries?
RQ3. What are the important topics in the peer-to-peer lending literature from an economic and business perspective?
RQ4. What are the main issues of concern in the discussion on peer-to-peer lending from an economic and business perspective?
RQ5. What are recommendations should be made for the development of related literature in the future

2. Literature review
2.1. Peer-to-peer lending

P2P lending is a direct lending and borrowing service between lenders and borrowers based on information technology, where all transaction processes are carried out online through a platform (Wang et al., 2015; Suryono et al., 2021). P2P lending provides facilities for fund owners to provide loans directly to debtors with higher returns, while fund borrowers can apply for credit directly to fund owners with easier terms and a faster process compared to conventional financial institutions (Suryono et al., 2021). Investing in P2P lending is considered capable of providing a fairly high return, but investing in the platform must be in accordance with the profile, risk appetite of each and how to manage it (Suryono et al., 2019; Liu et al., 2019; Suryono et al., 2021). Therefore, the very first step in the investment process in P2P lending is to understand the risks. Ding et al. (2019) conducted study on more than 178,000 loan lists in China and revealed that the reputation or loan history of prospective borrowers is the most important factor as the main reference for investors in evaluating the risks of investment on peer-to-peer lending. In addition, from the point of view of investment activities on the platform, according to a study by Ribeiro-Navarrete et al. (2021), investor satisfaction on the peer-to-peer lending platform is

![Figure 1. Peer-to-peer lending scheme. Source: Indonesian Financial Service Authority (2021)](image)
determined by the ease of doing searches on the platform, updating project details, offering facilities in the form of mobile applications, publications on blogs related to the latest developments, on the platform and the intensity of information dissemination to investors via email to support their investment decisions. Apart from being attractive in terms of investment, peer-to-peer lending also provides great benefits for individuals or businesses that need instant funding, especially for groups who are still having adversity getting credit from banks. Therefore, the presence of peer-to-peer lending is also referred to as the impact of a decline in public confidence in the formal financial system as banking institution (Abubakar and Handayani, 2018). The global financial crisis that has occurred since 2008 has increasingly made banks selective in lending to reduce their non-performing loans (Siek and Sutanto, 2019). Online access, faster transactions and an easy selection process make peer-to-peer lending a new phenomenon in certain groups, especially for the unbanked population (Suryono et al., 2021). Therefore, peer-to-peer lending is attractive as an alternative source of funding used by entrepreneurs to develop their businesses (Wolfe et al., 2021).

2.2. Bibliometric studies related to peer-to-peer lending

Bibliometric analysis techniques have previously been applied in many studies to identify developments in certain disciplines. In the fields of economics and business, bibliometric analysis is generally used to map written media, either in the form of books or journals that have been published over a long period of time, even for decades. For example, a study conducted by Andrikopoulos et al. (2016) who reviewed articles in the Journal of Econometrics published in the first forty years. The bibliometric analysis in the study was able to produce a mapping of the network of authors, as well as the most productive authors, institutions, and countries in publications in related fields. Another example of the use of bibliometric techniques in mapping similar disciplines is in Korom (2019) which focuses on exploring scientific articles related to the topic of wealth inequality in economics and sociology disciplines published from 1990 to 2017. Meanwhile, on this occasion, we apply bibliometric techniques to map economic and business disciplines that specifically discuss peer-to-peer lending platforms. In recent years, peer-to-peer lending has become a widely studied general research topic. Many of the world’s leading researchers have paid attention to studying issues regarding peer-to-peer lending in order to provide solutions to problems faced in related fields. Countries such as China and the USA have produced many peer-to-peer lending studies. We have some research that takes object in China and USA about peer-to-peer lending (Ding et al., 2019; Ding et al., 2020; Liang and He, 2020; Wang et al., 2020; Zhou and Wei, 2020; Liang and Cai, 2020; Zhang et al., 2020; Zhao et al., 2021). Previously, there have been several studies conducting bibliometric studies in related fields. Ariza-Garzón et al. (2021) in their study identified the most influential scientific publications and study developments in the field of peer-to-peer lending using bibliometric analysis techniques. However, in this paper, bibliometric analysis related to peer-to-peer lending is only carried out using publications indexed in the Web of Science (WoS) database. In contrast to this study, which took data from scientific publications from Scopus indexed journals. The results of the bibliometric analysis by Ariza-Garzón et al. (2021) conclude that several business problems in peer-to-peer lending have not been explored in previous literature, especially those related to fraud, debt collection, credit provision (LGD), third-party collateral warranties, etc. In addition, many previous studies have also focused on examining the credit risk classification model. On the other hand, the related literature conducts more research based on a qualitative approach from conceptual and theoretical aspects.

Another study on bibliometric analysis of the peer-to-peer lending literature was conducted by Ribeiro-Navarrete et al. (2021c), which also retrieved publications from WoS database. The results of the bibliometric analysis show the diversity of issues discussed in this field, but some of the main issues discussed are centered on information asymmetries, social capital, communication channels, and rating-based models. Meanwhile, the study by Li et al. (2020) takes a broader perspective on bibliometric analysis of the development of literature in the field of internet finance indexed in WoS. Meanwhile, the study by Li et al. (2020) takes a broader perspective on bibliometric analysis of the development of literature on the field of internet finance indexed in WoS. The results of bibliometric analysis using CiteSpace have revealed six main modes of Internet finance, namely Internet banking, peer to peer lending, crowdfunding, big data finance, digital currency and fintech. However, peer-to-peer lending and crowdfunding are the main highlights that have attracted the attention of the world’s leading researchers in recent years. Studies with similar topics have also been previously carried out by Martínez-climent et al. (2018), but the main focus is bibliometric analysis of crowdfunding studies from the aspect of financial returns taken from the Thomson Reuters WoS database. The findings from the study reveal that if you look at financial returns, peer-to-peer lending seems more interesting to study than equity-based crowdfunding loan schemes based on the number of publications produced. However, each of these schemes has characteristics that can attract borrowers as an alternative source of funding. Still related to the study of digital finance, another study by Merediz-Solá, I. and Bariviera, A. F. (2019) focused on mapping the development of the study of bitcoin using bibliometric analysis techniques indexed on the WoS Core Collection since 2012. The main findings of the study confirm that the literature related to bitcoin is still lacking in exploring how the impact of changes in the regulation of bitcoin from an economic and social perspective.

Based on literature review related to peer-to-peer lending bibliometric studies, it can be concluded that there is a gap on the research area. The first is related to the source of publication database used, which almost all related research takes from the WoS index (Ariza-Garzón et al., 2021; Ribeiro-Navarrete et al., 2021; Li et al., 2020; Martínez-climent et al., 2018). Considering this fact, it is clear that academics need to investigate further regarding peer-to-peer lending from an economic and business perspective as a relatively new issue. With this study, the author seeks to assess the current situation by analyzing related literature around the world using bibliometric techniques. This study has some contributions for further studies, particularly in providing topics or potential issues for further research. Therefore, this research can open new perspectives in the field of peer-to-peer lending.

3. Research methodology

Bibliometrics is known as a statistical method used in the field of library and information science to analyze academic literature in the form of books, articles, and other types of literature (Bellis, 2009). As the field of research and journal publication index evolves, bibliometric studies are created to record and analyze scientists’ written results. Referring to the main source of bibliometric analysis techniques by Pritchard (1969), bibliometrics also known as statistical bibliography is a combination of statistical and mathematical techniques in analyzing written data such as books or other communication media. Specifically, bibliometric techniques have several functions, including: explaining the written communication process to identify the direction of development of certain disciplines and statistically interpreting written data (Pritchard, 1969). This method is also used to measure the quality and importance of research fields published in the form of scientific articles or books (Ball, 2018). The indicator of quality measurements can be seen from how often a publication is cited by other publications. Moreover, bibliometric studies are also able to map out relevant information, such as the most popular keywords and authors, as well as related issues discussed (Agbo et al., 2021). This study employed a bibliometric analysis on published research in reputable journals indexed on Scopus related to peer-to-peer lending. As one of the database indexes for international scientific publications with a high reputation, Scopus is able to provide comprehensive
information related to research results in various branches of sciences. In addition, Scopus can also accommodate research results that can be searched based on the subject area, authors, keywords, publisher, year of publication, affiliation and country. Therefore, this database is relevant to use for data collection in bibliometric studies.

This study adopted a qualitative methodology in the form of a literature study of 191 publications on peer-to-peer lending. The main characteristic of qualitative research is descriptive analysis, where the research results do not prove a hypothesis (Rusydiana et al., 2021). Publication data from scientific journals were collected using triangulation techniques, then processed using statistical software called VOSviewer. Furthermore, the data from VOSviewer were analyzed qualitatively to identify essential matters relevant to peer-to-peer lending research. The purposive non-probability sampling method was used for sample selection based on several criteria adjusted to the study’s objective. The collection of samples for this bibliometric analysis has passed through five stages. The following is the modified combinations by Suban et al. (2021), Sukmana (2020); Narayanan and Phan (2017). The steps for collecting research data are summarized in Figure 2.

First, publications related to peer-to-peer lending from Scopus journals index were explored. This exploration was carried out to find documents related to peer-to-peer lending. The search of papers only used a single keyword “P2P Lending” which referred to Peer-to-Peer Lending, considering that the primary concern of the article must dominantly discuss this topic.

Second, the search was carried out based on the article title, abstract, keywords, and authors.

Third, the search results based on the subject area consisting of "Economics, Econometrics and Finance" and "Business, Management and Accounting" were limited. Then document type “Article”, publication stage “Final”, source type “Journal”, and language “English” were filtered. This study only considers papers published since 2005. The setting of this period refers to the history of peer-to-peer lending, which was first established in 2005. However, the first publication related to peer-to-peer lending in the Scopus database appeared in 2009.

Fourth, a total of 191 scientific articles related to peer-to-peer lending was identified in the Scopus database index. Data collection was carried out on December 17, 2021 at 19.30 and took all documents for further analysis without specific considerations regarding content and abstracts.

Fifth, the list of papers that have been collected was mapped using VOSviewer software. VOSviewer is a software developed to map out bibliometric studies (Rusydiana, 2019). The bibliometric mapping technique using VOSviewer refers to VOS or similarity visualization. VOS acts to visualize literature data such as books and articles in figure maps which help the author find the research pattern about the related issue (Van Eck et al., 2010). Rusydiana et al. (2021) adjusted study of Costas et al. (2010) revealed four research stages using bibliometric analysis.

First, determining the object of analysis, research objectives, and the scientific basis for the bibliometric study to be carried out.

Second, starting the search procedure by specifying the search term, search engine and search filter.

Third, using suitable software for data collection and management of bibliometric analysis.

Fourth, analyzing scientific contextual, such as analysis on the citation, country origin, keyword and scientific field of the selected publications.

Fifth, analyzing citation networks analysis by sample. VOSviewer is software developed to map bibliometric studies (Rusydiana, 2019; Suban and Madhan, 2021). The selection of VOSviewer as analytical tool considers that the software is able to visualize written data in the form of image maps (Kawuki et al., 2021; Nasir et al., 2021; Rusydiana et al., 2021). The VOSviewer software is available free of charge to the bibliometric study community for download at www.vosviewer.com. VOSviewer has a function to place items in a low dimension so that the distance between two items can accurately reflect the uniformity of the items. The following is the VOS equation in mapping written data (Van Eck and Waltman, 2010):

\[ V(x_1, \ldots, x_n) = \sum_{i<j} S_{ij} \| x_i - x_j \|^2 \]

Based on Eq. (1) above, \( n \) represents the number of items to be mapped. In the VOSviewer mapping construct, a two-dimensional map between items 1 and \( n \) is written in such a way that the distance between each item \( i \) and \( j \) shows their similarity and represents \( s_{ij} \) accurately. Items that are very similar should be placed close together, and vice versa. For each pair of items \( i \) and \( j \), VOS includes similarity \( s_{ij} (s_{jj} = 0) \) as a measure on the ratio scale. Eq. (1) shows that \( s_{ij} \) is calculated using the intensity of association. VOS determines the location of items on the map by minimizing the sum of the weights squared by the distance between all pairs of items. Equations between items weigh the square of distance between pairs of items. Restrictions are applied so that the distance between two items is equal to one item to avoid bias. The higher the similarity between two items, the higher their squared distance in the sum. The vector \( x_i = (x_{ij}, x_{k}) \) represents the location of item \( i \) in the two-dimensional mapping and \( |x_i| \) shows the Euclidean norm. Meanwhile Eq. (2) below shows the minimization of objective function per subject formed on the constraints (Van Eck and Waltman, 2010):

\[ \frac{2}{n(n-1)} \sum_{i<j} \| x_i - x_j \| = 1 \]

To avoid the same item location constraint, the average distance for each item must be equal to 1. The majority algorithm is used to solve a constrained optimization problem that can be run several times. Bibliometric mapping using VOSviewer is capable of mapping at least a large number of items, for example 100 items or more. The important points of the bibliometric analysis related to peer-to-peer lending delivered by VOSviewer are co-authorship and co-occurrence.

4. Results and discussion

4.1. Publication trend

This section is intended to answer RQ1, RQ2 and RQ3. This section begins by explaining the trend of publishing research on peer-to-peer lending based on economic and business aspects to answer the first research question. This section begins by describing the trend of publishing research on peer-to-peer lending based on economic and business aspects to answer the first research question. Then proceed with analyzing the most salient authors, organizations and countries to answer RQ2 and analysis of important topics and sub-topics in related fields as answers to RQ3. The peer-to-peer lending platform was first established in 2005, but the first research appeared in 2009 in the Scopus database. As shown in Table 1, a total of 191 publications were written by 436 authors from 2009 to 2021. The table below also shows a significant increase in peer-to-peer lending publications since 2015 in line with the growth of peer-to-peer lending platforms, and have been increasing since then until reach 62 publications by 2020. However, we only managed to collect 25 articles in mid-2021 when this bibliometric study was conducted. The increase in the number of publications indicates that increasing issues related to peer-to-peer lending are emerging and also attracting a lot of attention from researchers around the world (see Table 2).

Once again, this bibliometric study is essential to do to evaluate published research related to peer-to-peer lending. It is relevant to identify innovations in this field and to find what important issues have gone unnoticed and have not been researched. To explore these research gaps, this section presents the results of a bibliometric mapping of 191 peer-to-peer lending publications. The bibliometric maps presented refer to the most popular authors, countries, organizations, and popular keywords in the related literature.
4.2 Salient authors, organizations and countries

Co-authorship analysis was used to identify the relationship between items in the database determined based on the number of documents. The outputs of the co-authorship analysis are the authors, organizations, and countries that contributed to the publication of the related topic. Co-authorship mapping is generally displayed in the form of network visualizations. The visualizations configure some clusters or groups that are connected by lines. Clusters connected by lines indicated that authors, organizations or countries collaborate in their studies. Based on data processing using VOSviewer software, bibliometric maps related to peer-to-peer lending papers on Co-authorship analysis refer to the prominent authors, organizations, and countries as shown in Figures 3, 4, 5.

Figure 2. Design of study. Source: Author's elaboration.

Figure 3 above shows a map of co-authorship based on the author names who published his research related to peer-to-peer lending indexed by Scopus. The map shows that there are several clusters formed when all documents related to peer-to-peer lending are grouped by authors’ name. The authors’ name in the circle connected by the line indicates that there were collaborations between authors on their peer-to-peer lending research. However, especially for the authors in the circle on the fringe and are not bound by any line with other clusters, they constitute single authors. The authors in the middle circle of a cluster with many members constitute authors who most often collaborate with many other authors. In addition, the size of circle represents the number of papers written by the authors. Based on the Figure above, the largest cluster with the most number of authors consisting of 18 authors. The
second-largest cluster consists of 16 authors. While the third and fourth largest clusters each comprised of 15 authors. The top ten most popular authors which ranked based on the number of documents (4–6 publications), citations and total link strength can be seen in Table 2 below.

Zhang W., Li Y., and Chen D. are the three most popular authors in research publications related to peer-to-peer lending and also have many collaborations with other authors. One of the papers written by Zhang W. related to this issue is entitled “Textual sentiment of comments and collapse of P2P platforms: Evidence from China’s P2P market” which aims to explore the opinion and sentiment of comments from investors listed on the peer-to-peer lending platform and their effects against potential failures of the platform. The study's empirical results show that the investor community's positive comments on the platform indicate a lower probability of failure (Wang et al., 2021).

Li Y. is the second most popular author, one of the papers raises the topic of investor rationality and its impact on the returns they get from investing through peer-to-peer lending using a sample from a platform in China. The results show that highly rational investors tend to choose high-quality borrowers and are more likely to earn higher yields (Zhao et al., 2021). The third popular author, Chen D, once wrote a paper entitled “Gender discrimination in online peer-to-peer credit lending: evidence from a lending platform in China.” Using a sample of one of the peer-to-peer lending platforms in China, the study revealed that female borrowers are more heavily funded than male borrowers because female borrowers have statistically higher loan success and are willing to pay higher interest costs (Chen et al., 2016).

The second co-authorship mapping is based on the authors’ origin organization. The mapping visualization can be seen in Figure 4. Figure 4 below only shows three organizations that are basically interconnected in terms of collaboration for publishing peer-to-peer lending journals.

The most popular authors’ organizations were rated based on link strength, publications and citations, namely Purdue University, Washington University and Tsinghua University. Data processing with VOSviewer only includes organizations that have at least two published documents related to peer-to-peer lending. More details regarding the top ten authors’ organizations that have many publications related to peer-to-peer lending are set out in Table 3.

Figure 5 below is a co-authorship based on the authors’ origin country. It also shows the collaboration network between countries in publishing peer-to-peer lending research. The size of the circle cluster represents the number of papers written by authors from the country. In the first position, China, which is shown by the biggest circle cluster in the center with the most prominent circle size, representing its status as a country with the highest level of peer-to-peer lending publications.

There are 11 countries in the biggest cluster and connected each other in publications on this field. This cluster consists of Belgium, Brazil, China, Hong Kong, Pakistan, South Korea, Japan, Switzerland, Taiwan, Thailand, and the USA. The rank of the top ten countries that produce the most publications related to peer-to-peer lending is set in Table 4. As shown in Table 4, China is first as the country that publishes the most peer-to-peer lending papers. This result is relevant considering that China has been known as the country with the largest growth and market share of peer-to-peer lending worldwide so far (Ding et al., 2020). The peer-to-peer lending sector in China has experienced up and down since 2007 due to the absence of policy control from the government. Since 2015, the Chinese government has issued strict regulations on this sector to protect all parties involved and reduce the number of fraud. The same thing happened in other developed economic countries, such as the USA and UK. The peer-to-peer lending sector is predicted to continue to grow due to the loan high demand, especially for the SMEs sector, and the support from many technology companies that have a high interest in developing peer-to-peer lending platforms.

4.3. Salient keywords, authors keywords and index

Besides co-authorship, VOSviewer software can also show bibliometric visualizations based on co-occurrence. There are three outputs that are generated by the co-occurrence bibliometric, namely all keywords, the keywords most used by authors, and index keywords. Bibliometric mapping based on co-occurrence is shown in Figures 6, 7, and 8. Co-occurrence of all keywords analysis refers to all keywords used in each paper analyzed by VOSviewer to be classified into several clusters based on the number of keywords that often appear in the documents, the relationship between words, and the division of word clusters. Figure 6 below shows the most popular keywords in research publications related to peer-to-peer lending. All keywords that are connected by lines show that these keywords are the most frequently used together. The largest cluster in the picture above has the most members, with ‘P2P Lending’ as the main keyword in the center. In the cluster, these main keywords are interconnected and related to other keywords such as crowdfunding, internet finance, China, alternative finance, financial innovation, and repayment performance. Apart from being in one cluster, these keywords are also connected to several keywords in other clusters which contain keywords related to the operational characteristics of peer-to-peer lending, such as lending behavior, default risk, survival analysis, internet and credit provision.

Generally, all the keywords that appear in this visualization are relevant related to peer-to-peer lending. In one of the other clusters, most keywords that occur are related to other names of peer-to-peer lending, such as crowdfunding, internet finance, crowdlending, and alternative finance. In addition, there are also several keywords related to technology, such as big data, peer-to-peer networks, social networking, and artificial intelligence. It shows that peer-to-peer lending is a financing model that is inseparable from technology. China became one of the most

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**Table 1.** Number of article publications on peer-to-peer lending between 2009-2021.

| Year | Number of Publications |
|------|-----------------------|
| 2021 | 25                    |
| 2020 | 62                    |
| 2019 | 27                    |
| 2018 | 26                    |
| 2017 | 15                    |
| 2016 | 10                    |
| 2015 | 14                    |
| 2014 | 2                     |
| 2013 | 0                     |
| 2012 | 3                     |
| 2011 | 2                     |
| 2010 | 4                     |
| 2009 | 1                     |

Source: Authors’ elaboration based on Scopus.

**Table 2.** Top ten authors in peer-to-peer lending research publications.

| Author name  | Number of documents | Citations | Total link strength |
|--------------|---------------------|-----------|---------------------|
| Zhang W.     | 6                   | 12        | 18                  |
| Li Y.        | 6                   | 47        | 16                  |
| Chen D.      | 5                   | 283       | 13                  |
| Wang Z.      | 4                   | 44        | 13                  |
| Li X.        | 5                   | 79        | 12                  |
| Zhang Y.     | 5                   | 36        | 12                  |
| Ding Y.      | 3                   | 47        | 11                  |
| Jiang C.     | 3                   | 43        | 11                  |
| Li M.        | 3                   | 5         | 10                  |
| Liu Y.       | 3                   | 74        | 10                  |

Source: Authors’ elaboration based on Scopus data processing by VOSviewer software.
Figure 3. Co-authorship authors. Source: Authors’ elaboration.

Figure 4. Co-authorship organizations. Source: Authors’ elaboration.
prominent keywords, indicating that this country has high popularity in peer-to-peer lending publications. Thus, it often appears in the results of software data processing. The previous analysis of co-authorship countries also showed China as the authors’ country of origin, which produced the most publications of peer-to-peer lending. Figure 7 below is a bibliometric mapping visualization based on the most common keywords pinned by the authors in their abstract. The keywords in the abstract are generally included to make it easier to search in the database based on the abstract and also help readers review the most discussed words in the papers. Apart from the co-occurrence of all keywords analysis, the visualization of author keywords does not seem much different. It can be seen from the similarity of several keywords that appear. Moreover, the results of network visualization on the authors’ keywords also show a similar pattern. Several keywords that were connected in the previous analysis, were also connected again this time.

On Figure 7 shows the most popular keywords used by authors simultaneously and connected to each other are P2P Lending, peer-to-peer lending, fintech, and crowdfunding. Furthermore, several other keywords also stand out and correlate with many keywords in different clusters, such as microfinance, China, and banking. The keyword China reappears in this section and is also linked to many other keywords,

Table 3. Top ten author organizations in peer-to-peer lending research publications.

| Organization name                              | Number of documents | Citations | Total link strength |
|------------------------------------------------|--------------------|-----------|--------------------|
| Purdue University                             | 2                  | 82        | 2                  |
| Washington University                         | 2                  | 8         | 2                  |
| Tsinghua University                           | 2                  | 8         | 2                  |
| Hong Kong University                          | 2                  | 4         | 2                  |
| South China University of Technology          | 2                  | 4         | 2                  |
| Southwestern University                       | 2                  | 26        | 1                  |
| Beijing University                            | 2                  | 53        | 1                  |
| Peking University of Beijing                  | 2                  | 54        | 1                  |
| University of Electronic Science and Technology of China | 2 | 27 | 1 |
| Asian Development Bank Institute              | 2                  | 46        | 0                  |

Source: Authors’ elaboration based on Scopus data processing by VOSviewer software.

Table 4. Top ten author countries in peer-to-peer lending research publications.

| Organization name | Number of documents | Citations | Total link strength |
|-------------------|--------------------|-----------|--------------------|
| China             | 98                 | 1269      | 52                 |
| USA               | 44                 | 1600      | 36                 |
| Hong Kong         | 13                 | 186       | 17                 |
| United Kingdom    | 15                 | 52        | 10                 |
| Australia         | 6                  | 44        | 8                  |
| France            | 6                  | 33        | 8                  |
| Singapore         | 3                  | 200       | 6                  |
| Taiwan            | 5                  | 35        | 6                  |
| Pakistan          | 3                  | 2         | 4                  |
| Finland           | 3                  | 99        | 3                  |

Source: Authors’ elaboration based on Scopus data processing by VOSviewer software.
showing that many case studies related to peer-to-peer lending from China were raised in the papers. One of the papers that linked P2P Lending and banking as keywords in the abstract is a study by Ding et al. (2020), which discusses lessons learned from the journey of peer-to-peer lending in China. The rise and the fall of peer-to-peer lending in China provided a prominent lesson for financial innovations, especially in emerging countries. One lesson learned should be noted is in the terms of regulation support to encourage innovation in this sector. The regulators must also ensure that the fintech innovation is not threatening the security of all parties involved. The third co-occurrence analysis is based on unit index analysis. This type of analysis is still related to keyword, but specific maps to the keywords are generated by journal indexes. Co-occurrence index mapping can identify keywords in the search box on the journal index, which in this case, is Scopus. This time, the bibliometric mapping for the co-occurrence index from the VOSviewer data processing is displayed in the form of Overlay Visualization. This visualization makes it possible to review the novelty of publications, which can be seen from the shades of the cluster. The brighter shades indicate that the publications in the cluster publish in the latest year. Meanwhile, the darker shades of a cluster represent the further away the year of publication. Thus, the shades displayed in this type of visualization do not represent clusters but represent the year publication. The different shade displayed by the overlay visualization provides an overview of the evolution of publication keywords every year.

Figure 8 shows the results of visualizing the co-occurrence index, and it is clear that keywords in research publications related to peer-to-peer lending evolve gradually. The most generated keywords in publications around 2009 are shown in the darkest shade. Examples of the top 3 keywords that fall into this category are economic analysis, electronic commerce, and microfinance. These were three popular and interconnected keywords at that time. Meanwhile, the word ‘finance’ in the largest circle in the middle is the most popular index keyword, linked to many other keywords and used by many publications. Especially for the latest index keywords, they are shown in the brighter shades, which are included in the 2020 period scale and beyond. Several index keywords that are relatively new investigated in the latest time, namely sensitivity analysis, soft information, semantics, credit risk, probability of defaults, investment, classification of information, survival analysis, and new approaches. These results indicate that research trends related to peer-to-peer lending currently focus on risks, one of which is defaults.

5. Discussion

This discussion section is specifically intended to answer the fourth research question (RQ4) which focuses on discussing the main issues of concern in the discussion about peer-to-peer lending from an economic and business perspective. Based on the analysis of bibliometric mapping using the VOSviewers software in the previous section, so far we have obtained an overview of the scope of peer-to-peer lending research from co-occurrence analysis, which we have classified into the following three sub-topics below:

1. Peer-to-peer lending and the business model
2. Peer-to-peer lending and the default risks
3. Peer-to-peer lending and the contributions for SMEs
4. Recent publication topic analysis

Classification of research topics in the field of peer-to-peer lending that are relevant to the economic and business perspective is concluded from the cluster output of the co-occurrence all keywords analysis (Figure 6). The results of co-occurrence of all keywords for popular keyword clusters that are often used are related to blue cluster keywords (crowdfunding, internet finance, fintech, alternative finance), green cluster keywords (finance, peer-to-peer networks, credit scoring, risk management, decision trees) and red cluster keywords (default risk, lending behavior, credit provision, financial service). To conclude a more specific topic classification, the authors also consider the number of citations more than ten times from publications with keywords that emerged from the co-occurrence all keywords analysis cluster. Citation is an important consideration for research publications, because it can show how much impact the research has on making other authors interested in citing the work of the main author as a reference (Suban et al., 2021; Tepe et al., 2022; Nasir et al., 2020). Based on tracking these popular keywords and considering the number of citations, shows that the trend of research topics on peer-to-peer lending leads to three aspects, namely the business model, the default risks and the contribution of peer-to-peer lending for SMEs.

5.1. Peer-to-peer lending and the business model

As part of the financial industry, the main focus of the peer-to-peer lending business model is to provide financial services in the form of loans. Unlike other financial institutions, peer-to-peer lending schemes have their own features. As discussed in Wang et al. (2015) study, revealed that peer-to-peer lending companies provide loans for borrowers using an online platform. The characteristics of the peer-to-peer lending business model are unique compared to traditional bank loans. First, the flow of information in peer-to-peer lending is known to be more transparent because users are given the privilege to apply for a nominal loan amount. Second, the loan eligibility selection model in peer-to-peer lending is highly dependent on technology and information systems. However, the weakness of the peer-to-peer lending system lies in the limited information related to the post-loan history of the borrower. This is because the reputation of the borrower is generally the main reference for investors who are able to increase their trust in providing funds for peer-to-peer lending investment projects (Ribeiro-Navarrete et al., 2021). Thus, transparency of data regarding potential borrowers will be advantageous to support investment decisions. Borello and Veronica (2017) also revealed that the peer-to-peer lending business model has a limited role because the borrower has a separate bank account from the peer-to-peer lending platform, while the platform does not have a right to access bank accounts.

Peer-to-peer is one of the successful digital financial platforms that has experienced rapid growth in recent years (Yan et al., 2018; Everett, 2019; Pierrakis, 2019). In its development, peer-to-peer lending has gone through several stages of business model development, as discussed in Au and Tan’s (2020) study. Based on the study using sample one of the leading peer-to-peer lending companies in China, namely P2P Lend.com, it shows that the peer-to-peer lending platform has undergone three stages of development. The first stage is the development of an assessment system to select the eligibility of credit applications by customers through cooperating with big data companies as third parties in order to obtain information regarding potential borrowers. Considering that currently big data has an important role indirectly in directing contradictions, trust and perceived value from users of all types of internet-based platforms (Al-Omoush et al., 2021). Therefore, the development of a platform supported by big data is an important factor for peer-to-peer lending business. A phase like now, when fintech is intensively building user trust, has become an urgency for service providers to ensure that credibility is well established, even consumers always expect zero mistakes in using the financial system (Ioannidou et al., 2014; Jiménez et al., 2014). Entering the second stage, peer-to-peer lending companies are starting to face intense competition among investors due to the increasing number of peer-to-peer lending companies. Thus, the development of peer-to-peer lending business at this stage is focused on attracting investors or lenders by subsidizing participation fees for investors. In the third stage, the company began to focus on improving services by offering faster loan facilities for customers who have a good credit payment, developing mobile applications, and additional services such as insurance.

A study by Havrylyshyn and Verdier (2019) revealed that peer-to-peer lending has a better financial intermediation role than banks because this
platform can directly connect borrowers with investors. In some cases, peer-to-peer lending provides an opportunity for lenders to choose the potential borrowers they want to fund. Retail investors on this financing platform can analyze their investment risks through the online application’s financial and non-financial information uploaded by prospective borrowers. While in the banking system, depositors have limited visibility about the use of their investments. Hence, it is possible for peer-to-peer lending platforms to take some of the credit market shares from the banking sector but will not be able to fully take over, as discussed in Thakor (2019).

In the financial industry, peer-to-peer lending has a largely complementary role with banks because peer-to-peer lending can cover the market share of risky credit and borrowers who do not have collateral that banks cannot reach (Milne and Parboteah, 2016; Kohardinata et al., 2020b). Moreover, banks and peer-to-peer lending can also collaborate in providing loans where banks can act as institutional lenders who channel their loans to potential lenders through peer-to-peer lending platforms (Kohardinata et al., 2020a). Thus, there is no possibility that the role of banks in funding distribution will decrease significantly. In recent years, many Islamic peer-to-peer lending platforms have emerged which provide interest-free loan facilities.

A study by (Piskin, 2019) explained that there are requirements that must be fulfilled so that the investment and lending process in peer-to-peer lending comply with Islamic principles. First, the product must be clear in its form, both goods or services. Second, the borrower and the lender establish a partnership based on profit-loss sharing using a Mudharabah contract. In this case, the profits of the project financed by the platform will be shared between investors and users based on a mutually agreed rate. As part of an Islamic financial entity, there are two stakeholders in Islamic peer-to-peer lending, namely investors as parties who have excess funds and customers who need funds, both for consumptive and productive needs. Investors in Islamic peer-to-peer lending are motivated to earn profits and also motivated by investment activities that comply with Islamic ethics.

Muhammad et al. (2021), revealed that the implementation of Islamic ethics in Islamic peer-to-peer lending can potentially reduce the risk of failure in several ways. Firstly, stakeholders understand Islamic ethics can increase their trust in users that the funds invested will be used according to the agreement and are expected to be more productive to generate optimal profits. Secondly, Islamic ethical values provide instructions for various parties involved to carry out all activities based on Islamic principles and social norms. Thirdly, the implementation of Islamic ethics is expected to prevent all perverse motives and infractions of agreements that can dissuade other parties.

Based on Hashfi and Zusryn’s (2019) study, the scheme of Islamic peer-to-peer lending has been popular in several Muslim countries, such as Saudi Arabia, Malaysia, UAE, and Indonesia. The utilization of Fintech on the Islamic capital market is also increasing, especially in some jurisdictions that offer many Islamic financial services. Investment Account Platform (IAP) from Malaysia offers financing facility for regional and

Figure 6. Co-occurrence all keywords. Source: Authors’ elaboration.
Figure 7. Co-occurrence authors keywords. Source: Authors’ elaboration.

Figure 8. Co-occurrence index. Source: Authors’ elaboration.
global potential business (Oseni and Al, 2019). This financing scheme is predicted to grow and become an important issue along with the rise of the global Islamic financial industry.

5.2. Peer-to-peer lending and the default risks

As a platform that offers fast loan solutions to people with difficulty getting bank access, peer-to-peer lending faces a higher risk of failure. In recent years, the risk of default in peer-to-peer lending has become the most discussed issue in the literature. Even the default rate of peer-to-peer lending platforms in China reached 87.2 percent in 2019, according to a study by Gao et al. (2021). Their study also managed to identify the determinants of platform failure in China using the Decomposition Method, which is influenced by ownership, interest rates, popularity, bond yields, and loan maturity factors. Study by Yoon et al. (2019) also revealed that the default risk in peer-to-peer lending arises due to default events that bring losses to investors. Therefore, it is essential to analyze information from borrowers to predict and reduce the credit risk (Liang and He, 2020). Chen et al. (2020) suggest that the borrower's education level is the most considered factor by peer-to-peer lending companies in China. The platform considers that education level is the most efficient indicator to predict loan success because, on average, more educated people show a lower probability of default. Meanwhile, Galemia (2020) revealed that the proximity between investors and borrowers is one of the key factors that encourage investors to invest more. It is an event that is most likely to occur in peer-to-peer lending companies, which gives individual lenders the freedom to get acquainted with borrowers. This study also confirms that the proximity between investors and borrowers can reduce the risk of default. Beside that, Investor satisfaction is also an important factor that needs to be considered by platform managers, such as the ease of access to information related to platform management, details of funding projects, the latest developments in the platform and mobile application facilities (Ribeiro-Navarrete et al., 2021). Therefore, to increase competitiveness and attract investors and borrowers, peer-to-peer lending platforms are encouraged to increase the disclosure of information they share with users (Ribeiro-Navarrete et al., 2021). Moreover, in peer-to-peer lending transactions, the disclosure of information can reduce information asymmetry to minimize the potential for failure. In this case, the presence of third party investors can also play a role in building a stronger relevance of communication in addition to communication in the form of conventional content such as words, videos, images, and updates embedded on the platform (De Crescenzo et al., 2021). In addition, social media can also be an influential communication medium to promote peer-to-peer lending platforms so that they can reach more users. Previous research by Wolfe et al. (2021) has proven that platform promotion through social media can increase the chances of a crowdfunding platform success. Of course, this strategy can bring benefits to the marketing of similar platforms.

Croux et al.'s (2020) study indicate the determinants of default on fintech loans using a sample of one million personal loans from LendingClub consumers from 2007 to 2018. The study found that borrowers with longer loan maturities had a higher probability of default. Meanwhile, Muhammad et al. (2021) also identified the determinants of failure in the case of Islamic peer-to-peer lending in Indonesia. The results found that the high level of lenders’ debt and the loan amount, and ineffective governance can increase the risk of failure. However, applying Islamic business ethics on peer-to-peer lending platforms has been proven to reduce some of the potentials for failure because it can prevent violations or other malicious intentions that can harm other parties. In addition, according to Gong et al.'s (2020) study, it proves that peer-to-peer lending companies led by experienced CEOs in the banking industry have better default risk control. This shows that the CEO’s banking experience is a leading factor that positively influences the performance of peer-to-peer lending. According to Yoon, Li, and Peng (2018), the level of competition between platforms can also increase the risk of default because it allows peer-to-peer lending to be reckless in filtering loans so that risky borrowers have the potential to easily enter the platform system.

5.3. Peer-to-peer lending and the contributions for SMEs

Peer-to-peer lending and Small and Medium Enterprises (SMEs) are two inseparable things. SMEs’ difficulty getting access to funding from traditional banks due to the unavailability of collateral and limited financial information of SMEs has become a market niche for peer-to-peer lending to fund this sector (Gharehbagh et al., 2019). Therefore, the role of peer-to-peer lending in the SMEs sector is widely discussed in the literature. A study of Abbasi et al. (2021) investigated the effect of peer-to-peer lending on the accessibility of SMEs financing. Using data from OECD countries in 2011–2018, the study show that fintech-based peer-to-peer lending can increase financial access for SMEs. These results are relevant considering that the use of big data technology on the platform can accurately measure SMEs’ credit risk through a credit scoring system, making it easier for SMEs to fulfill their loan application requirements.

Hashfi and Zusryn's (2019) study suggests that SMEs are the main target of peer-to-peer lending platforms. The target of SMEs funding by peer-to-peer lending is generally procurement of goods and services or additional capital for business expansion. According to a study by Surianto et al. (2020), the presence of a peer-to-peer lending platform strongly supports the development of SMEs in Indonesia. Several services provided by peer-to-peer lending that are capable of being a catalyst in the growth of SMEs in Indonesia are equity crowdfunding, e-wallet, and the service of personal finance. Effectiveness of funding, ease of transaction process, broad market access, and routine business financial reporting are some of the benefits for SMEs by using the peer-to-peer lending platform.

Meanwhile, Rosavina et al. (2019) have investigated the factors that encourage SMEs to be interested in applying for loans to peer-to-peer lending platforms. Using a sample of ten SMEs in Indonesia, their study found that there are considered factors for SMEs in applying loans to peer-to-peer lending, such as ease of loan processing, borrowing costs, interest rates, loan amount, and loan flexibility. In addition, several SMEs are also considering alternative financing schemes, such as Islamic-based loans with a profit-sharing system. A study by Tamara and Kasri (2020) towards one of the peer-to-peer lending platforms in Indonesia, namely PT Ammana Fintech Syariah, shows that financing from the platform generates a positive impact on the performance of Islamic micro-enterprises in Indonesia.

5.4. Recent publication topic analysis

In order to analyze the trend of the most followed peer-to-peer lending research topics, the author has also conducted an analysis of the topic trends of recent publications. The analysis in this section is obtained from the results of the bibliometric visualization of Co-occurrence Index shown in Figure 8. This visualization allows reviewing the latest publications, which can be seen from the shades of the most intense colored cluster (yellow), which represents publications above 2020. Results identification of the most popular keywords for the latest publications showing some specific topics, such as sensitivity analysis, soft information, semantics, new approaches, probability of defaults and forecasting. The results of the content analysis are shown in Table 5 below.

Based on content analysis of the latest publications on peer-to-peer lending directed by popular keywords from the results of the co-occurrence index, it shows that the trend of issues that have been frequently discussed since 2020 is about analyzing the potential risk of failure or default of loans disbursed by peer-to-peer lending, peer-to-peer lending. The trend of these issues appears a lot in papers that embed keywords such as soft information, semantics, new approaches, probability of defaults and forecasting. There are several publications that
focus on discussing in depth the issue, including: Liang and He (2020), Wang et al. (2020), Zhou and Wei (2020), Liang and Cai (2020), Zhang et al. (2020), Zhao et al. (2021), Mukhammad et al. (2021), Gao et al. (2021) and Xia et al. (2020).

Evaluation of potential failure and default risk on peer-to-peer lending platform lending discussed in previous research has offered several solutions and strategies to minimize these problems. Previously, Liang and He (2020) in their study offered a solution in the form of semantic loan description text information to help predict the credit risk of various types of borrowers who use the peer-to-peer lending platform in China. Evaluation of potential failure and default risk on peer-to-peer lending platform lending discussed in previous research has offered several solutions and strategies to minimize these problems. Previously, Liang and He (2020) in their study offered a solution in the form of semantic loan description text information to help predict the credit risk of various types of borrowers using the peer-to-peer lending platform in China, more precisely the analysis was carried out on the Renrendai P2P platform. Then, there is a study conducted by Wang et al. (2020) which focuses on the ability of the extracted semantic soft factor to improve the accuracy of the credit risk evaluation process both in terms of discrimination performance and awarding performance. Meanwhile, Zhou and Wei's (2020) paper focuses on analyzing the performance of joint liability loans, compared to individual loans, in peer-to-peer lending, which shows that each loan has its own potential for information asymmetry. Another study by Liang and Cai (2020) studied the monthly fresh loan default rate on the peer-to-peer lending platform at the USA Lending Club from 2008 to 2015, and showed that the LSTM (Long Short Term Memory) network had the highest accuracy of default rate prediction.

Some other studies such as in the paper of Zhang et al. (2020), Xia et al. (2020), Zhao et al. (2021), Mukhammad et al. (2021), Gao et al. (2021) also provides a different point of view regarding credit risk evaluation on the platform. First, Zhang et al. (2020) argue that textual loan descriptions have not been fully explored for their usefulness to evaluate platform credit risk. Therefore, the study proposes a new approach to build a credit risk assessment model for the peer-to-peer lending market, which uses a transformer encoder to extract textual features from loan descriptions, and then combines them with hard features derived from loan applications. Meanwhile, Xia et al. (2020) in his study offered a classifier feature and narrative data to improve the credit scoring system in peer-to-peer lending. In addition, Zhao et al. (2021) in their study emphasizes the management and supervision of Internet financial risks applied to peer-to-peer lending platforms. Meanwhile, Mukhammad et al. (2021) focus on analyzing the potential failure of Islamic peer-to-peer lending in Indonesia by relying on the application of Islamic ethics in platform transactions. Furthermore, another study by Zhao et al. (2021) take another point of view by identifying other factors that cause non-payment of peer-to-peer lending platforms by adopting two approaches, namely the Failure Prediction Model and the Decomposition Method. One of the other important keywords that includes the issue that has been the focus of recent publications in related fields is about sensitivity analysis. One study identified from the results of bibliometric analysis is study by Reza-Gharebagh et al. (2020) which focuses on delving the financing supply chain for SMES. The study emphasizes two alternative financing schemes provided by peer-to-peer lending, namely debt financing (DF) and equity financing (EF).

6. Recommendations for future studies

Finally, in this section we provide recommendations for future research in the related field in order to answer the fifth research question (RQ5). Based on the bibliometric analysis of the peer-to-peer lending literature, we provide recommendations for further research. The recommendations are tracked by matching the results of bibliometric analysis based on the co-occurrence of all keywords by VOSviewer and a elaboration on the publications database downloaded from Scopus. Based on the co-occurrence of all keywords, we found some less popular keywords but are closely related to the main keyword (peer-to-peer lending), such as financial regulation, risk management, forecasting and competition. These keywords have led us to find some gaps on essential issues but have not been studied in-depth or only a minor part of the main general discussion of papers. The topic that is recommended is potential for further studies. However, these recommendations are not limited to the following research areas:

1. Several works of literature have discussed the differences between peer-to-peer lending and bank on their business models as well as the possible substitution effects between them, but only a few studies can propose a collaboration model between the two institutions (Havrylych and Verdier, 2019; Kohardiniat et al., 2020a; Broby, 2021). Creating other innovative financing models will be interesting by optimizing the role and collaboration between peer-to-peer lending and other financial institutions. Therefore, we expected more studies in the future could explore this potential.

2. Another critical issue that is missed from the research focus is the Islamic peer-to-peer lending model considering that many peer-to-peer lending platforms are starting to use these Sharia-based lending models because they have the potential to set a better management system referring to Islamic ethics. Few studies have explored this issue (Piiskin, 2019; Mukhammad et al., 2021). Therefore, we suggest that it is necessary to conduct a more in-depth study related to Islamic peer-to-peer lending, both in terms of performance, market share, innovation, and other related issues.

3. Many researchers (Croux et al., 2020; Gong et al., 2020; Yoon et al., 2018) have analyzed or evaluated the determinants of default risk on peer-to-peer lending platforms which show many potential failures faced by the platform. So, for further research, it is highly expected that a specific and in-depth study can propose a risk management system reform to minimize the default in peer-to-peer lending activities.
4. A review of regulatory issues and legal protection in lending activities of peer-to-peer lending is also completely missed from the literature. Very few papers were found on this important issue, one of which is a study by Kharisma (2021) which reviews the urgency of legal need for the regulation of fintech in Indonesia due to the high number of illegal fintech activities, failures and consumer data theft cases. Therefore, we expected that the contributions of other researchers, especially those with a background in business law, can contribute ideas and solutions to solve this issue.

5. We also find that recent publication trends in related fields specifically discuss various approaches to reducing credit risk or failure on the platform (Liang and He, 2020; Wang et al., 2020; Zhou and Wei, 2020; Liang and Cai, 2020; Zhang et al., 2020; Zhao et al., 2021; Muhammad et al., 2021; Gao et al., 2021; Xia et al., 2020). We suggest for further research to develop more practical innovative approaches for peer-to-peer lending platforms to increase their competitiveness, especially in attracting investors’ attention, as well as in terms of promotion by utilizing social media, considering the lack of studies that focus on exploring this issue.

7. Conclusion

This bibliometric study maps the literature that discusses the phenomenon of peer-to-peer lending. The purpose of this study is to review research publications related to peer-to-peer lending in the scientific journals indexed on the Scopus database in the last 13 years, from 2009 to 2021. A total of 191 research titles written by 436 authors were collected from the Scopus database using the keyword of ‘P2P Lending’, which is limited to the subject areas ‘Economics, Econometrics, and Finance’ and ‘Business, Management, and Accounting.’ Using VOSviewer software, we have carried out bibliometric mapping and analysis divided into co-authorship and co-occurrence, resulting in the findings of authors, countries, organizations, most popular keywords, etc.

The results of co-authorship bibliometric show that ten authors contributed the most to publications related to peer-to-peer lending, namely Zhang W., Li Y., Chen D., Wang Z., Li X., Zhang Y., Ding Y., Jiang C., Li M., and Liu Y. Meanwhile, the three most popular authors’ organizations are Purdue University, Washington University, and Tsinghua University. Furthermore, China is the leading contributor country that produces the most research related to peer-to-peer lending in the Scopus with 98 documents. Based on co-occurrence, the analysis unit of all keywords, authors’ keywords, and index keywords ranges from 5 keywords, namely p2p lending, finance, fintech, crowdfunding, and commerce.

From the existing literature, we found that the scope of research on peer-to-peer lending from the economic and business aspects can be categorized into three sub-topics: peer-to-peer lending business model, analysis on the determinants of peer-to-peer lending failure, and the contribution of peer-to-peer lending on the SMEs. Since it was first established in 2005, the peer-to-peer lending platform has played an important role in digitizing the economic and financial sector and increasing the accessibility of SMEs to access funding. Therefore, to increase innovation and the role of peer-to-peer lending in the growth of the economic, business, and financial sectors, it is necessary to carry out further research on important and urgent issues as recommended in section 5.

We have also analyzed the content for the most recent publications in the last two years since 2020 and found that the risk of default on peer-to-peer lending appears to be of increasing concern to experts in the related field. We draw this conclusion from the recent trend of related research, which still focuses a lot on discussing solutions and strategies to minimize the potential for failure in lending practices. This issue is certainly of interest to most researchers, because each financing scheme certainly has its own weaknesses. In addition to its advantages, peer-to-peer lending also has a weakness in terms of the high risk of failure, because the platform still has limitations in accessing credit history information from prospective borrowers, unlike banks that have complete information on this matter (Borello and Veronica, 2015; Suryono et al., 2019).

Theoretically, our study contributes to peer-to-peer lending literature by making it easier for readers and researchers to track the development of studies in related fields through bibliometric mapping. The findings of this study can provide recommendations for further research areas for other researchers. Practically, this study provides knowledge and information for stakeholders, businessmen and investors to identify important issues regarding peer-to-peer lending that are of concern to the world, so they can pay more attention to these issues and contribute to providing solutions.

7.1. Limitation and study forward

Similar to other studies, our study also has some limitations, bibliometric analysis is limited to publications in the Scopus database. Future research can collect papers from other index databases, such as the Web of Science to see other possible interesting issues to analyze. In addition, adding data from different databases also makes it possible to find what has been missing since 2005, when the peer-to-peer lending platform was first discovered, given the availability of publications in the Scopus database only appeared from 2009.

Declarations

Author contribution statement

Himitul Kholidah: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Hanif Yuliattul Hijriyah: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Imron Mawardi: Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Nurul Huda: Performed the experiments; Wrote the paper.

Sri Herianingrum; Bani Alkausar: Conceived and designed the experiments; Wrote the paper.

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The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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