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## Article

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# Unmasking privacy apprehension: A bibliometric review of mobile sharing economy applications

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## ABSTRACT

The emergence of mobile applications (apps) that utilize sharing economy concepts has revolutionized multiple industries, including transportation, accommodation, healthcare, and other sectors. With the nature of massive data collection and sharing policies, these platforms create serious privacy concerns for their users, even though they enhance existing services and enable new economic potential. This research identifies the key contributors and knowledge concerning privacy apprehensions and mobile sharing economy apps. We analyze downloaded bibliographic data from 201 papers from the Scopus database and present the main contributors in the field based on criteria such as journal, article, author, institution, and country. We further employ keyword co-occurrence and thematic mapping techniques to create a scientific map that reveals three distinct groups (clusters) and pinpoints the prominent papers for each cluster. This paper offers valuable insights into the literature's current progress and points out potential directions for future research in terms of privacy concerns in mobile sharing economy apps.

## Introduction

While the sharing economy is not a new topic (Felson & Spaeth, 1978), the broad expansion of mobile device usage has fueled growth in the number of mobile applications (apps) and has facilitated a paradigm shift across various industries, including transportation, accommodation, and related sectors (Sutherland & Jarrahi, 2018). This transformation has greatly affected consumers' behavior and their expectations, while also revolutionizing traditional business models (Hamari et al., 2016). Even though these mobile apps offer exceptional convenience for consumers, generate economic opportunities, and optimize resource usage, they simultaneously raise significant privacy concerns due to their extensive data collection behavior as well as their sharing practices (Lutz et al., 2018; Teubner & Flath, 2019).

The intersection of mobile technology and the sharing economy has created a complex ecosystem where consumer data flow freely, and even some mobile apps and services will not function properly without users' permission to allow access to their app data (Acquisti et al., 2015). When having the need to use a service provided by a mobile app, consumers also worry about the security of their personal information and have no choice but to give up their information security in order to enjoy the

usefulness of a mobile service. This phenomenon has brought forth the concept of the privacy paradox, which refers to the disparity between users' stated privacy concerns and their actual conduct (Barth & De Jong, 2017; Kokolakis, 2017). Privacy concerns encompassing mobile sharing economy apps are particularly pertinent given the increasing integration of these platforms into daily life and their potential to reshape urban mobility, resource utilization, and social interactions (Frenken & Schor, 2019; Möhlmann, 2015).

The instantaneous growth of mobile sharing economy platforms has surpassed the advancement of comprehensive privacy frameworks and regulations, creating a pressing need for research that addresses the unique challenges posed by their technological and sociological advancements (Tikkinen-Piri et al., 2018). Sizable investigations have been carried on the privacy matters on mobile applications in general (Gerber et al., 2018). Even though many review papers have investigated the sharing economy, they either adopt a different review approach, utilize different tools and datasets, have a different scope, or are dated. Barth and De Jong (2017) evaluated discrepancies between users' attitudes toward privacy and their actual online behavior by utilizing systematic literature review methods on 32 articles, which differs from the bibliometric approach (Donthu et al., 2021). Kraus et al.

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(2020) used CiteSpace visualization software to analyze bibliometric data of 326 publications over the period 2013–2020 from the Web of Science Core Collection database and solely focused on the sharing economy. Pandita et al. (2023) utilized Bibliometrix-R package and data from Scopus within the domain of “Business, Management, and Accounting”, however, they solely focused on the topic of “sharing economy” within the period 2010–2020. Consequently, there exists a compelling necessity for a contemporary research endeavor that offers a more up-to-date perspective with a heightened focus on aspects directly pertinent to mobile app users and any associated privacy implications.

This study addresses the evolving landscape of mobile application usage while simultaneously examining the critical dimension of user privacy in the mobile ecosystem within the sharing economy concept. Building upon this identified research problem, our study conducts a comprehensive bibliometric analysis of users’ privacy concerns in the context of mobile sharing economy apps using data exclusively from Scopus. This approach allows us to chart out the intellectual landscape of privacy research in this specific domain, trace its development, predict its evolution, and identify emerging trends and research gaps in this field.

By focusing on privacy concerns within mobile sharing economy applications, our study offers a unique perspective that distinguishes it from other bibliometric analyses, as those cover a broader scope of privacy or sharing economy fields. Scopus is chosen as the data source for this research, because it offers a comprehensive and curated database, provides a robust foundation for our analysis, and offers extensive coverage of peer-reviewed literature across various disciplines (Baas et al., 2020). Hence, the following research questions are addressed.

RQ1: What are the most notable and influential contributors (e.g., journals, articles, authors, institutions, countries) in the research of privacy concerns in mobile sharing economy apps?

RQ2: What are the prominent themes and clusters that have emerged from research in the context of privacy concerns and mobile sharing economy apps?

RQ3: What are the recommendations for future research of privacy concerns in mobile sharing economy apps?

The rest of the paper runs as follows. Section 2 is a literature review, followed by the methodology in section 3. Sections 4, 5, and 6 address RQ1, RQ2, and RQ3, respectively. Section 7 concludes.

## Literature review

The sharing economy has established a notable socio-economic phenomenon, with Cheng et al. (2018) indicating substantial growth in relevant research from 2013 to 2016. Frenken and Schor (2019) offered a fundamental definition in which the most vital function of a digital platform is being an enabler for peer-to-peer transactions of underutilized assets. The literature has investigated various aspects of the sharing economy, including motivations for participation (Hamari et al., 2016) and user segmentation (Guttentag et al., 2018). Its effect on traditional businesses is significant, such as on hotels (Zervas et al., 2017) and the transportation sector (Cramer & Krueger, 2016).

Bibliometric reviews (Cheng, 2016; Ertz & Leblanc-Proulx, 2018) have identified emerging research clusters and the interdisciplinary characteristics of the topic, encompassing business, information systems, and environmental studies. These papers emphasize the dynamic and evolving nature of the sharing economy, indicating chances for further research into its societal, economic, and environmental impacts. Additionally, the growth of mobile sharing economy applications has intensified privacy concerns. Acquisti et al. (2015) provided a comprehensive overview of privacy economics, highlighting the unique challenges posed by digital platforms. Applying empirical data from a ride-sharing service, Karwatzki et al. (2017) tested users’ data privacy concerns and found that their perceptions of risks significantly influence their willingness to disclose personal information. Lutz et al. (2018) also showed that trust in a service platform provider is the most important

factor in mitigating privacy risks.

There is clearly a limitation in research that integrates privacy concerns over mobile app usage within the sharing economy. Thus, a significant gap in the literature exists, particularly systematizing privacy apprehensions in the context of mobile sharing economy apps. To address the gap, this study calls attention to it by conducting a bibliometric review, providing a broad assessment of the present status of privacy concern in mobile sharing economy apps, and pinpointing potential areas for further exploration.

## Methodology

### Scope of study

This research focuses on identifying the key contributors (e.g., journals, articles, authors, institutions, countries), clustered knowledge, and future research directions for privacy concerns in mobile sharing economy apps. The setting herein covers various aspects of privacy, mobile applications, and the sharing economy, as shown by the overarching research topics (RQ1–RQ3).

### Tools and technique

This research combines the main techniques and enrichment techniques of bibliometric analysis (Donthu et al., 2021) to trace the evolutionary arc on mobile apps in the sharing economy in terms of privacy concerns. It employs bibliometric methodologies as its foundational analytical framework, aiming to clarify the current landscape of surrounding privacy issues within the domain of mobile sharing economy applications as well as to uncover potential research fields (Lim & Kumar, 2024). Bibliometric methods utilize quantitative analytics and possess advantages in terms of objectivity and the ability to adhere to rigorous review protocols (Donthu et al., 2021). The main techniques applied to systematize the literature on privacy concern in mobile sharing economy applications are performance analysis and science mapping. Performance analysis involves assessing publication trends, citation counts, and the impacts of various authors and journals, thereby identifying key contributors and influential works in the field. Science mapping visually delineates the interconnections among diverse research themes, key terms, and authors, facilitating a thorough comprehension of the evolution of privacy concerns over time.

Clustering and network analysis visualization help facilitate the interpretation of interrelationships as well as identify gaps in the literature, suggesting new avenues for future study (Donthu et al., 2021). The more widely utilized algorithms are Louvain Glänzel and Thijs (2017), Leiden (Colavizza et al., 2021), Infomap (Velden et al., 2017), and OSLOM (Order Statistics Local Optimization Method) (Šubelj et al., 2016). Among the four, Leiden is one of the best choices due to its ability to generate internally connected clusters. Unlike other algorithms, especially Louvain, that frequently produce disconnected or poorly connected communities, the Leiden algorithm includes a refinement phase that divides initially identified clusters into well-connected sub-groups, ensuring internal connectivity within clusters (Traag et al., 2019). This is an important factor, because disconnected sub-groups can lead to misleading conclusions in analyses assuming functional or topical coherence within communities. The Leiden algorithm is proven to be more effective and efficient for delineating cancer service areas, maximizing community flows while minimizing inter-community flows (Wang et al., 2021). For these reasons, this research chooses the Leiden algorithm. To visualize the network we use two specialized softwares: VOSviewer software (Van Eck & Waltman, 2014) and the bibliometrix package in R software (Aria & Cuccurullo, 2017). The purpose of this parallel software usage is to reduce interpretation bias, which is a known limitation in qualitative evaluations (Donthu et al., 2021; MacCoun, 1998).

Data collection

We follow PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow (Page et al., 2022) to select publications for this evaluation as presented in Fig. 1 (Moher et al., 2015). As this research examines privacy in mobile sharing economy apps using bibliometric methodologies, the search parameters used to encompass document kinds include articles, conference proceedings, and reviews, source types including journals and conferences, those written in English, and a publication period from 2011 to 2024. Conference papers is also accepted in this research since it captures rapid dissemination of current research findings and emerging trends before they appear in journals, making them essential indicators of field developments. From a bibliometric perspective, conference papers help measure research impact through citation patterns and collaboration networks, revealing how knowledge flows between researchers and institutions (Ahmi et al., 2019; Chigarev, 2022). The period 2011–2024 is chosen, because these

years carefully align with how the sharing economy has grown and changed in mobile apps. The year 2011 marks a pivotal point in this field with the launch of Airbnb’s mobile app. This mobile application has significantly expanded the accessibility and reach of peer-to-peer accommodation services (Guttentag, 2015). This research period also encapsulates the rapid growth and diversification of sharing economy platforms, such as transportation (e.g., Uber in 2010) or task-based services (e.g., TaskRabbit in 2012) (Rogers, 2015; Sundararajan, 2017). By extending our analysis to 2024, we see not only the initial growth of these platforms, but also their later trends, and the growing attention paid to user privacy issues.

This 13-year period enables us to delineate the evolution of study focus on privacy concerns in the sharing economy, along with the growing sophistication and use of mobile applications (Cohen & Kietzmann, 2014). This timeframe enables an overall examination of the evolution of privacy concerns regarding technological progress, change in user behaviors, and possible new regulatory frameworks, while also

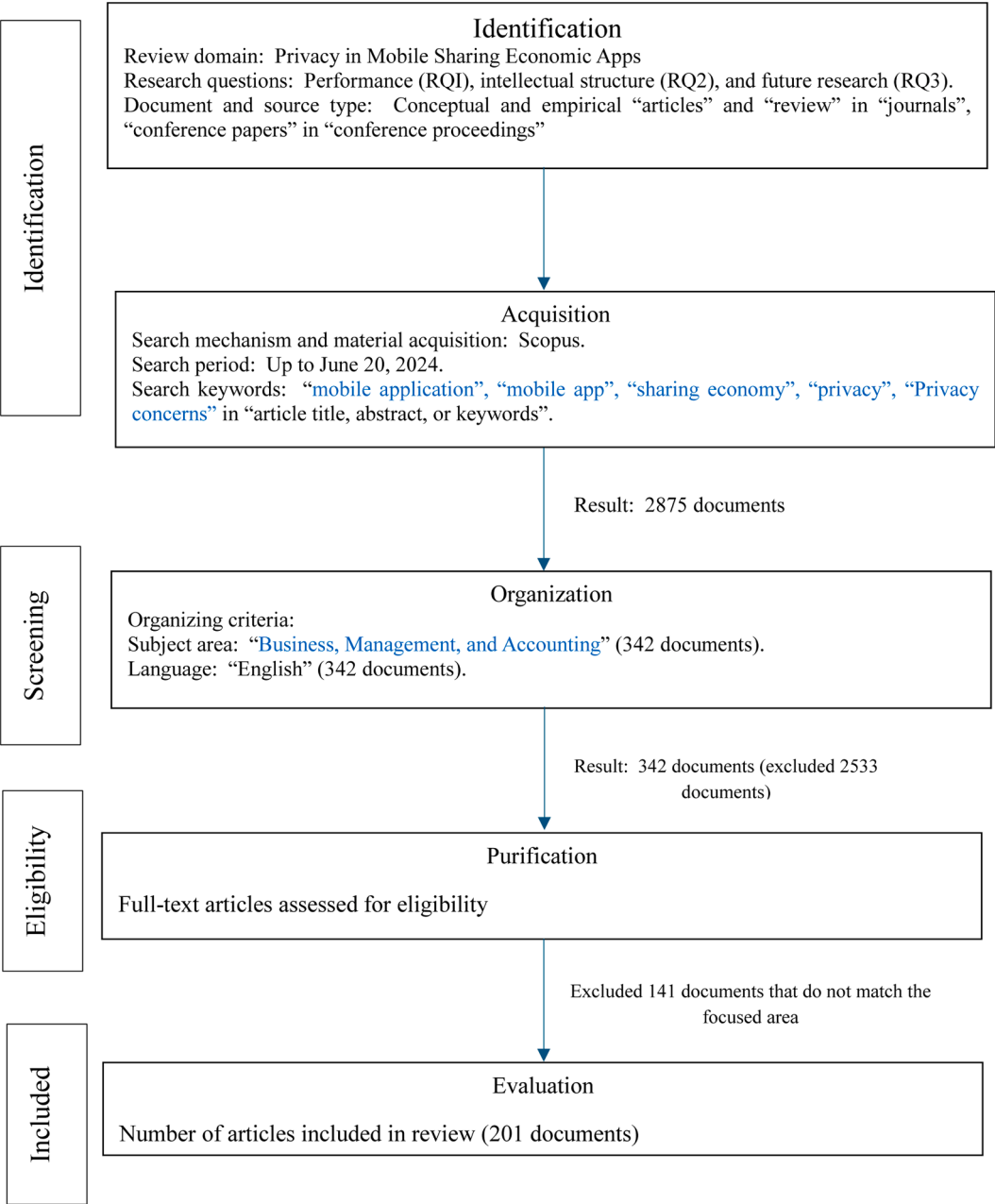


Fig. 1. PRISMA.

offering a thorough evaluation on the development of this field, from its early day to the present. We used “privacy”, “privacy concern”, “sharing economy”, “mobile application”, and “mobile apps” as keywords when searching Scopus for article title, abstract, and keywords.

We select Scopus to gather data for several compelling reasons. First, it includes rigorously evaluated articles, ensuring their relevance in scientific and scholarly domains, and provides an extensive array of bibliometric data for indexed publications (Paul et al., 2021). Second, it has established itself as a trustworthy repository of bibliometric information, with its measures correlating remarkably well with other scientific databases like Web of Science (WoS) (Archambault et al., 2009). The overlap between Scopus to WoS is as big as 84 % (Gavel & Iselid, 2008). Third, Scopus offers more comprehensive coverage versus WoS (Paul et al., 2021) and a broader range of journals that meet stringent quality criteria (Mongeon & Paul-Hus, 2016). This extensive coverage, coupled with its user-friendly and feature-rich interface, makes Scopus a preferred choice for comprehensive scholarly research and bibliometric analysis (Donthu et al., 2021; Ruparel et al., 2023; Singh et al., 2021). Lastly, most journals indexed in WoS are also included in Scopus (Singh et al., 2021).

The selection of the set of keywords also needs to be documented. The dataset from Scopus offers two options when searching for keywords: “author keywords” and “keywords plus”. Even though they are both equally efficient, “author keywords” is more likely to be able to capture the content of the articles comprehensively (Zhang et al., 2016). Therefore, we apply “author keywords” to ensure that the theme of the articles fit our research objectives.

The data gathering part of our investigation was conducted on June 20, 2024. Regarding query operators, we first use the “AND” operator for the three keyword subsets and obtain a rather small sample set. We then proceed to try a second searching method in which we use the “AND” operator for each pair of keyword subsets, and the result is much better. When we manually check the articles in these second datasets, many of them fit the scope of our research perfectly without having all the related keywords, but they got eliminated in the first run.

For the third run, we decide to use the “OR” operator when searching for results to ensure we do not miss any relevant articles. After this step, we follow PRISMA and proceed to conduct multi-layer filtering to ensure the final dataset is reliable. The filtering process includes coding, matching, and ranking articles according to the presence of keyword combinations in the article’s title, author keywords, and abstract. For example, if an article’s title contains enough keywords related to all three subsets (“privacy”, “sharing economy”, and “mobile app”), then it earns a score of three, with the score being deducted accordingly for any missing keyword subset. The same rule applies to author keywords and abstracts. However, we acknowledge that article titles can be named in various ways according to authors’ preferences, and author keywords are chosen based on authors’ focus. Therefore, the scores have different weights, with the weighting score of abstract, author keywords, and title decreasing orderly.

The overall score is then calculated and ranked again, with the abstract score as the second sorting layer, since abstracts are more likely to have enough space for authors to include related information, even if it is not the main theme of their research. After eliminating articles that do not meet the base requirements, we manually read and filter the remaining articles, as well as check the eliminated articles with middle-high scores to minimize the chance of missing out on relevant studies. The result is a sample set of 201 articles that fit our research scope. The initial inquiry covers a total of 2875 academic publications. After the first screening process, we exclude 2533 publications not related to the “Business, Management, and Accounting” field, resulting in a selection of 342 papers deemed suitable for further evaluation. We then implement stricter criteria for inclusion, resulting in the exclusion of an additional 141 articles that do not clearly focus on privacy concerns in mobile-based sharing economy applications. After this thorough filtration process, we end up with a final corpus of 201 publications

considered relevant to our research area.

## Results from performance analysis

### Publication trend (RQ1)

Fig. 2 shows the distribution of 201 publications that have keywords related to the topic of privacy concern in mobile sharing economy apps from 2011 to 2024. The data show a clear evolution in research output, starting with a modest number of published papers and culminating and reaching a significant peak before a recent decline. From 2011 to 2015, publication numbers remain low, with only two publications of Toch (2011) and Benats et al. (2011) in their year. However, 2017 marks the beginning of a rapid growth phase, as the number of publications doubles from 7 papers in the previous year to a peak of 37 in 2020. This five-year period of expansion likely indicates increasing interest and research activity in the field. Interestingly, after reaching this zenith, the trend reverses, with publication numbers declining to 33 in 2021 and then further to 24 and 21, and finally to 11 in 2024. Despite this recent downturn, a dotted trend line overlaid on the graph suggests an overall upward trajectory across the entire period. This pattern of growth followed by decline could reflect various factors, such as maturation of the research area, shifts in funding priorities, or possibly incomplete data for the most recent year since our analysis starts before the end of 2024.

### Journal performance (RQ1)

As seen in Fig. 3, ACM (Association for Computing Machinery) International Conference Proceeding Series - ICPS appears to be one of the best options for researchers to submit their paper with 11 published papers on privacy concern in mobile sharing economy apps. Following closely is JMIR (Journal of Medical Internet Research) Health and Unhealth with 9 publications, indicating a strong focus on mobile health applications within the sharing economy context and most likely addressing privacy issues in health-related mobile apps. IEEE (Institute of Electrical and Electronics Engineers) Access has 8 publications, further emphasizing the technical aspects of privacy concerns in these mobile applications. The Journal of Medical Internet Research contributes 4 publications, suggesting that privacy in health-related mobile sharing platforms is a key area of interest.

When we refer to Table 1 and apply Total Citation (TC) as the main criterion for comparison, we see that IEEE Access emerges as the most influential source, boasting 746 total citations from 8 publications and an h-index of 6 that demonstrates its significant impact in the domain. Right behind is the International Journal of Contemporary Hospitality Management, which, despite having only 2 publications, has garnered 289 citations that indicates exceptional influence per paper. The ACM International Conference Proceeding Series leads in publication volume with 11 entries, though its total citation count of 181 suggests a broader yet potentially less concentrated impact. JMIR mHealth and uHealth stands out with the highest h-index of 7, underlining its consistent citation performance.

The interdisciplinary nature of related research is evident from the diverse array of journals represented, spanning computer science, hospitality management, business ethics, marketing, and healthcare. This variability highlights the complex consequences of privacy issues in mobile sharing economy applications across different sectors. While conference proceedings like ACM’s series show high publication numbers, journals typically accumulate more citations per paper (Zhang & Glänzel, 2012), indicating a perhaps more significant long-term effect for journal publications. The advent of new platforms concentrating on development and policy issues, such as Information Technology for Development and Internet Policy Review, indicates shifting research trajectories in this domain.



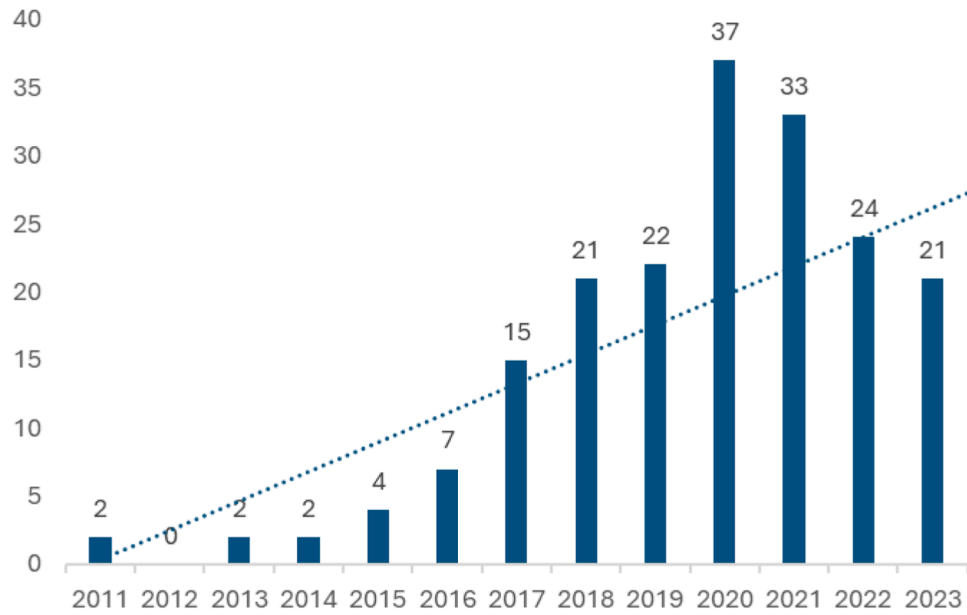


Fig. 2. Publication trend of research about privacy concern in mobile sharing economy apps.

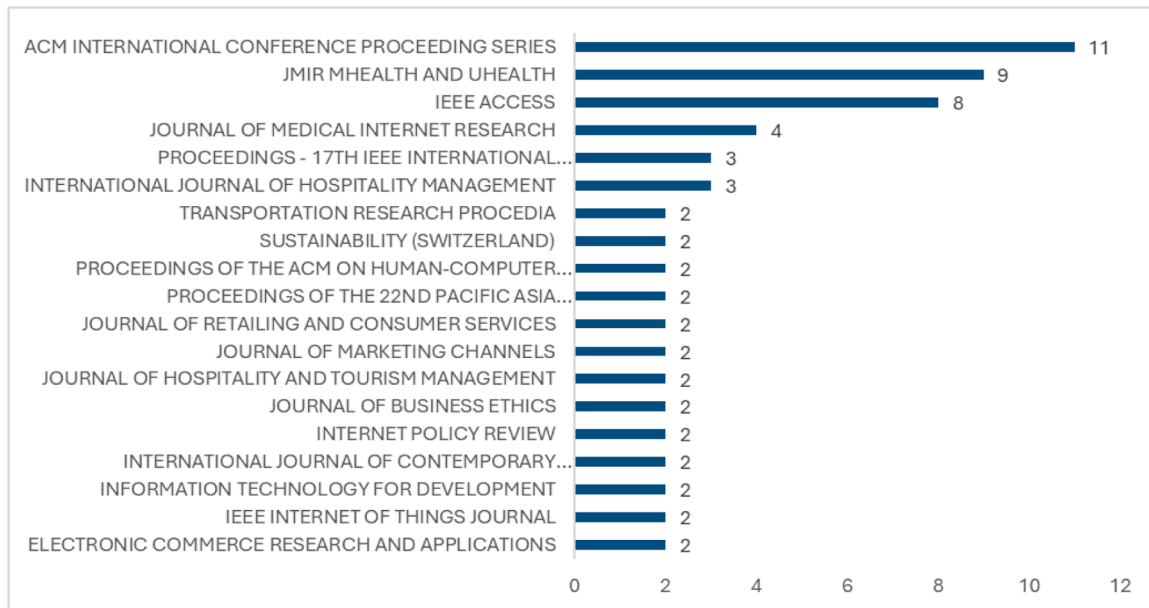


Fig. 3. Most productive journals for research about privacy concern in mobile sharing economy apps.

### Article performance (RQ1)

#### Global citations

Table 2 provides a detailed summary of the most significant articles regarding privacy issues in mobile sharing economy applications, ranked by their Total Global Citations (TGC). Blockchain applications in healthcare, consumer adoption of ride-sharing apps, Internet of Things (IoT) and smart city services, data security, and trust in sharing economy platforms such as Airbnb are among the topics covered. This topical diversity highlights the complex nature of privacy concerns in the context of mobile sharing economy. Notably, there is a noticeable concern on blockchain technology, with the top two most-cited papers (Liang et al., 2017; Nguyen et al., 2019) focusing on its application in healthcare data sharing and suggesting its perceived potential in addressing privacy and security concerns in sensitive data sharing

scenarios.

The interdisciplinary nature of this research area is evident, with contributions spanning computer science, healthcare, tourism, marketing, and information systems and reflecting the complex and far-reaching implications of privacy in the sharing economy. The most cited paper, “Integrating blockchain for data sharing and collaboration in mobile healthcare applications” (523 citations), significantly outperforms others, establishing its landmark status in the field. “Blockchain for Secure EHRs Sharing of Mobile Cloud Based E-Health Systems” comes second with TGC = 399, and “Consumer adoption of the Uber mobile application: Insights from diffusion of innovation theory and technology acceptance model” is the third most cited paper (283 citations). Publication venues are diverse, with IEEE publications featuring prominently and suggesting a strong technical and engineering perspective in the research. Many studies focus on practical applications

**Table 1**

Most impactful journals for research about privacy concern in mobile sharing economy apps.

Journal title	TC	NP	Start PY	h_index
IEEE ACCESS	746	8	2018	6
INTERNATIONAL JOURNAL OF CONTEMPORARY HOSPITALITY MANAGEMENT	289	2	2017	2
ACM INTERNATIONAL CONFERENCE PROCEEDING SERIES	181	11	2011	3
JMIR MHEALTH AND UHEALTH	165	9	2018	7
JOURNAL OF BUSINESS ETHICS	155	2	2019	2
JOURNAL OF HOSPITALITY AND TOURISM MANAGEMENT	104	2	2020	2
JOURNAL OF RETAILING AND CONSUMER SERVICES	82	2	2020	2
JOURNAL OF MARKETING CHANNELS	81	2	2017	2
ELECTRONIC COMMERCE RESEARCH AND APPLICATIONS	73	2	2018	2
JOURNAL OF MEDICAL INTERNET RESEARCH	58	4	2020	4
PROCEEDINGS OF THE ACM ON HUMAN—COMPUTER INTERACTION	51	2	2018	2
IEEE INTERNATIONAL CONFERENCE ON TRUST SECURITY AND PRIVACY IN COMPUTING AND COMMUNICATIONS	44	3	2018	3
IEEE INTERNET OF THINGS JOURNAL	44	2	2020	2
INTERNATIONAL JOURNAL OF HOSPITALITY MANAGEMENT	36	3	2020	2
INFORMATION TECHNOLOGY FOR DEVELOPMENT	35	2	2021	2
SUSTAINABILITY (SWITZERLAND)	35	2	2019	2
INTERNET POLICY REVIEW	23	2	2021	2
IEEE INTERNATIONAL CONFERENCE ON SYSTEMS MAN AND CYBERNETICS	9	1	2017	1
INTERNATIONAL CONFERENCE ON CONTEMPORARY COMPUTING	7	1	2018	1
AMERICAS CONFERENCE ON INFORMATION SYSTEMS	6	1	2019	1
INTERNATIONAL CONFERENCE ON ELECTRONICS MATERIALS ENGINEERING AND NANO-TECHNOLOGY	5	1	2018	1
ANNUAL CONFERENCE ON PRIVACY SECURITY AND TRUST	4	1	2015	1
INTERNATIONAL CONFERENCE FOR INTERNET TECHNOLOGY AND SECURED TRANSACTIONS	4	1	2017	1
INTERNATIONAL CONFERENCE ON CONTEMPORARY COMPUTING	3	1	2014	1
INTERNATIONAL CONFERENCE ON ADVANCES IN COMPUTING CONTROL AND TELECOMMUNICATION TECHNOLOGIES	1	1	2022	1

Notes: TC = total citations. TP = total publications. Start PY = start of publication year.

and real-world scenarios, highlighting the immediate relevance of this research to current technological and business challenges. The top TGC 20 papers come from a variety of journals without any dominant journal. Only IEEE Access and Journal of Business Ethics exhibit two occurrences.

#### Local citations

Table 3 presents a refined view of the most impactful articles related to privacy concerns in mobile sharing economy apps, using Total Local Citations (TLC) as the sorting criteria. The most influential article, “The sharing economy: Why people participate in collaborative consumption” (Hamari et al., 2016), leads with 12 citations, suggesting its central importance to the field. “An extended privacy calculus model for e-commerce transactions” with TLC = 9 has the second highest citations. Three other papers, “You are what you can access: Sharing and collaborative consumption online”, “Trust and reputation in the sharing economy: The role of personal photos in Airbnb”, and “Evaluating Structural Equation Models with Unobservable Variables and

**Table 2**

Most impactful articles according to global citations for research about privacy concern in mobile sharing economy apps.

Article title	Author(s)	Year	Journal title	TGC
Integrating blockchain for data sharing and collaboration in mobile healthcare applications	Xueping Liang; Juan Zhao; Sachin Shetty; Jihong Liu; Danyi Li	2017	The 28th Annual IEEE International Symposium on Personal, Indoor and Mobile Radio Communications	523
Blockchain for Secure EHRs Sharing of Mobile Cloud Based E-Health Systems	Dinh C. Nguyen; Pubudu N. Pathirana; Ming Ding; Aruna Seneviratne	2019	IEEE Access	399
Consumer adoption of the Uber mobile application: Insights from diffusion of innovation theory and technology acceptance model	Somang Min, Kevin Kam Fung So, Miyoung Jeong	2018	Journal of Travel & Tourism Marketing	283
Blockchain and IoT-Based Cognitive Edge Framework for Sharing Economy Services in a Smart City	Md. Abdur Rahman; Md. Mamunur Rashid; M. Shamim Hossain; Elham Hassanain; Mohammed F. Alhamid; Mohsen Guizani	2019	IEEE Access	254
Inside the sharing economy: Understanding consumer motivations behind the adoption of mobile applications	Ge Zhu, Kevin Kam Fung So, Simon Hudson	2017	International Journal of Contemporary Hospitality Management	238
Spatial crowdsourcing: a survey	Yongxin Tong, Zimu Zhou, Yuxiang Zeng, Lei Chen, Cyrus Shahabi	2020	The International Journal on Very Large Data Bases	196
Fast, scalable detection of “Piggybacked” mobile applications	Wu Zhou, Yajin Zhou, Michael Grace, Xuxian Jiang, Shihong Zou	2013	Proceedings of the Third ACM Conference on Data and Application Security and Privacy	192
The effect of the perceived risk on the adoption of the sharing economy in the tourism industry: The case of Airbnb	Jisu Yi, Gao Yuan, Changsok Yoo	2020	Information Processing & Management	170
Who Owns the Data? Open Data for Healthcare	Patty Kostkova et al.	2016	Front Public Health	160
Evolution of Consumption: A Psychological Ownership Framework	Carey K. Morewedge, Ashwani Monga, Robert W. Palmatier, Suzanne B. Shu, Deborah A. Small	2021	Journal of Marketing	158
A Decentralised Sharing App Running a Smart Contract on the Ethereum Blockchain	Andreas Bogner, Mathieu Chanson, Arne Meeuw	2016	Proceedings of the 6th International Conference on the Internet of Things	155

(continued on next page)

**Table 2** (continued)

Article title	Author(s)	Year	Journal title	TGC
The privacy trade-off for mobile app downloads: The roles of app value, intrusiveness, and privacy concerns	Verena M. Wottrich, Eva A. van Reijmersdal, Edith G. Smit	2018	Decision Support Systems	129
What Makes Hosts Trust Airbnb? Antecedents of Hosts' Trust toward Airbnb and Its Impact on Continuance Intention	Yichuan Wang, Yousra Asaad, Raffaele Filieri	2019	Journal of Travel Research	125
The role of privacy concerns in the sharing economy	Christoph Lutz, Christian Pieter Hoffmann, Eliane Bucher, Christian Fieseler	2017	Information, Communication & Society	118
Privacy in the Sharing Economy	Timm Teubner, Christoph M. Flath	2019	Journal of the Association for Information Systems	106
Sleeping in a stranger's home: A trust formation model for Airbnb	Zhenxing (Eddie) Mao, Margie F. Jones, Mimi Li, Wei, Jiaying Lyu	2020	Journal of Hospitality and Tourism Management	95
Enabling the Sharing Economy: Privacy Respecting Contract based on Public Blockchain	Lei Xu, Nolan Shah, Lin Chen, Nour Diallo, Zhimin Gao, Yang Lu, Weidong Shi	2017	Proceedings of the ACM Workshop on Blockchain, Cryptocurrencies and Contracts	81
Sharing Economy, Sharing Responsibility? Corporate Social Responsibility in the Digital Age	Michael Etter, Christian Fieseler, Glen Whelan	2019	Journal of Business Ethics	80
The Role of Ethical Perceptions in Consumers' Participation and Value Co-creation on Sharing Economy Platforms	Waqar Nadeem, Mari Juntunen, Nick Hajli, Mina Tajvidi	2019	Journal of Business Ethics	75
Availability, readability, and content of privacy policies and terms of agreements of mental health apps	Julie M, Robillard, Tanya L Feng, Arlo B. Sporn, Jen-Ai Lai, Cody Lo, Monica Ta, Roland Nadler	2019	Internet Interventions	72

Measurement Error" share third with their TLC values all equal at 8. Amongst the top 20 papers, Information Systems Research and Harper Business are the top contributors with 2 papers each.

The number of TLC interestingly ranges from 4 to 12, while TGC appears to have a much higher range of 72 to 523 citations. The much higher TGC numbers indicate that these articles have a significant impact beyond the specific field of privacy concerns in mobile sharing economy apps. They are influencing a broader range of disciplines and research areas. High TGC numbers suggest that the concepts, methodologies, or findings in these papers are applicable to multiple fields, demonstrating the interdisciplinary nature of their research. The most cited papers of those may represent foundational works that have implications far beyond the specific focus of mobile sharing economy apps. Relatively low TLC numbers (4–12) indicate within the specific dataset of 201 articles on privacy concerns in mobile sharing economy apps that even the most influential papers have a modest citation count. Papers with high TGC but comparatively low TLC may be applying general principles or methodologies to a specific context of mobile sharing

**Table 3**

Most impactful articles according to local citations for research about privacy concern in mobile sharing economy apps.

Article title	Author(s)	Year	Journal title	TGC
The sharing economy: Why people participate in collaborative consumption	Juho Hamari, Mimmi Sjöklint, Antti Ukkonen	2016	Journal of the Association for Information Science and Technology	12
An Extended Privacy Calculus Model for E-Commerce Transactions	Tamara Dinev, Paul Hart	2006	Information Systems Research	9
You are what you can access: Sharing and collaborative consumption online	Russell Belk	2014	Journal of Business Research	8
Trust and reputation in the sharing economy: The role of personal photos in Airbnb	Eyal Ert, Aliza Fleischer, Nathan Magen	2016	Tourism Management	8
Evaluating Structural Equation Models with Unobservable Variables and Measurement Error	Claes Fornell, David F. Larcker	1981	Journal of Marketing Research	8
When is Ours Better than Mine? A Framework for Understanding and Altering Participation in Commercial Sharing Systems	Cait Poynor Lamberton, Randall L. Rose	2012	Journal of Marketing	7
Collaborative consumption: determinants of satisfaction and the likelihood of using a sharing economy option again	Mareike Möhlmann	2015	Journal of Consumer Behavior	7
Sharing	Russell Belk	2010	Journal of Consumer Research	6
Information Privacy Concerns, Procedural Fairness, and Impersonal Trust: An Empirical Investigation	Mary J. Culnan, Pamela K. Armstrong	1999	Organization Science	6
Internet Users' Information Privacy Concerns (IUIPC): The Construct, the Scale, and a Causal Model	Naresh K. Malhotra, Sung S. Kim, James Agarwal	2004	Information Systems Research	6
The Sharing Economy: The End of Employment and the Rise of Crowd-Based Capitalism	Arun Sundararajan	2016	MIT Press	6
What's Mine is Yours: How Collaborative Consumption is Changing the Way We Live	Rachel Botsman, Roo Rogers	2011	Harper Business	5
What's Mine Is Yours: The Rise of Collaborative Consumption	Rachel Botsman, Roo Rogers	2010	Harper Business	5
Assessment of the Data Sharing and Privacy Practices of Smartphone Apps	Kit Huckvale, John Torous, Mark E Larsen	2019	JAMA Network Open	5

(continued on next page)



**Table 3** (continued)

Article title	Author(s)	Year	Journal title	TGC
for Depression and Smoking Cessation				
Online Social Networks: Why We Disclose	Hanna Krasnova, Sarah Spiekermann, Ksenia Koroleva, Thomas Hildebrand	2010	Journal of Information Technology	5
Bitcoin: A Peer-to-Peer Electronic Cash System	Satoshi Nakamoto	2008	Cryptography Mailing	5
On the evaluation of structural equation models	Richard P. Bagozzi, Youjae Yi	1988	Journal of the Academy of Marketing Science	4
E-commerce: the role of familiarity and trust	David Gefen	2000	Omega	4
Privacy as a Concept and a Social Issue: A Multidimensional Developmental Theory	Robert S. Laufer, Maxine Wolfe	1977	Journal of Social Issues	4
The role of privacy concerns in the sharing economy	Christoph Lutz, Christian Pieter Hoffmann, Eliane Bucher, Christian Fieseler	2018	Information, Communication & Society	4

economy apps - hence, their broader impact (Batista-Canino et al., 2023). Low TLC numbers could also suggest that research on privacy concerns in mobile sharing economy apps is a relatively new or emerging field, drawing on established works from other areas (as indicated by high TGC numbers). Researchers in this specific field might be citing a broader range of literature beyond just mobile sharing economy apps, which could explain the lower TLC numbers. Lastly, the

disparity between TLC and TGC suggests there is potential for increased cross-pollination of ideas within the specific field of privacy in mobile sharing economy apps.

#### Author performance (RQ1)

##### Authors

The best contributors are defined by the number of papers published in the field of privacy concern in mobile sharing economy apps, as seen in Fig. 4 and Table 4. The top prolific author is Wang Y with 5 papers and h-index of 5. Three authors share the second position: Zhang C, Li J, and Guizani M with 3 publications each and a similar h-index score of 3.

##### Author collaborations

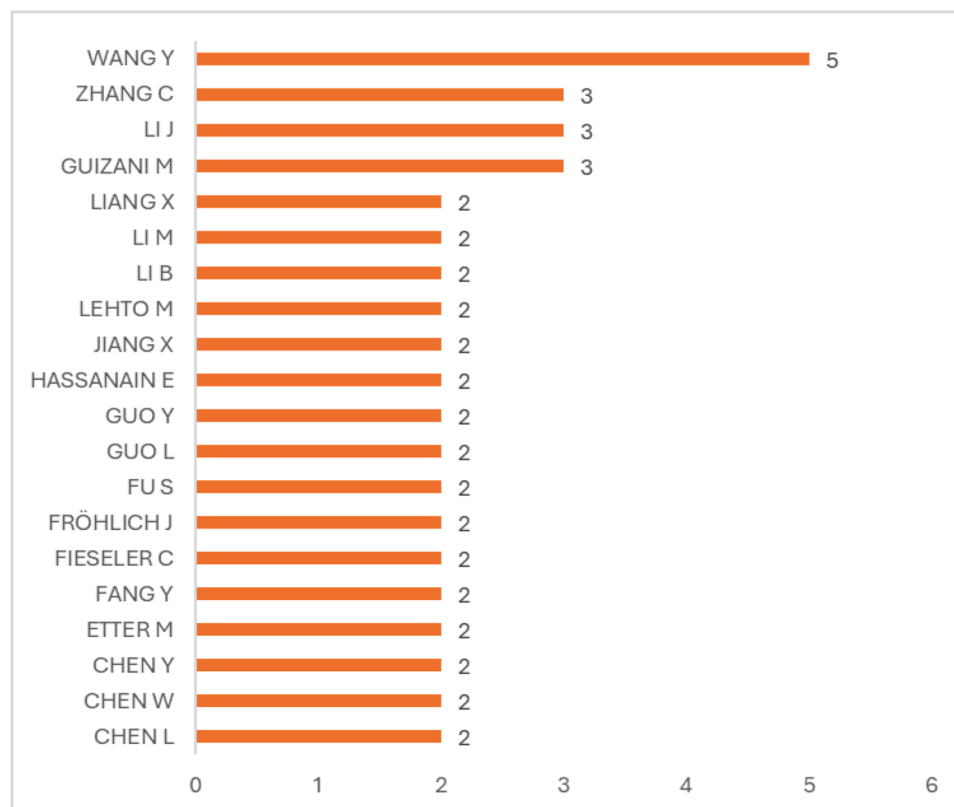
The analysis results in Fig. 5 show 11 clusters of collaboration amongst authors. While most of them (9 clusters) remain unconnected, two clusters of collaboration (Li J and Wang X) are connected via the join paper of Fu S and Chen Y.

#### Institution performance (RQ1)

Fig. 6 depicts the analysis results indicating that ULM University leads the chart with 11 publications. Fujian University of Technology and Beijing University of Technology share the second position with 8 publications. Northwestern University is third at 7 articles.

#### Country collaboration

In Fig. 7 the color indicates the intensiveness of research, with dark blue showing countries with the greatest number of papers, light blue indicating a lesser number, and gray meaning no paper published. Fig. 8 indicates that China (724 papers), Australia (488 papers), and the U.S. (439 papers) are the biggest publishers in this field.



**Fig. 4.** Most productive authors for research about privacy concern in mobile sharing economy apps. Note: Top contributing authors with a minimum of two articles.



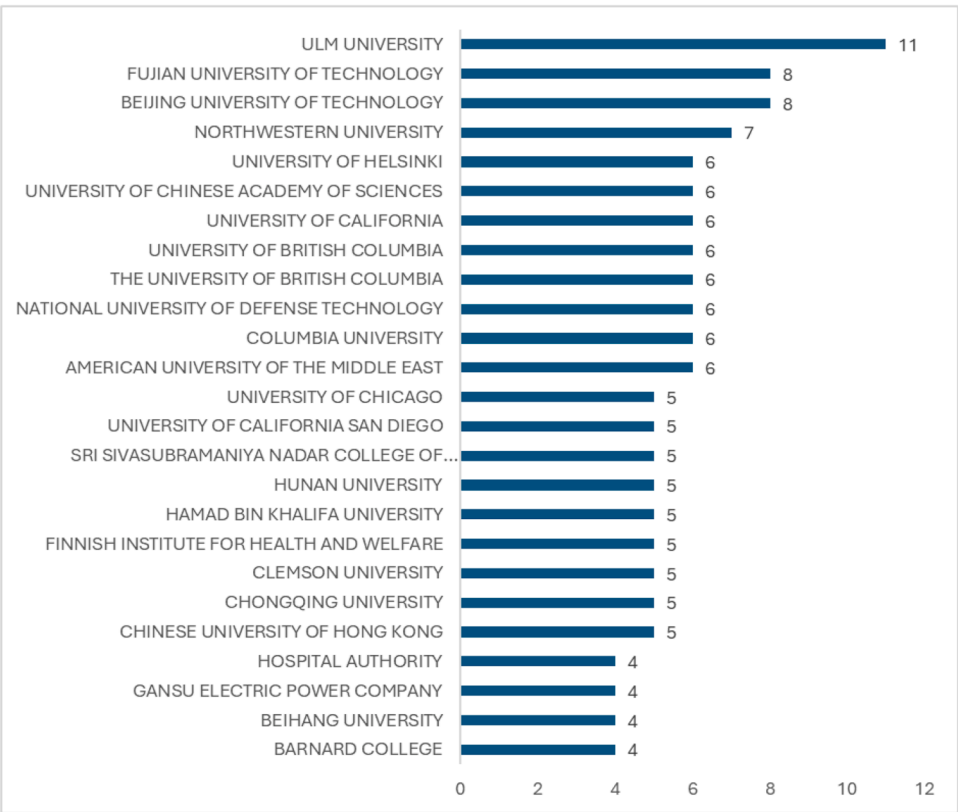


Fig. 6. Most productive institutions for research about privacy concern in mobile sharing economy apps. Note: Top contributing institutions with a minimum of four articles.

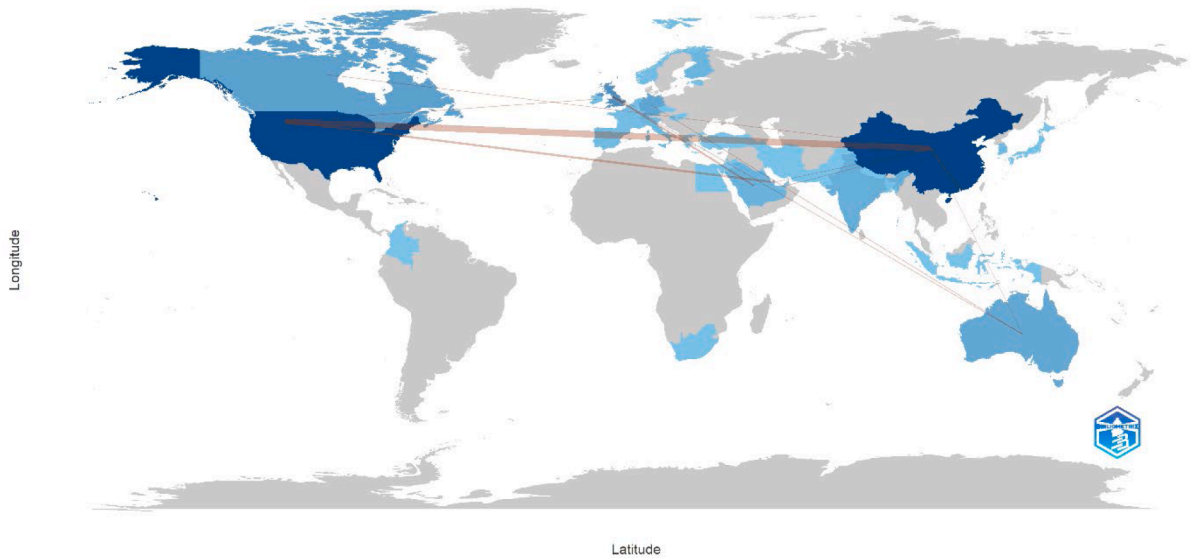


Fig. 7. Geographical density of research about privacy concern in mobile sharing economy apps.

This cluster includes 10 keywords: “app,” “apps,” “COVID-19,” “data privacy,” “mhealth,” “mobile app,” “mobile apps,” “mobile health,” “smartphone,” and “technology”. The prominence and interrelation of these terms underscore a critical research emphasis on privacy issues within health-related mobile applications, especially in light of the recent COVID-19 pandemic. The notable co-occurrence of “mobile apps” and “privacy,” evidenced by two links, reflects an enduring apprehension regarding data protection in mobile health applications (Adhikari et al., 2014). The incorporation of “COVID-19” in this cluster

underscores the significant increase in research on mobile health technologies during the pandemic, likely tackling privacy challenges associated with contact tracing and health monitoring applications (Sun et al., 2021). The presence of both singular and plural forms of “app(s)” and “mobile app(s)” indicates a thorough exploration of individual applications alongside the broader mobile health ecosystem. The connection between “data privacy” and “mobile apps” further emphasizes the specific focus on protecting sensitive health information in mobile environments (Azad et al., 2020). The addition of “smartphone” and

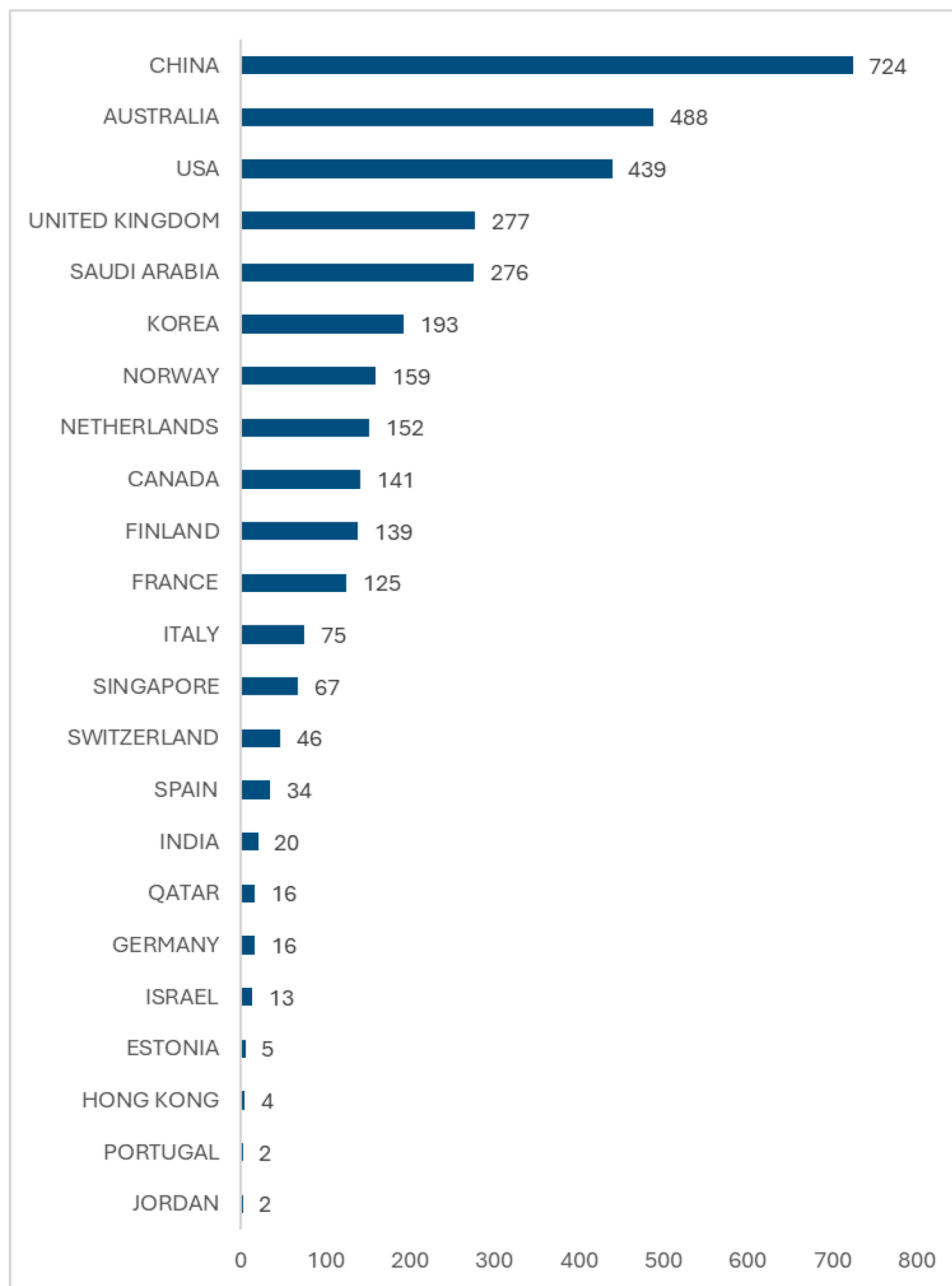


Fig. 8. Most impactful countries for research about privacy concern in mobile sharing economy apps.

“technology” in this group suggests a wider contemplation of the technical foundation that backs up mobile health apps and its impact on privacy (Vayena et al., 2018). This cluster’s makeup demonstrates the changing landscape of mobile health studies, keeping a powerful focus on equalizing benefits from mobile healthcare tech with an essential requirement for strong privacy safeguards and especially considering ongoing worldwide medical difficulties.

#### Cluster 3: Sharing economy and trust (blue)

Cluster 3 contains a total of 4 keywords, including “sharing economy,” “trust,” “Airbnb,” and “collaborative consumption”. The blue cluster, involving “sharing economy” and including “trust”, points to investigations into trust mechanisms and specific platforms within the sharing economy ecosystem (Tussyadiah & Park, 2018). “Blockchain” is presented as a link and acts like a bridge between the clusters of privacy and sharing economy. This hints at its budding role as possible technology that enhances privacy in this area (Jentzsch &

Hochgeschwender, 2019). The connectedness of links across various clusters - for instance, the connections among “privacy,” “mobile apps,” and “data privacy” - emphasizes how complex the concerns about privacy are when it comes to mobile applications for sharing economies (Barth & De Jong, 2017). This analysis offers important understanding about the prevailing research conditions, emphasizing the relationship among technological, health-related, and economic facets of privacy in the context of the mobile sharing economy (Delecroix & Epstein, 2004). Fig. 9 displays co-occurrence patterns in this study, providing a complete summary of how this field has grown over time and its current focus in terms of research.

#### Thematic clusters of privacy in mobile sharing economy apps

Fig. 10 shows a visual representation of the thematic landscape, which is created by combining frequently co-occurring keywords by

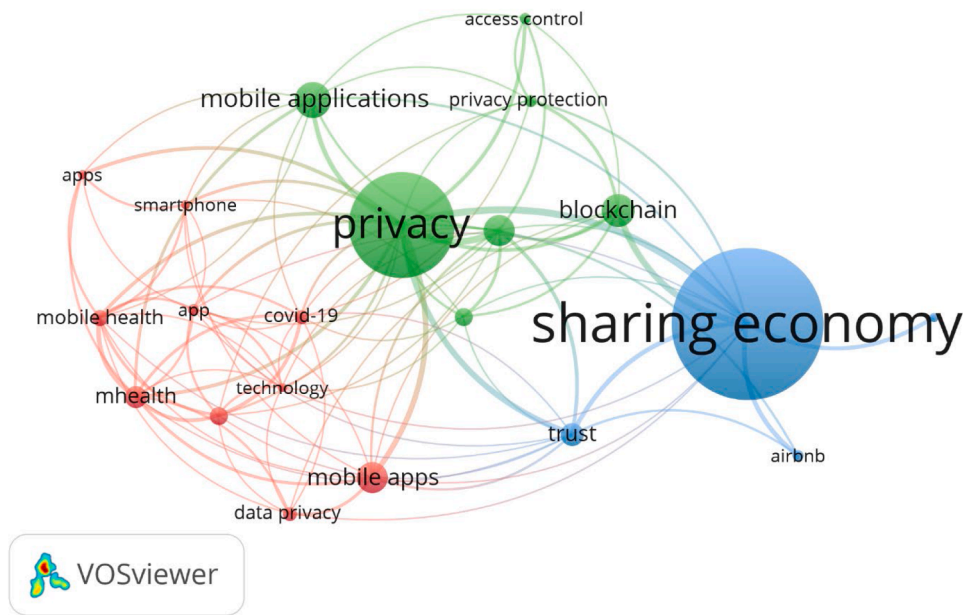


Fig. 9. Keyword co-occurrence network of research about privacy concern in mobile sharing economy apps.

authors. The arrangement of thematic clusters in the figure is based on Callon’s metrics of centrality and density (Callon et al., 1991). Callon’s centrality metric measures the level of interaction and conceptual overlap between different thematic nodes. On the other hand, Callon’s density metric assesses the internal strength and conceptual integrity of individual thematic clusters. Employing these two parameters, thematic elements are visualized on a bi-axial strategic schematic comprising four sectors. The four distinct thematic categories are: nucleus themes (highly integrated, upper right sector); specialized themes (internally cohesive, but isolated, upper left sector); nascent or waning themes

(underdeveloped, lower left sector); and core themes (pervasive yet underexplored, lower right sector) (Chen et al., 2019).

Niche themes

The quadrant of niche themes in the thematic map reveals two key topics in the field of privacy in mobile sharing economy apps: *attribute-based encryption* (including attribute-based encryption, patient-centric data privacy, personal health records) and *privacy protection* (including privacy protection, access control, ehealth, healthcare, spatial crowd-sourcing, incentive mechanism, integrity, location privacy, medical

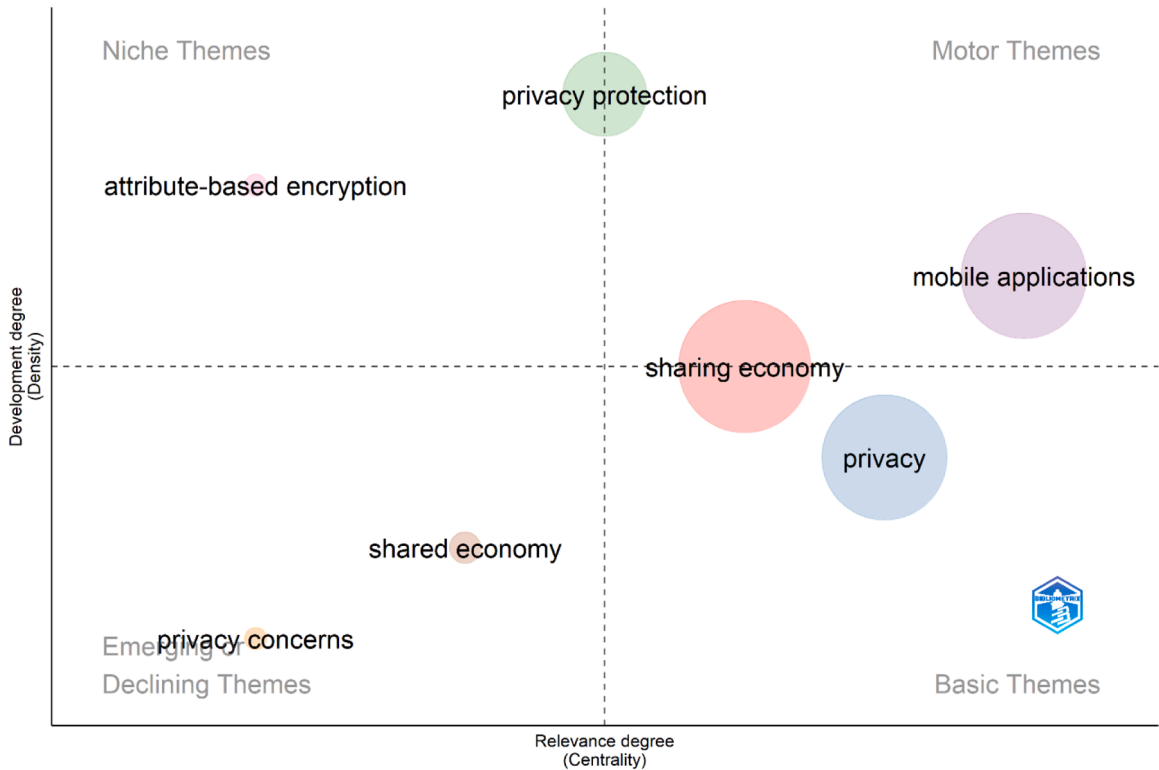


Fig. 10. Thematic map.



imaging, mobile cloud computing (mcc), mobile platform, permissioned blockchain, privacy preserving, scalability, wearable devices), with the latter straddling the border between niche and motor themes (Cobo et al., 2011). These themes are characterized by high development (density), but low centrality, indicating their specialized nature within the broader research landscape (Callon et al., 1991).

Attribute-based encryption represents a highly specialized technical solution that, while well-developed, has limited broader application in the field (Li et al., 2012). Its position suggests a mature yet narrow focus, potentially offering sophisticated solutions to specific privacy challenges (Zhang et al., 2018). Privacy protection appears to be in a transitional state, possibly evolving from a niche topic to a more central theme (Van Eck & Waltman, 2010). Its position hints at growing importance and broader relevance in the field, possibly reflecting shifting priorities in privacy research for mobile sharing economy apps (Trepte et al., 2017).

The presence of these themes in the niche quadrant contrasts with more central themes like “sharing economy” and “mobile applications” in the quadrant of motor themes, highlighting their specialized roles (Bornmann & Mutz, 2015). Researchers who focus on these niche themes are likely working on advanced and targeted topics, which, while highly developed, may not yet be widely integrated into the broader field. This positioning suggests that although these themes may have limited overall centrality, they likely play crucial roles in specific aspects of privacy protection in the mobile app sharing economy (Acquisti et al., 2015). The potential for evolution is evident, particularly for privacy protection, and seems poised to gain more centrality in future research (Zhou et al., 2017).

#### Motor themes

The motor themes of the thematic map reveal two key clusters that are central to the field of privacy in mobile sharing economy apps: *mobile applications* (including mobile applications, mhealth, mobile app, mobile health, COVID-19, data privacy, app, apps, smartphone, technology, digital health, ethics, privacy policy, contact tracing, data, data sharing, mobile phone, safety, self-management, surveillance, usability, awareness, caregiver, children, covid, data collection, data security, depression, differential privacy, health information, machine learning, mental health, survey, telehealth, telemedicine, user) and *sharing economy* (including sharing economy, blockchain, Airbnb, collaborative consumption, car-sharing, smart contract, user experience, barriers, big data, continuance intention, ethereum, privacy-preserving, qualitative research, ride-hailing, uber, value co-creation, access-based consumption, adoption, block chain, car sharing, collaborative platforms, digital platform, employment, game theory, gig economy, investments, mechanism design, motivation, online risk, participation, peer-to-peer accommodation, perceived risk, sentiment analysis, sharing, zero-knowledge proof) (Börner et al., 2003). These clusters are characterized by a high degree (density) of development and a high degree (centrality) of relevance, indicating their well-established and pivotal role in this field of research (Small, 1973).

Mobile applications emerge as the most prominent cluster, implying they form the core focus of this research and even likely encompass various aspects of app development, user interaction, and privacy integration (Bélanger & Crossler, 2011). The sharing economy cluster, while slightly less developed, maintains high centrality, highlighting the importance of understanding this economic model in the context of privacy concerns within the boundary of mobile apps (Frenken & Schor, 2019). The positioning of these clusters as motor themes signifies their status as well-established research areas with significant impacts both within their specific clusters and in connection to other topics (Zupic & Čater, 2015). They likely form the foundation upon which more specialized research is built and are probably highly interconnected, with studies often addressing the intersections among mobile applications, the sharing economy, and privacy concerns (Schor, 2016; Smith et al., 2011).

#### Emerging or declining themes

The emerging or declining themes reveal two clusters: *shared economy* (including shared economy, Internet of things, transport) and *privacy concerns* (including privacy concerns, satisfaction) (Cobo et al., 2011). These themes are characterized by a low degree (density) of development and low degree (centrality) of relevance, indicating they are either emerging topics still in development or waning themes losing importance in the field of privacy in mobile sharing economy apps (Callon et al., 1991). The presence of “shared economy” as distinct from the “sharing economy” in the quadrant of motor themes suggests a potential shift in terminology or approach, possibly representing a more nuanced aspect of the concept (Frenken & Schor, 2019). Likewise, it is a surprise to see “privacy concerns” located separate from the broader “privacy” topic in the motor themes. This might be because this is a newly identified specific issue or a shift in focus within privacy research (Baruh et al., 2017). These themes’ positioning in this quadrant presents a dual interpretation: they could be either an emerging area ripe for innovative research and fresh perspectives, or this field of research might be declining in relevance as the field evolves (Van Eck & Waltman, 2014). The low density and centrality suggest limited current connections to other topics and a lack of core influence in the field (Börner et al., 2003). This limitation also presents opportunities for groundbreaking exploration, as these themes may represent unexplored territories or shifting paradigms in the study of privacy in mobile sharing economy apps (Zupic & Čater, 2015). The relationship between these emerging or declining themes and their counterparts in the quadrant of motor themes highlights the dynamic nature of the field, showcasing how specific aspects of broader concepts evolve independently (Chen, 2006).

#### Basic themes

The basic themes cover only one cluster: *privacy* (including privacy, mobile apps, security, trust, mobile application, hipaa, IoT, privacy calculus, privacy paradox, smartphones, social media, authentication, China, consumer protection, data protection, gdpr, gps data, homomorphic encryption, personal data protection, protected health information, risks) (Small, 1973). Represented by a light blue circle in the lower right area, this cluster’s positioning offers valuable insights into its role within the field of privacy in mobile sharing economy apps. Its placement in the basic theme’s quadrant indicates that privacy is considered a fundamental and important concept, yet its development is relatively low versus themes in other quadrants (Aria & Cuccurullo, 2017).

The high centrality of the privacy cluster, evidenced by its rightward position, suggests that it is a core concept with connections to many other themes in this research area (Boyack & Klavans, 2010). However, its lower vertical placement implies that despite its importance, privacy may not be as thoroughly researched or applied as some other themes (Liu et al., 2015). As a basic theme, privacy likely represents a foundational element crucial to understanding the field, but it may not be at the forefront of current research efforts (Bélanger & Crossler, 2011). This positioning also suggests that privacy probably has stronger connections to topics within its immediate cluster rather than extensive links to external concepts (Garfield, 2009). The combination of high centrality and low-density points to significant potential for future research and development in this area. Overall, the presence of privacy as the sole basic theme underscores its fundamental importance to the field of mobile sharing economy apps while highlighting the opportunity for more in-depth research and development that could yield significant insights and advancements in this context (Barth & De Jong, 2017).

#### Research suggestions (RQ3)

From thematic cluster analysis, niche and emerging or declining themes are the most promising field for future research (Kumar et al., 2022). The emerging or declining themes (including *privacy concerns*



and *shared economy*), however, need more comprehensive analysis to discover whether they have potential to become a new field to study. Privacy concerns are composed of privacy concerns and satisfaction, which are very likely to be directly related if not a part of privacy or privacy protection in the motor theme. Similarly, shared economy is composed of shared economy, Internet of things, and transport, which can easily be a part of the sharing economy. Either if those clusters drift away from the more dominant terminology clusters due to obsolescence, superfluous per se, or the emergence of new phenomenon that require attention, their similarity would most likely cause confusion and unnecessary complications instead of any meaningful contribution to the field's current body of literature. Perhaps thoroughly analytical research solely focuses on those two clusters, checking their development over time compared to other similar clusters that could offer a better direction for interested researchers.

Niche theme, with only one cluster of attribute-based encryption (attribute-based encryption, patient-centric data privacy, personal health records) is a more promising frontier. The potential for development lies in bridging the gap between this niche theme and the more central themes in the quadrant of motor themes, particularly "privacy," "sharing economy," and "mobile applications." By finding ways to apply attribute-based encryption more broadly to these central concerns, researchers could increase its relevance and impact in the field. The opportunity to connect attribute-based encryption with "privacy protection" is also a good motivation since it can play the role of a straddler for the quadrants of niche and motor themes. This connection could lead to more robust and specialized privacy protection methods in mobile sharing economy apps. The challenge and opportunity are in expanding the application of attribute-based encryption beyond its current niche and finding ways to integrate it more deeply with the core themes of privacy, sharing economy, and mobile applications. This could include developing new encryption schemes fitted to the unique needs of users of mobile sharing economy apps or creating user-friendly implementations that make attribute-based encryption more accessible to app developers and users.

The importance of privacy concern in our study highlights critical gaps in the literature on mobile sharing economy apps. While revealing a decreasing trend in privacy-related publications, our analysis also uncovers emerging technologies that are reshaping the privacy landscape. They include blockchain for secure data sharing, edge computing for localized data processing, and advanced encryption methods like homomorphic encryption and zero-knowledge proofs. From a global perspective, our study identifies regional variations in privacy concerns and regulatory approaches, such as the EU's GDPR, China's Personal Information Protection Law, and California's CCPA, demonstrating the need for a more nuanced, international view of privacy issues. By identifying interconnected themes - mobile applications and privacy protection, mobile health and COVID-19, and sharing economy and trust - we provide a holistic understanding of the privacy ecosystem. Our comprehensive analysis of 201 research articles offers a data-driven perspective on the field's development, addressing the need for an objective overview. This global and technological focus not only contributes to the current body of knowledge, but also aims to stimulate research interest in emerging privacy solutions and cross-cultural privacy challenges in mobile sharing economy apps, guiding future investigations in this rapidly evolving area of mobile technology and privacy.

## Conclusions

The main concept of privacy concerns both in the title of our paper and as a key cluster in our bibliometric analysis underscores its central role in the field of mobile sharing economy apps. This focus directly relates to several gaps in the literature that our study addresses and fills.

First, while privacy is a persistent concern in the sharing economy, our analysis reveals a decreasing trend in the number of published

articles on this topic. This unexpected finding highlights a potential gap in the continuous examination of privacy issues, especially as mobile sharing economy apps evolve, and new challenges emerge. This paper focuses on reinvigorating research interest in this crucial area by providing a comprehensive overview of the privacy concern in mobile sharing economy apps and identifying new trends.

Second, the identification of three prominent clusters through our science mapping analysis - (1) mobile applications, privacy protection, and access control; (2) mobile apps, mobile health, and COVID-19; and (3) sharing economy and trust - reveals the multifaceted nature of privacy concerns in this domain. By elucidating these interconnected themes, our study addresses a gap in the literature that may have previously treated these aspects in isolation. This holistic approach provides researchers with a more nuanced understanding of the privacy landscape in mobile sharing economy apps.

Third, our finding that researchers may be shifting focus towards new frontiers, such as attribute-based encryption, addresses a gap in the literature regarding emerging technological solutions to privacy challenges. By highlighting this potential shift, our study can help bridge the gap between current privacy research and future technological developments in the field.

Fourth, organizations and policymakers should prioritize the integration of attribute-based encryption (ABE) into mainstream privacy protection frameworks for mobile sharing economy applications, while at the same time harmonizing this approach across different regulatory environments (GDPR, CCPA, etc.). This recommendation is particularly actionable as ABE represents an underutilized yet promising technical solution that fills the gap between robust privacy protection and usability in mobile applications. Organizations should invest in developing user-friendly implementations of ABE that are easily integrated into existing mobile sharing platforms, with special attention to creating standardized encryption schemes that comply with various regional privacy regulations. To ensure effective implementation, policymakers should establish clear guidelines for ABE adoption in mobile sharing applications, potentially making it a requirement for certain types of sensitive data transactions, while also providing incentives for organizations to upgrade their privacy protection mechanisms with this technology.

Lastly, the comprehensive nature of our bibliometric analysis, examining 201 research articles, addresses a gap in the literature by providing a broad, data-driven perspective on the state of privacy research in mobile sharing economy apps. This approach offers a more objective view of the field's development, status, and potential future directions, which may have been lacking in previous, more narrowly focused studies.

## CRedit authorship contribution statement

**Thuy-Dzung T. Pham:** Writing – original draft, Investigation, Funding acquisition, Formal analysis, Data curation. **Fang-Yi Lo:** Writing – review & editing, Supervision, Project administration, Conceptualization. **Kun-Huang Huang:** Writing – review & editing, Supervision, Methodology, Conceptualization.

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