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# Exploring the Role of Academic Social Networking Sites Amongst LIS Professionals: A Meta-Narrative Review

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**Abstract:** Academic Social Networking Sites (ASNS) has revolutionized the concept of knowledge sharing and publication pattern in academia. It offers a new paradigm to interrelate research scientists globally, influencing research communities' structure and crescendos (dynamics). This changing trend has attracted considerable attention in the research domain and the consequent impact on library & information science professionals. Due to the high operationalizing ability of these networking sites, it provides online services of collaboration and knowledge sharing. The present study reviewed 23 studies from the past that highlights the methodologies, usage pattern of ASNs, impact on professionals, different categories of services, and issues related to academics and social networking in a researcher's life. This study has implemented the *ICA framework,* a way forward to conduct meta-analysis studies in LIS, using the two most prominent citation and indexing databases, i.e., 'Scopus' and 'Web of Science'.

Moreover, this systematic review formulated four main research categories: *Usage, Impact, Services, and Issues* related to the ASNS. On further analysis of these four main research categories, eleven sub-categories evolved across four main categories. Finally, at the end of the study, specific suggestions and recommendations are provided for future studies.

**Keywords:** Research Collaboration, Information Sharing, Research Services, Research Contributions, Academic Social Networking Services, LIS professionals, ICA framework.

## 1. Introduction

Academic Social Networking Sites (ASNSs) have witnessed a considerable increase in the scholar communities. These sites help build personal profiles for interaction, share interest, ask questions, and track relevant research articles **(Nentwich & Konig, 2014)**. These sites provide social recognition and empower scholars to boost one's achievement in the field **(Bik & Goldstein, 2013)**. ASNSs have been profoundly adopted globally by higher education professionals for developing careers and research goals. With the progress of technology, educators tried to understand the pedagogical view of social networking expanding research and innovation **(Kukulska-Hulme et al., 2007; Liu et al., 2018)**. The growing body of literature has focused on several broad areas of inquiry like ASNSs as a source of personal interaction and knowledge sharing **(Eid & Al-Jabri, 2016)**. Knowledge sharing has been encouraged to promote constructivist learning and critical thinking **(García et al., 2014; Gokhale, 1995)**. Thus, higher educational institutions enable ASNSs to increase knowledge sharing among researchers **(Domingo & Garganté, 2016)**. Studies in the past have provided valuable insight into the usage of ASNSs and have helped in synthesizing the broader research trend in the field, but further investigation is needed based on the various research direction **(Chu & Meulemans, 2008; Mason, 2020; Salahshour et al., 2016; Wang et al., 2020)**. The present study aimed to determine the

publication trend and usage pattern in the past published studies. In a nutshell, the present study systematically reviews and synthesizes relevant literature to provide a comprehensive analysis of the previous studies.

### 1.1. Problem statement

Regardless of the research on ASNS, a continuous effort must be carried out to systematically review the past published related literature. It involves recognizing, combining, and evaluating the available findings to generate a robust conclusion. The present study will discover the researchers' existing trends and patterns in utilizing academic, social networking sites. The results of this study will also help fulfil the research gaps and contribute to the current body of knowledge.

## 2. Literature Review

The last decade has witnessed a considerable increment in the scientific collaboration among researchers across multiple institutions and disciplines **(Bhardwaj, 2017; Bullinger et al., 2010; Kapoor et al., 2018; Koranteng & Wiafe, 2018; Ortega, 2015; Williams & Woodacre, 2016)**. Few studies have shown that Academic Social Networking sites are "replicating the experience of socializing at conferences", developing professional networks and facilitating work diffusion **(Bullinger et al., 2010; Curry et al., 2009; Huang, 2020)**. **Nentwich & Konig (2014)** have named academic social networking a "tool for scientific marketing". This would congregate researchers to share their work, ideas, and experiences and manage a large amount of information, references, literature, and documents **(Bullinger et al., 2010)**. Academic social networking is changing the pattern of interaction between researchers and other community members on a rolling setup from time to time due to the emergence of various tools and platforms **(Veletsianos & Kimmons, 2013)**.

The research studies worldwide are being carried out to draw attention to the potentialities of using social networking in educational setup **(Livingstone & Brake, 2010; Williams & Woodacre, 2016)**. **Misra & Such (2016)** have pointed out that gender differences are apparent in using social networking sites. The ASNSs helps in sustaining a professional relationship and keep records of current research trends **(Krause et al., 2019)**. In their study, **Thelwall & Koushal (2014)** revealed that Brazilian and Indian researchers are taking good benefits of ASNSs to maximize the academic impact of their work, while countries like China, Russia, and South Korea are behind in using ResearchGate. **Ali & Vaidya (2020)** stated that most Indian social scientists perceived social media as "research and education-centric". **Shafiq et al. (2015)** revealed that ResearchGate is the most preferred social networking site. This finding is further supported by **Elsayed (2015)** and **Yu et al. (2015)** that the ResearchGate is used frequently to share publications as compared with other ASNSs. **Ortega (2015)** deduced that Academia.edu is more prevalent among humanists and social scientists while biologists mostly use ResearchGate. These ASNSs helps in instructed and collaborative learning, enhancing researchers' knowledge and increasing their resource pool **(Bicen & Uzunboylu, 2013)**. It was observed that an accelerated pace of collaboration and improving communication between researchers are viewed as the

'Potentialities of ASNSs' **(Greenhow, 2009; Zaugg et al., 2011)**. The Academic Social Networking Sites provide various research assistance, including measuring citation counts, journals' quality, Altmetrics, making the research work more influential **(Goodyear et al., 2009; Kelly et al., 2012)**. A systematic literature review intends to locate, search, and synthesize relevant studies efficiently and effectively using replicable procedures throughout every step. The systematic literature review, also known as meta-narrative reviews, motivates researchers to produce a significant result **(Wong et al., 2013)**. Meanwhile, a few studies have been conducted on systematic literature reviews on academic social networks **(Appel et al., 2019; Cao et al., 2015)**. This study will help the researcher identify research gaps and provide a roadmap to analyze the need for future studies.

### 2.1. Research Gap

The literature review shows that academic social networking sites are promptly used by researchers and other academicians for formal communication and collaboration. These platforms assist researchers in their study and act as a source of professional development. Several studies have been conducted on different ASNSs among researchers of varied disciplines belonging to several developed and developing nations, revealing their perception of ASNSs. However, there has not been much systematic review performed on academic social networking sites by researchers. Thus, a systematic review has been conducted using a novel ICA framework proposed to perform such studies, particularly in the LIS discipline.

### 2.2. Research Questions

The present systematic review proposes the following research questions:

1. What are the latest trends evolving in the studies related to ASNSs?
2. What type of research design and outcome has been addressed in the studies related to ASNSs?
3. What is the pattern in the research studies conducted on ASNSs across various countries?
4. What is the practice adopted in previous studies conducted on ASNSs among researchers of different disciplines?

3. **Research Methodology:** In order to address the research questions, investigators implemented the newly introduced meta-analysis approach, i.e., ICA (Initialization, Conceptualization, Actualization) framework, which a group of researchers has recently introduced, i.e., PBN*[1], as a way forward in the field of social sciences in general and library sciences in particular **(Vaidya et al., 2021)**. This framework is an amendment to conduct meta-analysis studies which have elaborated the entire process in three simple steps and hence adopted by the researchers in this study. These

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three steps would entail the whole process of meta-analysis research, which is proposed in the shape of a Venn diagram (figure 1). The selected databases "Scopus" and "Web of Science" were used as information searching resources in the present study. Scopus, launched in 2004, is one the largest abstract and citation database of peer-reviewed literature. It provides a comprehensive overview of global research output in life science, social science, physical science, and medicine **(Norris & Oppenheim, 2007)**. Intelligent tools like "h-index, CiteScore, SJR (SClmago Journal Rank) and SNIP (Source Normalized Impact per Paper)" available on Scopus are used to track, analyze, and visualize research papers **(Zhu & Liu, 2020)**. On the contrary, another database, i.e., Web of Science (WoS), provides comprehensive citation data from different disciplines like social sciences, social issues, planning, environmental studies, and many more. It is maintained by Clarivate Analytics, giving access to multiple databases and in-depth exploration within a discipline **(Vieira & Gomes, 2009)**.

### 3.1. Steps included in ICA Framework:

3.1.1. *Initialization:* The first step of the *ICA framework* would elaborate the planning phase, which is considered a foundational step, over which the entire research would stand erect. It has included an extensive process followed by intensive brainstorming discussion; thus, a need for meta-analysis in ASNs has been generated. It has resulted in a string of most prominent keywords suitable to both the concerned databases (as indicated in table 1), which has retrieved a set of related documents on a specific knowledge domain.

**Table 1: Search strings**

| **Databases** | **Keywords used** |
|---|---|
| Scopus | TITLE-ABS-KEY= ("academic social network*" OR "online community*" OR "networking website*" OR "social network*" OR "web2.0" "Research Gate" OR "Academia.edu" OR "Google Scholar" OR "LinkedIn" OR "social media" OR "forum") AND SUBJMAIN (3309) |
| Web of Science | TS = ("academic social network*" OR "online community*" OR "networking website*" OR "social network*" OR "web2.0" "Research Gate" OR "Academia.edu" OR "Google Scholar" OR "LinkedIn" OR "social media" OR "forum") Refined by: WEB OF SCIENCE CATEGORIES: (INFORMATION SCIENCE LIBRARY SCIENCE) Timespan: All years. Indexes: SSCI |

3.1.2. *Conceptualization:* In this stage, two phases (i.e., searching and mapping phase) have been amalgamated to conceptualize different processes, in which a set of influential research papers indexed in leading databases (here, Scopus= 321 documents and WoS=253 documents) were retrieved for the period of (2015-2020) and get it arranged on the same sheet of Microsoft Excel. Since 574 research studies were not possible to include to perform a systematic review, researchers have limited the study to one year, i.e., 2020, followed by funnelling the entire records, i.e., applying a duplication check and then evaluating the

unique 547 documents. The researchers used a few filters like ‘document and language type’ (indicated in Table 2), i.e., excluding different formats of documents, i.e., book chapters, conference proceedings, review, editorial, early access, and non-English documents. On the contrary, the papers published in the year 2020 were included (N=466) (as indicated in Table 2). Thus, a final set of 81 research articles were left out to ideate the research categories, which helped the researchers assess the evolving research pattern in ASNs.

**Table 2: Inclusion and Exclusion Criteria**

| **Criteria** | **Inclusion** | **Exclusion** |
|---|---|---|
| Timeline | 2020 | Before and After 2020 |
| Type of document | Research articles | Reviews, books, book chapters, conference proceedings, editorials, and early access articles |
| Language type | English | Non-English |

3.1.3. *Actualization:* This step discusses three phases (i.e., assessing, syntheses and recommendation) in which the entire process must be actualized for the set of 81 research articles. After thoroughly examining the title, abstract and main body of each paper, researchers found that 58 articles were found to be 'Out of the Context' research studies, which were not concentrating on the academic sites of social networking, and hence excluded further from the meta-analysis procedure. Finally, researchers are left with 23 research articles that would help unfold the various research methods and methodologies with a broad spectrum of findings to get a clear picture of the meta-analysis study. Through this step, researchers could categorize or unveil the four broad research categories with their 11 sub-categories after scrutinizing the core 23 publications (mentioned in Table 4).

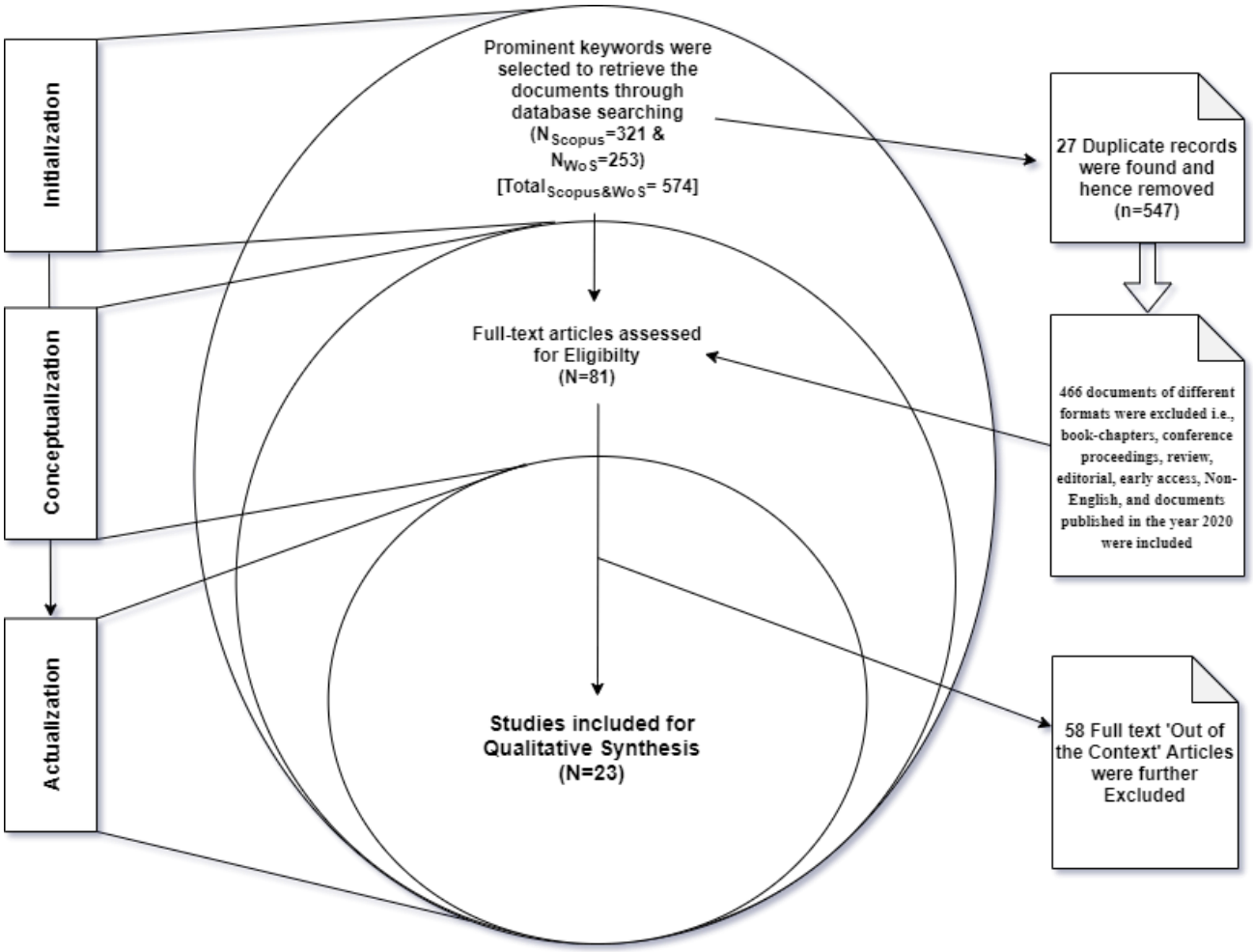


***Figure 1 The Venn Diagram for ICA Framework***

**3.2. Extraction of Research Categories and Sub-Categories:** The researchers extracted different research categories and sub-categories relevant to the current study. Thematic analysis was used to identify different categories related to the present paper. Then an inductive approach was carried out, which has involved rigorous reading of titles, abstracts, and an in-depth study of the full-text research articles. The researchers examined all 23 studies and extracted relevant keywords that answered the research question at the first step. Subsequently, in the next step, a grouping mechanism was employed using the coding technique. Here, the researchers highlighted the section of the article, primarily phrases and sentences and came up with labels or "codes" describing the content **(Sandelowski, 1995)**. After analyzing the created "codes", a pattern was identified which would combine several "codes", and thus, a "research category" was generated. Eventually, the process has resulted in four main categories: *Usage, Impact, Services, and Issues*. These research categories have ultimately spawned 11 sub-categories (Figure 2). For ensuring the validity of these developed categories and sub-categories, expert opinions were also taken to confirm the clarity, relevancy, and appropriateness of each category and its sub-categories.

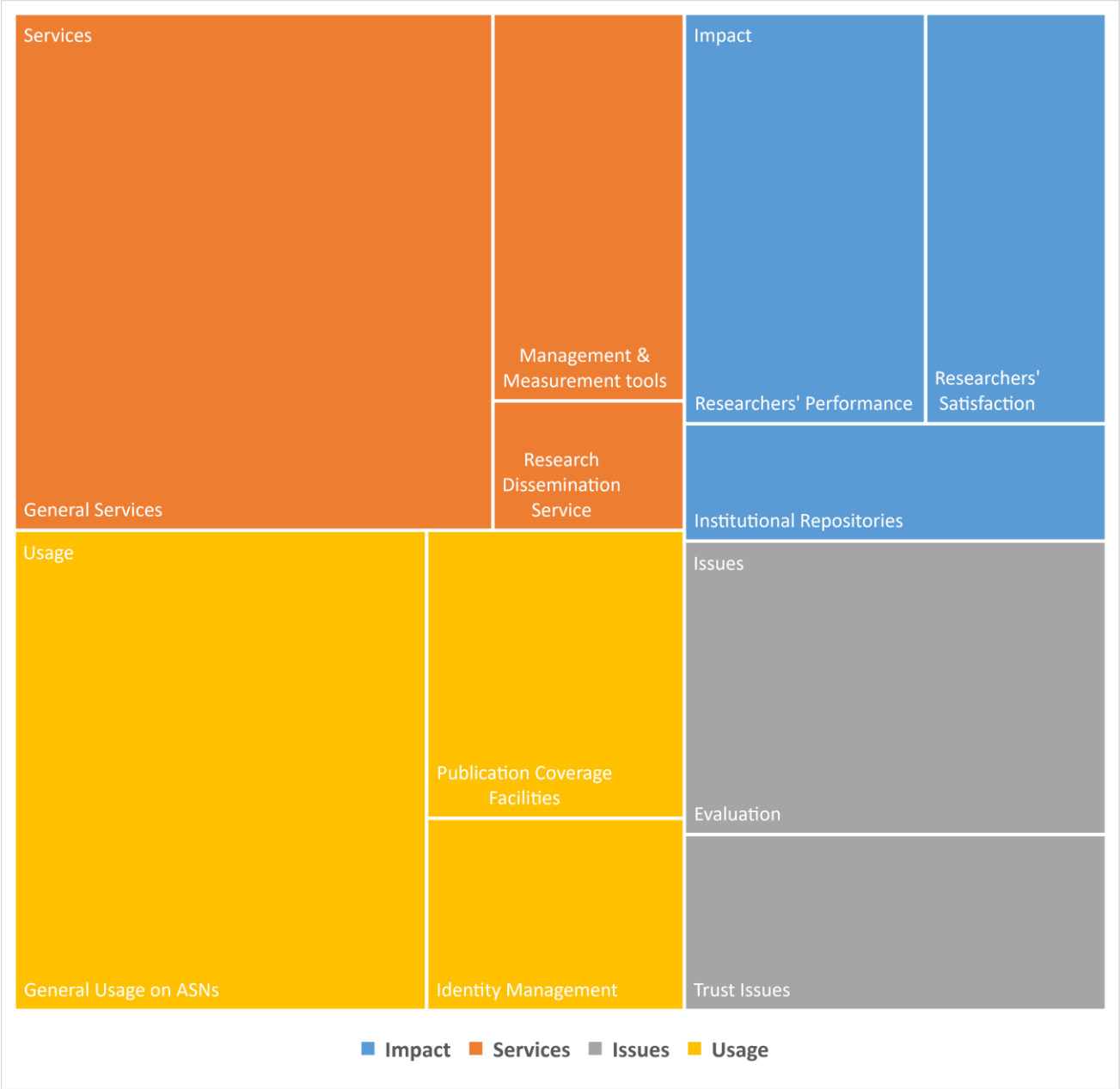


***Figure 2 Thematic Representation of Research Categories & Sub-Categories***

## 4. Findings

Out of the total 23 studies, ten were quantitative, eight were qualitative, and five followed the mixed-method approach. On the basis of discipline, two studies focused on arts and humanities, one on social sciences, two on media studies, four on sciences, four on medical, two on library and information science, and the rest were found scattered (Table 3). Most of the studies analyzed the usage, impact, services, and issues related to ResearchGate (18), Mendeley (5), LinkedIn (5), Google Scholar (5), ORCID (2) and Academia.edu (5). Based on country-wise distribution, five of the studies were limited to the researchers of the USA, three on China, two each on the UK, India, Germany, Japan, Canada, Poland, and one each on researchers of Serbia, Iran, and Finland. There were seven studies in which the geographical boundary of the researchers was not limited, and the data was extracted through online platforms.

**Table 3: Classification of Research Articles based on the Methods, Discipline and Type of ASNSs**

| Authors | Countries | Methods | Disciplines | Type of ASNS |
|---|---|---|---|---|
| Aguillo | 30 countries[2] | QN | NA | 28 tools[3] |
| Butler, Garg & Stephens | USA | MM | NA | LinkedIn |
| Djuric, Dobrota & Filipovic | Serbia | MM | Science | Research Gate |
| Ebrahimzadeh, Sharifabadi & Kamran,Dalkir | No Geographical boundary | QL | LIS | Research Gate |
| Goldstein | UK | MM | Arts and Humanities | Research Gate and Academia.edu |
| Gorska, Korzynski, Mazurek & Pucciarelli | No Geographical boundary | QL | Management | Research Gate, ORCID and Academia.edu |
| Hauer, Hofmann Krafft & Zweig | Germany | QN | All except literature | Google Scholar, Research Gate |
| Horng | China | QN | NA | Academic Twitter, LinkedIn |
| Janavi,Nadi-Ravandi & Batooli | No Geographical boundary | QL | Medical | Research Gate |
| Kowalska-Chrzanowska & Krysiski | Poland | QN | Science | Research Gate, Google Scholar and Academia.edu |
| Lamba | USA | QN | Medical | Mendeley, Research Gate |
| Li, Zhang, He & Du | USA | QN | LIS and Arts | Research Gate |
| Mason & Sakurai | Japan | MM | All discipline | Google Scholar, LinkedIn and Mendeley |
| Nasibi-Sis, Valizadeh-Haghi.,& Shekofteh | Iran | QN | Medical | Research Gate |
| Radford, Kitzie, Mikitish, Floegel,& Connaway | USA | QL | Media Studies | Research Gate, Academia.edu |
| Saarti & Tuominen | Finland | QL | NA | Research Gate |
| Stephen & Yadav | India | QN | Social Science | Research Gate |
| Taylor | No Geographical boundary | QL | Arts and Humanities. | Mendeley, Research Gate, Google Scholar |
| Waheed Klobas & Ain | No Geographical boundary | MM | NA | Research Gate |
| Wang, Chen, Glatzel | No Geographical boundary | QL | Mathematics | LinkedIn, Mendeley |
| Wei, Chakoli | No Geographical boundary | QL | Geography, Medicine, and Public Health, Culture, and Media Studies | Mendeley |
| Yan; Liu, Chen Yi | China | QN | Science | Research Gate |
| Zhang & Yuan | Canada | QN | Science | Research Gate, ORCID, Google Scholar and Academia.edu |

[2] USA, Japan, UK, France, Germany, Indonesia, Spain, Ukraine, Taiwan, Italy, Australia, Brazil, Canada, Colombia, India Sweden, Portugal, China, Poland, Malaysia, Ecuador, Russia, Turkey, Belarus, Peru, South Africa, Argentina, Croatia, Hungary and South Korea

[3] Academia, Bibsonomy, CiteUlike, CrossRef, Datadryad, Facebook, Figshare, Google+, GitHub, Instagram, LinkedIn, Pinterest, Reddit, RenRen, ResearchGate, Scribd, SlideShare, Tumblr, Twitter, Vimeo, VKontakte, Weibo, Wikipedia All Languages, Wikipedia English, Wikia, Wikimedia, YouTube, and Zenodo

## 5. Discussion

In this section, four main categories and their 11 sub-categories will be considered for detailed discussion to investigate the trend and research pattern in ASNs research. The research categories and sub-categories are *Usage* (General usage of ASNSs, Publication coverage facilities and Identity management), *Impact* (Researchers' Satisfaction, Researchers' Performance and Institutional Repositories), *Services* (General services, Research dissemination service, Management and measurement tools) and *Issues* (Evaluation, and Trust issues). Table 4 and Figure 2 represented these different research categories and their sub-categories which would assist the readers in identifying them thematically.

**5.1. Usage:** Under the ASNSs usage category, three sub-categories emerged, namely general use of ASNSs, publication coverage facilities, and identity management. Eight studies focused on the ASNSs usage, three investigated publication coverage, and three mentioned identity management (Table 4). Researchers in their studies have discussed the use of Academic Social Networking by academicians. **Wang et al. (2020)** explored the impact of uploading content on academic social networking like ResearchGate, Academia.edu on the scientific communication among researchers on a common platform. This scientific communication has enhanced researchers and experts' research skills by receiving constant feedback and regular participation.

**5.2.**Moreover, scientific communication has generated a better dialogue-based engagement among collaborators in the same or multi-domains **(Hauer et al., 2020)**. **Yan et al. (2020)** analyzed the role of follower–followee in Academic Social Networking in enhancing scientific communication. This study also highlights how the corporate users of ASNSs mingle with the institutional user for enhancing interdisciplinary collaboration. Despite the country and language differences, these sites have become the vehicle for scientific communication **(Kowalska-Chrzanowska & Krysiński, 2020)**. Collaboration is the bond created among the ASNSs group members developing a sense of belonging that instil interpersonal trust and cooperation. **Djuric et al. (2020)** developed a quality indicators model for measuring the social capital among 'Academic Social Networking' communities. The community members perceived that their work in research used collaboration strategies and broader communities' interests considered sequence planning a vital measure. **Gorska et al. (2020)** highlighted the role of social media in academic collaboration and how senior researchers have played a more extensive role in bridging social collaboration in international team research activation. **Horng & Wu (2020)** showed that the relation between SNS and social commerce intentions is partially mediated by bridging social collaboration. The researchers in the study depicted how browsing social networking has a more substantial impact on social collaboration. Studies like these are standard worldwide; the research related to the usage pattern is the most common. Several studies in the past have determined the publication coverage in ASNSs.

**Wang et al. (2020)** and **Ebrahimzadeh et al. (2020)** have determined the impact of preprints on scholarly networking sites. Readership advantage and shorter altmetric attention delay have been witnessed in preprint publication on ASNSs. **Wei & Chakoli (2020)** analyzed that the non-open access manuscript is liable to have fewer citations, people tend to avoid buying manuscripts.

**5.3.Taylor (2020)** reported that non-open access publications have more irregular coverage rates on Wikipedia, thus decreasing the impact of these texts. However, contradictory results are found in open access publications which have increased social sharing of the publication. It has also boosted knowledge sharing on Twitter and Mendeley. But still, there are some disciplines where non-open access attracts more citations than open access **(Taylor, 2020; Wei & Chakoli, 2020)**. **Radford et al. (2020)** emphasized the potential of Academic Social Networking in maintaining scholar identity management. The study argues that enabling academicians to connect provides ample opportunities and possible benefits for scholar identity management. In line with this, Goldstein (2020) exhibited that academic social networking is smaller than twitter networking, making Twitter more foster in building new connections and developing a formal identity.

**5.4. Impact:** Under the ASNSs impact category, three sub-categories emerged, namely, researchers' satisfaction, researchers' performance, and institutional repositories. Three studies focused on the researchers' satisfaction, four investigated researchers' performance, and two on institutional repositories (Table 4). The impact of Academic Social Networking Sites on the users (members) has been the subject of interest in many studies. **Aguillo (2020)** explored the presence of institutional repositories content in twenty-eight social tools ("Academia, Bibsonomy, CiteUlike, CrossRef, Datadryad, Facebook, Figshare, Google+, GitHub, Instagram, LinkedIn, Pinterest, Reddit, RenRen, ResearchGate, Scribd, SlideShare, Tumblr, Twitter, Vimeo, VKontakte, Weibo, Wikipedia All Languages, Wikipedia English, Wikia, Wikimedia, YouTube, and Zenodo") using the webometric approach. **Mason & Sakurai (2021)** studied the impact of article sharing by researchers' in the institutional repositories. In terms of the researcher's satisfaction as an impact, **Waheed et al. (2020)** researched the perceived gratification from academic social networking determines the researcher's satisfaction with the platform. Besides researcher satisfaction, a study also covers researcher performance as an impact of ASNSs **(Hauer et al., 2020)**. Most of the studies conducted were on the effectiveness of ASNSs towards the researcher, especially performance **(Yan et al., 2020)**. Researcher performance against impact and ASNSs effectiveness is mainly measured by the citation count, h-index, work visibility, authorship, readership, etc. Previous studies have measured researchers' performance in terms of ASNSs effectiveness **(Gorska et al., 2020)**. Hence, the impact of ASNSs can also be researched in terms of their function performed. This performance of ASNSs can also be assessed by its community members and the opportunities offered. **Gorska et al. (2020)** analyzed the role of social media in providing collaboration and opportunities to its users. This collaboration activates the professional relationship and, at a time, extends job opportunities to its

users. **Butler et al. (2020)** had emphasized that with the increase in digitalization, funding opportunities across national boundaries had increased among researchers. LinkedIn has proven to be an excellent medium for networking and opportunities. **Saarti & Tuominen (2020)** highlighted that digitalization had enhanced the funding opportunities for researchers at the national and international levels for better research in every discipline.

***Table 4 Selected Articles depicting Research Categories and their Sub-Categories***

| Authors | Usage | | | Impact | | | Services | | | Issues | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | General usage of ASNSs | Publication Coverage Facilities | Identity management | Researchers' Satisfaction | Researchers' performance | Institutional Repositories | General Services | Research Dissemination Service | Management and Measurement Tools | Evaluation | Trust Issues |
| **Aguillo** | √ | | | | | √ | √ | | | √ | |
| **Butler, Garg & Stephens** | | | | √ | | | | √ | | | |
| **Djuric, Dobrota & Filipovic** | √ | | | | | | | | | | |
| **Ebrahimzadeh, Sharifabadi & Kamran,Dalkir** | | √ | | | | | | | √ | | |
| **Goldstein** | | | √ | | | | | √ | | | |
| **Gorska, Korzynski, Mazurek & Pucciarelli** | √ | | | | √ | | | | √ | | |
| **Hauer, Hofmann Krafft & Zweig** | √ | | | | √ | | | √ | | | |
| **Horng** | √ | | | | | | | | | | √ |
| **Janavi,Nadi-Ravandi & Batooli** | | | | | | | | | | √ | |
| **Kowalska-Chrzanowska & Krysiski** | √ | | | | | | | | | | √ |
| **Lamba** | | | | | | | √ | | √ | | |
| **Li, Zhang, He & Du** | | | | | | | √ | | √ | | |
| **Mason & Sakurai** | | | | | | √ | | | | | |
| **Nasibi-Sis, Valizadeh-Haghi.,& Shekofteh** | | | | | | | √ | | √ | √ | |
| **Radford, Kitzie, Mikitish, Floegel,& Connaway** | | | √ | | | | | | | | |
| **Saarti & Tuominen** | | | | √ | √ | | | | | | |
| **Stephen & Yadav** | | | | | | | √ | | | | |
| **Taylor** | | | √ | | | | | | | √ | |
| **Waheed Klobas & Ain** | | | | √ | | | √ | | | | √ |
| **Wang, Chen, Glatzel** | √ | √ | | | | | | | √ | | |
| **Wei, Chakoli** | | √ | | | | | √ | | | | |
| **Yan; Liu, Chen Yi** | √ | | | | √ | | | | | | |
| **Zhang & Yuan** | | | | | | | | | | √ | |

**5.5. Services:** Services have often been studied concerning ASNSs. A total of sixteen studies reported in the review have investigated tools and services of ASNSs. Under this category, four sub-categories emerged, namely, general services, research dissemination service, management, and measurement tools. Seven studies focused on the general tools and services, six on management and measurement tools, and three on research dissemination (Table 4). Although services in general offered by ASNSs had always been the main topic of interest of researchers **(Aguillo, 2020; Lamba, 2020; Nasibi-Sis et al., 2020),** not many publications have found when it comes to bookmarking and file processing services provided by ASNSs **(Wei & Chakoli, 2020)**. Several studies have been conducted related to the effectiveness and assessment of the services offered by ASNSs as a whole **(Waheed et al., 2020)**. Researchers conducted studies on ASNSs service for specific members like researchers **(Stephen & Yadav, 2020)** and faculty members **(Li et al., 2020)**. The following areas of ASNSs services were studied by **(Wang et al., 2020)** and **(Ebrahimzadeh et al., 2020),** like discussion board and altmetric analysis, citation analysis, referencing services. At the same time, others highlighted suggestions on improving the services such as collaboration **(Gorska et al., 2020)**, personal management **(Radford et al., 2020)**, research dissemination **(Hauer et al., 2020)**, managing documents **(Goldstein, 2020)** and measurement **(Ebrahimzadeh et al., 2020; Lamba, 2020; Wang et al., 2020)**. Among the trends in the ASNSS were attitude, effectiveness, factors, patterns, and issues on ASNSs services. However, in the context of ASNSs, there is still a lack of relevant empirical studies. ASNSs services are diverse and still need research in file repository, citation count, group collaboration, reference management, and network visibility. Therefore, to know more about the services provided ASNSs, more studies need to be carried out soon. **Wang et al. (2020)** and **Li et al. (2020)** have reported that the most relevant services provided by ASNSS are the altmetric and citation analysis. With a review of the services offered by ASNSs, appropriate parties may work on delivering more convenient and diversified services. Further studies can focus on the discussion board, bookmarking, and file repository on ASNSs. There is a need to learn more effective services provided by ASNSs and analyze the services offered by researchers, and studies should be more focused on user needs **(Butler et al., 2020)**.

**5.6. Issues:** Under this category, a total of eight studies found that there are several issues related to the ASNSs, evaluation, and trust issues. Five studies focused on the evaluation issues and three on the trust issues (Table 4). A systematic review of the studies revealed that not many studies had been done to analyze the problems related to the ASNSs. **Aguillo (2020)** has well pointed out that an important issue about Academic Social Networking is the evaluation of social networking metrics. It depends on altmetric data, which rely on other data providers. Studies have also proven that any application of ASNSs metrics is potentially limited by the strategies and actions of any of these data providers, resulting in the disappearance of the data source and restricting the type of data **(Nasibi-Sis et al., 2020; Taylor, 2020)**. Paper quality without DOI or PMID has been excluded from

tracking metrics **(Janavi et al., 2020)**. **Goldstein (2020)** has underlined that Academic Social Networking has given rise to influence maximization that helps determine a "minimum set of nodes" that could maximize the spread of influence. This requires the development of an efficient algorithm for handling issues related to influence maximization. **Zhang & Yuan (2020)** has underlined that the wide use of ASNSs among researchers in the field of sciences has resulted in a large amount of data collaboration generating new opportunities for obtaining data; this has influenced the practicability and efficiency of efficient algorithms. **Horng & Wu (2020)** addressed the identity crisis associated with researchers. The study reported that vision, language, and trust among the members of ASNSs facilitated the development of collaboration. The researchers also state how members of academic networking sites develop information and emotional support systems resulting in good partnerships. **Kowalska-Chrzanowska & Krysiński (2020)** depicted researchers' lack of trust and necessity on these platforms as a significant flaw. **Waheed et al. (2020)** highlighted that the quality of knowledge obtained from ASNSs is a critical source for determining the researchers' satisfaction through perceived learning by this platform and the trustworthy behaviour of researchers and collaborators. Studies on topics like these will prove beneficial for those in the field as they will help deal with the issues related to ASNSs, these sites can be improved for future use.

6. **Future Direction:** One of the most significant challenges in ASNS research is to bridge the gap between experts in the field and researchers by promoting recommendation tools, categorizing questions, and strengthening experiences. After a systematic review of the selected research articles, it has indicated that most of the research studies reported the usage, impact, services, and issues of ASNS in different academic domains. As the wings of technology spread over time, researchers seek more attention to less developed research areas of ASNS, such as the need for more rigorous theoretical groundwork. Moreover, there is still a need to provide proper guidelines to researchers in the ASNS design, development, implementation, and evaluation. The researcher antedates that future research may address the above areas and attempt to discuss models and theories on ASNS design, implementation, and evaluation and rigorous theoretical underpinnings. Researchers in the field may develop a comprehensive roadmap for detailed technical and economic decisions to implement the ASNS appropriately. These are only a few areas that are yet to be adequately addressed to pursue practical and theoretical implications for ASNS. The need, analysis, and qualitative feasibility approach should be used frequently since they thrive for detailed explanations and in-depth responses. These exciting domains of ASNS will continue to develop as a field of research for many years to come. The policymakers should try to create standardized metrics in ASNS to reveal the authenticity of the researchers and their research works.
7. **Conclusion:** ASNSs are designed to serve the research and academic community. These sites assist researchers in sharing ideas, knowledge, and wisdom, thereby boosting their collaborative and

critical thinking. The intellectual capabilities of the researcher get enhanced due to the presence of peers and experts in their respective knowledge fields. This study has filled the gap in understanding the recent trend of usage of academic social networking by academicians. The research categories and sub-categories derived from this study would enhance new knowledge for future work and fill the empirical gap in the study area. The systematic review typifies the usage, impact, services, and issues related to ASNSs among researchers. The study shows that cognitive, affective, and personal domains are inseparable among researchers. The social behaviour of these sites is converted into an academic network, where 'Self-Promotion' and 'Ego Bolstering' (confidence) are considered the main motives of using ASNSs by researchers. In a world where researchers are evaluated by the number of articles published and their citation act as an influencing factor in the research community, the role of ASNS would act as a catalyst for a large number of professionals.

It is visible from the review that the 'ResearchGate' and 'Academia.edu' are mainly used for collaboration, while Google Scholar is used for tracking citation. Although usage and impact of ASNSs have seen massive variation across the researchers. It is seen that there exists a high degree of trust issues and uncertainty related to the open-access paper due to copy-right policies. There is still a need to create awareness that articles published only under a CC-BY license can only be shared on commercial sites like ResearchGate. Such type of review studies would help in overcoming several critical issues on various sharing aspects. It would facilitate the researchers in better understanding the essence of Academic Social Networks and make sense to policymakers. The educational institution may organize workshops, seminars, guidance programs for the researchers to use ASNSs better. The library and library professionals could play a vital role in creating awareness among researchers regarding some of the least known ASNSs and showcasing their content productivity.

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