

## **Conceptual Framework of Components and Indicators of the Scholarly Publication System: Systematic Review**

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### **Abstract**

This paper provides a systematic review of scientific resources to determine the components and indicators of the scholarly publication system. The research community includes 1070 documents from Scopus and the Web of Science databases. Another researcher was used to determine the degree of accuracy, reliability, and quality of the final documents, and the agreement between the two researchers was calculated with the Kappa coefficient. Finally, 331 documents were studied in full text. Possible components and indicators were identified from these documents, and their information was entered into Excel software. Based on the frequency and similarity of the contents, the conceptual framework of the scholarly publication system was designed. Research findings show that the main components of this system include infrastructure, technology, management, access, evaluation, support, language, communication, control, education, and ethics. Each of the components also has specific indicators and sub-indicators. Some issues, such as rights, laws, regulations, standards, repositories, scientific players, and centers, are not mentioned among the components because these concepts are integrated into other parts.

**Keywords:** Scholarly Publication System, Systematic Review, Conceptual Framework, Academic Publishing, Scholarly Publication.

### **Introduction**

The purpose of scholarly publications is to serve the scientific community without financial benefits. However, with new models of academic publishing and the development of technologies to free access, scholarly publications are still a growing industry that brings much profit annually (Forgues & Liarte, 2013). The publications are a fundamental step in the

information cycle. Scholarly publications allow experts to use scholars' views and suggestions and will enable them to present their findings based on each other's scientific ideas.

Scholarly publications officially began with the formation of scientific journals. The first scientific journal was published in France in January 1665 as the "Journal des Savants"<sup>1</sup>, and a month later, in March 1665, England published the next scientific journal as " Philosophical Transactions of the Royal Society of London " (Huff, 1999). Scientific production increased during the Cold War, with significant investments in research projects developed due to intrinsic motivation and career advancement (Seidenfaden, Ortelbach & Schumann, 2007). With the rise of technology and the entry of systems into the electronic world, we face a multifaceted approach with some positive traits and obscure challenges (Ocholla, 2011). Information and communication technologies have dramatically changed scholarly publications by strengthening communication between scholars by providing access to various information and platforms for scientific distribution. Due to the rapid increase in scientific production and rising prices, membership in the required scientific resources has become a significant problem even for developed countries. Therefore, to solve this problem and other limitations, the scientific community organizes scholarly publications to distribute content and reduce material prices on a large scale for end-users (Obuh, 2013).

Scholarly publication issues are studied by individuals and organizations in different countries (Tecson-Mendoza, 2015; Ezema & Okafor, 2015; Leão, 2015; Besir Demir, 2018). These studies have surveyed the various dimensions of scholarly publication which includes policy issues and solutions (Van Noorden, 2013, Tecson-Mendoza, 2015), access (Besir Demir, 2018; Van Noorden, 2013; Hunter, 2018), evaluation (Hartgerink & Zelst, 2018; Krishnan, 2013), control (Tecson-Mendoza, 2015), ethics (Van Noorden, 2013), support (Tecson-Mendoza, 2015; Besir Demir, 2018); infrastructure (Assante, Candela, Castelli, et al, 2015), technology (Cotnoir, 2016; Chicaiza, 2016; Orlandi, Ricciardi, Rossignoli & De Marco, 2019), communication (Trotter, Kell, Willmers, Gray & King, 2014), economics (Groenewegen, 2015; Potts, Hartley, Montgomery, et al, 2017) and scientific organizations (Jubb, 2011). Although the international databases show that the scholarly publication study has been growing over the years, especially in 2019 and 2020, there is little agreement about the components or dimensions of the academic publication system.

If all aspects of the scholarly publication system are identified, managers, policymakers, system designers, and stakeholders can provide integrated management and federated access to scientific output (Wiederhold, 1993), long-term planning and development of scientific communication, control and take feedback (Evgeniou, 2002; Veretennikova et al., 2015) from the scholarly publishing ecosystem. Therefore, it seems reasonable to integrate these studies to identify most of the components and indicators of the scholarly publication system in a conceptual framework that leads to determining the strategic approach to manage the strengths and weaknesses of the system (Hamrahi, Pournaghi & Matlabi, 2022). The identified components and indicators of scholarly publication help to control and solve the problems of the scientific publication ecosystem i.e., reducing scientific misconduct, information legal and access issues, increasing stakeholders' awareness about scholarly publication system, and spreading infrastructure and standards to develop scholarly communication (Hamrahi, Pournaghi & Matlabi, 2023).

## Materials and Methods

This paper is a descriptive-applied study that uses a systematic review method to extract and describe the components and indicators of the scholarly publication system. The systematic review method has been used in the content analysis for reviewing different sources in a subject area in response to the relevant question; therefore, it has high power and credibility in conclusion and decision-making (Higgins, Thomas, Chandler, Cumpston, Li, Page & Welch, 2019).

Documents that are written in various fields of knowledge are increasing rapidly. Therefore, it is a complicated task for specialists in an area to study and summarize all the published sources in the specialized field (Davis & Vickery, 2007). Various methods are used to manage the research for systematic review; in this research, the Cochrane style manual is used (Moher, Liberati, Tetzlaff, Altman & Prisma Group, 2010). This handbook guides the standard methods applicable to every review (planning a review, searching and selecting studies, data collection, risk of bias assessment, statistical analysis, GRADE, and interpreting results). General methods for Cochrane reviews include Defining the review question and developing criteria for including studies, searching for studies, selecting studies and collecting data, assessing the risk of bias in included studies, analyzing data and undertaking meta-analyses, addressing reporting biases, presenting results and 'summary of findings' tables, interpreting results and drawing conclusions (Higgins et al., 2019).

The population of this research includes all published scientific outputs, including research books, articles, dissertations, reports of research projects, organizational reports, and conference papers that are extracted from two international citation databases (Web of Science and Scopus) and released by mid-2019. With this in mind, these databases cover the bibliographic information of some other databases, such as Science Direct, Emerald, Lisa, Lista, Eric, UNESCO, Research Gate, PubMed, and Google Book. This paper includes studies in science, medicine, social sciences, engineering, and interdisciplinary fields. According to the research sample, most studies are related to humanities and social sciences (Figure 1).

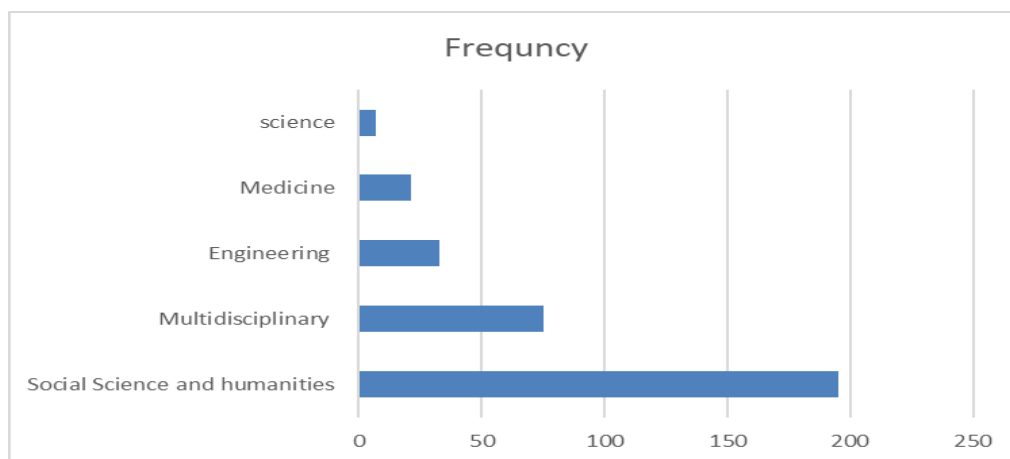


Figure 1: Sample Research by Field of Study

### Search Strategy

First, the resources were reviewed in several databases based on the "research title," and some related sources were studied (Table 1). Then, the required keywords were extracted from the "title" and "keywords" of these resources and added the synonyms and broader, narrower, and related terms to previous keywords from dictionaries (Oxford, Cambridge, Webster, Library and Information Science) and Library of Congress Subject Headings. Finally, the search strategy was presented according to the research objectives and the instructions of each citation database.

Table 1

Scopus Search Strategy for Scholarly Publication System

Number of records	Scopus search strategy
845 records	TITLE ( access OR policy OR economic OR infrastructure OR management OR communication OR language OR evaluation OR law OR ethics OR security OR technology OR control OR geography OR standard OR support ) AND ( TITLE ( "Academic publishing" OR "Academic Publishing Model" OR "Academic Resources" OR "publishing Scholarly" OR "scholarly communication" OR "scholarly publishing" OR "scholarly publication" OR "scholarly publishing system" OR "scholarly system" OR "scholarly works" OR "Scholarly writing" OR "scholastic publishing" OR "scholastic system" OR "scientific publishing" OR "scientific system" ) )

First, the search term was presented by topic; then, due to the high volume of irrelevant information, the search term was limited to "title" (Table 2).

Table 2

Web of Science Strategy for Scholarly Publication System

Describe	Number of records	Web of Science search strategy
Final Web of Science Syntax (Formula 1)	225 records	Title=(access OR policy OR economic OR infrastructure OR management OR communication OR Language OR Law OR ethics OR security OR technology OR control OR geography OR standard OR Support) AND Title=("academic publishing" OR "academic publishing model" OR "academic Resources" OR "publishing scholarly" OR "scholarly publishing" OR "scholarly publication" OR "Scholarly publishing system" OR "scholarly system" OR "scholarly work" OR "scholarly writing" OR "scholastic publishing" OR "scholastic system" OR "scientific publishing" OR "scientific system" OR "university press publishing" OR "university press")
Final Web of Science Syntax (Formula 2)	10 records	Title=("academic publishing" OR "academic publishing model" OR "academic Resources" OR "publishing scholarly" OR "scholarly publishing" OR "scholarly publication" OR "Scholarly publishing system" OR "scholarly system" OR "scholarly work" OR "scholarly writing" OR "scholastic publishing" OR "scholastic system" OR "scientific publishing" OR "scientific system" OR "university press publishing" OR "university press") AND Title=(pattern OR framework OR Design OR "conceptual model" OR "conceptual framework" OR "conceptual Pattern")

The search term was restricted to "title" because it had retrieved many irrelevant information. However, due to the small number of recovered documents, the syntax was

modified and rewritten in two separate formulas.

### Resource Selection Criteria

Table 3 summarizes the criteria for selecting resources for a systematic review of the components of the scholarly publication system.

Table 3

*Selection Criteria for Systematic Review Analysis of the Scholarly Publication System*

criteria	Selected criteria
Content	Scholarly publication, scientific publication, academic publication
Type of content	scientific-research
Context	Science, social sciences, humanities, technology and medicine
Type of document	Published resources in the form of articles, reviews, theses and dissertations, books, reports (research projects, organizational reports), conference papers
Language	All languages
Year	From the beginning to the middle of 2019

### Entry and Exit Criteria

Because these two databases (Web of Science & Scopus) covered the resources of many other databases, the study was limited to the resources of these databases, and resources were limited and selected based on selection criteria.

### Quality of Resources

The research sample was determined by studying the summary and abstract of resources. Two researchers examined the quality of resources. The results of Cohen's kappa ( $\kappa$ ) agreement test showed that the agreement of the two evaluators is statistically significant at the level of  $p < 0.05$ . The intensity of the kappa coefficient is equal to 0.546, which indicates the average and acceptable amount of agreement between the two evaluators regarding the quality of the studied resources.

### Data Extraction

A researcher-made form was designed to extract the data. This form includes the code of documents, title, author, year, publisher, methodology, sample, findings, components, indicators, advantages and disadvantages of research, email, and countries. The findings are described in detail in the next section.

### Prisma<sup>2</sup> Flowchart

A systematic review and meta-analysis studies after the completion of the work process, a checklist designed as "Prism" is used to improve the quality of the report, which shows the background and process of research development and includes four main stages: The steps are Identification, Screening, Eligibility, and Included (Moher et al., 2010). The Prisma of extracting the components of the scholarly publication system is shown in Figure 1.

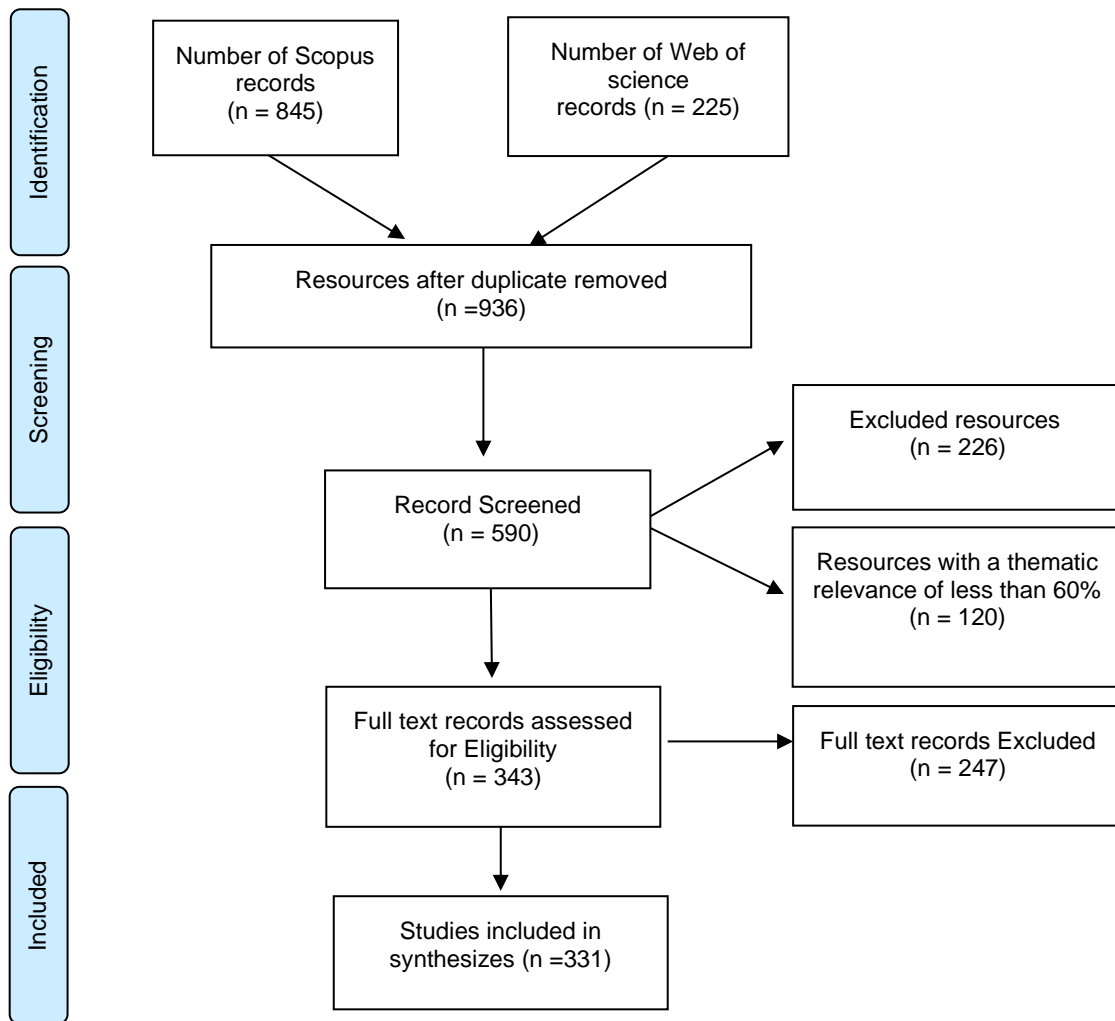


Figure 1: Prisma Flowchart for Systematic Reviews on the Scholarly Publication System

### Results

The full text of the final resources selected in a systematic review was studied to analyze the findings, and the necessary information was extracted by qualitative content analysis. The research findings are presented in Table 4.

Table 4  
Components and Indicators of the Scholarly Publication System

Components	Indicators	Sub- Indicators
Access	Access form	Open access, non-open access, hybrid access (Peekhaus, Proferes,2016, Jantz, and Wilson,2008, Groenewegen,2015, Koler-Povh, Mikoš and Turk, 2014, Bernius, Hanauske, König, et al, 2009, Day, 2008, Kaiser, 2006, Oladokun,2015),
	Scope of access	Local access, national access, regional access, international access, worldwide access
	Access type	Individual (private) access, organizational access, public access (Heath and Duffy, 2005, Lawlor, 2005).

Components	Indicators	Sub- Indicators
	Access format	Electronic access, digital access, print access (Bohlin, 2004, Wei, 2013).
Communication	Communication form	Informal communication, formal communication (Picco, 2014; Davies and Greenwood, 2004; Houghton, 2001; Halliday, 2001), semi-formal communication (Xia, 2007; Day, 2008).
	Scope of communication	Individual (private) communication, public communication, organizational communication, local communication, regional communication, national communication international communication, worldwide communication (Uysal, 2014; Maier, and Wildberger,1993; Picco, Aguirre-Ligüera, Maldini, et al, 2014)
	Communication format	Modern communication, traditional communication (Wei, 2013; Heath and Duffy, 2005; Maier and Wildberger, 1993).
Control	Control form	Random control, dynamic control, semantic control (Bohlin, 2004; Wei, 2013; Parkosewich, 2013).
	Scope of control	Local control, national control, regional control, international control, worldwide control(Xia, 2008; Kennedy, 2015; Asamoah-Hassan, 2010)
	Type of control	Organizational control, individual control (Houghton, 2001; Bohlin, 2004; Prosser, 2008).
	Control format	Machine control (automatic), physical/manual control
Infrastructure	Form of infrastructure	Technical (technology, communication, information) infrastructure (Heath and Duffy, 2005; Prosser, 2008; Hedlund and Rabow, 2009; Borrero, Ramos, Arsenal, Lopez, et al, 2007; Lawlor, 2003), non-technical infrastructure (educational,scientific-research, counseling infrastructure) (Šilhánek, 2014; Arunachalam, Madhan, 2016; Heath and Duffy, 2005).
	Scope of infrastructure	Organizational infrastructure, local infrastructure Regional infrastructure, national infrastructure, international infrastructure, worldwide infrastructure (Park, and Shim, 2011; Mehdi, Lagzian, and Borhardt, 2017; Heath and Duffy, 2005; Shearer and Birdsall Borrero, 2005; Ramos, Arsenal, Lopez, et al, 2007).
	Type of infrastructure	Economic infrastructure, social infrastructure, cultural infrastructure, managerial infrastructure, political infrastructure (Poppeliers, 2011; Curry and Lillis, 2017; Willinsky, 2017)
	Infrastructure format	Software infrastructure, hardware infrastructure (Bohlin, 2004, Ogburn,2008, Nancy Maron and Kirby Smith, 2009, Woodward,2010, Kenner,2014, Estelle,2017).
Language	Form of language	Natural language, machine language(Hedlund and Rabow, 2009)
	Language scope/ range	Local language, national language, regional language, International language (Saxena, Thawani, Chakrabarty, et al, 2013; Hedlund and Rabow, 2009).
	Type language	Formal language, informal language (Xia, 2008; Hedlund and Rabow, 2009).

Components	Indicators	Sub- Indicators
	Language format	Multilingual, bilingual
Material (information sources)	Form of materials	Informal materials, formal materials
	Scope of materials by access type	Subscription materials, open access materials, limited access materials
	Materials format	Printed materials, non-printed materials, hybrid materials
	Content-type of materials	First hand (primary) materials, second hand (secondary) materials
Support	Support form	Formal support, informal support
	Support scope	Individual (private) support, organizational support, local support, national support, regional support, international support, worldwide support
	Type of Support	Infrastructure support, policy support, mechanism support, functional support
Technology	Form of technology	Hardware, application software, and network (web 1, web 2, web 3 and etc.)
Economic	Economic profit function	Prices, expenses, income, profit, fee, charge, investment
	Financing	Budget, financial resources, fund, grant, subsidy, taxes
	Economic market	Buy, sell, supply, demand
Evaluation	Form of evaluation	Content evaluation, open evaluation, altimetric evaluation, bibliographic evaluation (creative evaluation, source evaluation)
	type of evaluation	Quantitative evaluation, qualitative evaluation, mixed evaluation,
	evaluation format	Technical evaluation, non-technical evaluation
Education	Teaching Method	Webinar, Educational Projects, Consulting, Scientific Panel, Workshop, Meetings, Seminar, Symposium, Contemplation, Lecture, Conference, Exhibition, Online Discussion, Online Hosting, Online Forum, Question Checklist
	Type of Education	periodical distance learning, periodical In-person training (attending training courses)
	Content of Training	Supplementary readings, skills, experiences, advice, events, instructions
Ethics	Form of ethics	Editorial ethics, peer review ethics, reviewer ethics, research ethics, information ethics
	Type of ethics	professional ethics, individual ethics
	Ethics format	Role and regulation of ethics, code of ethics

### Access Component

According to studies, the "access" component is among the most challenging and vital issues in the scholarly publication system. This component comes in three primary forms of "open access", "non-open access", and "hybrid access" (Peekhaus & Proferes, 2016; Jantz & Wilson, 2008; Groenewegen, 2015; Koler-Povh et al., 2014; Bernius et al., 2009; Day, 2008; Kaiser, 2006, Oladokun, 2015), which can be divided into "local access", "National access", "Regional access", "international access" and "Worldwide access". Each range of access can provide services in the form of "electronic access", "digital access," or "print access" (Bohlin, 2004; Wei, 2013). In this system, the type of access to resources can be defined according to the "individual" or private and "organizational" or "public" access of users (Heath & Duffy, 2005; Lawlor, 2017).

### **Communication Component**

Scholarly communication is often critical in preserving knowledge and significantly impacts its creation, transformation, and dissemination. New examples of scholarly communication include multiple works, inter-organizational and international collaboration, and the use of social media (McKee, Stamison & Bahnmaier, 2014). Fundamental and dynamic changes have taken place in the field of scholarly communication with the growth of information and communication technology and the increase of scholarly publications, such as the emergence of creative publishing forms and services that have facilitated faster and more useful distribution (Hagenhoff, Ortelbach & Seidenfaden, 2009). Studies show that the "communication" component in the scholarly publication system can take the form of "formal communication", "semi-formal communication", and "informal communication". Communication is one of the components in the scholarly publication system with specific definitions and forms. "Communication" in this system is a set of processes that mainly present, evaluate, edit, format, distribute, organize, access, and archive the research findings, mainly in the higher education sector (Shearer & Birdsall, 2005). The meaning of "formal communication" in the scholarly publication system is the dissemination of ideas on official media such as books and magazines." Informal communication" is communication that publishes results on informal media such as social networks or face-to-face communication (Picco et al., 2014; Davies & Greenwood, 2004; Houghton, 2001; Halliday, 2001). "Semi-formal communication" refers to the distribution of findings in conferences, symposiums, lectures, etc. The results of these programs are published in a series of lectures or a collection of articles (Xia, 2007; Day, 2008). Each form of communication can be in the scope of "Individual (private) communication", "public communication", "organizational communication", "Local communication", "national communication", "Regional communication", "international communication" and "Worldwide communication" (Uysal, 2014; Maier, and Wildberger,1993; Picco et al., 2014) and distributed in the form of "electronic communication" or "Traditional communication" (Wei, 2013; Heath & Duffy, 2005; Maier & Wildberger,1993).

### **Control Component**

Problem-solving and system accountability must be increased by developing a complex and multifaceted system to provide security and control for stakeholders at the national and international levels in the input, storage, processing, and output stages (Poniszewska-Maranda, 2008). Based on studies in the scholarly publication system, control is presented in three forms,

including "random control," "dynamic control," and "semantic control" (Bohlin, 2004; Wei, 2013; Parkosewich, 2013). Each of these forms of control is in the scope of "local control," "national control", "Regional control," "international control," and "Worldwide control areas" (Xia, 2008; Kennedy, 2015; Asamoah-Hassan, 2010) and can be applied by "individuals" or "Organizations" (Kling, Spector & McKim, 2002) in the "Machine (automatic) control" or, "physical (manual) control" format (Houghton,2001; Bohlin, 2004; Prosser, 2008).

### **Infrastructure Component**

Forms of scholarly publication infrastructure include "technical infrastructure" (Heath & Duffy, 2005; Prosser, 2008; Hedlund & Rabow, 2009; Borrero et al., 2007; Lawlor, 2003) and "non-technical infrastructure" (Šilhánek, 2014; Arunachalam & Madhan, 2016; Heath & Duffy, 2005). Each form of structure covers the "organizational," "local", "regional", "national", "international," and; "worldwide" scopes (Park & Shim, 2011; Dadkhah et al., 2017; Heath & Duffy, 2005; Shearer & Birdsall, 2005; Ramos, Arsenal, Lopez, et al., 2007). Infrastructures are divided into "economic", "social," "cultural", "managerial" and "political" types (Poppeliers, 2011; Curry & Lillis, 2017; Willinsky, 2017), which are considered in the "software" or "hardware" format. Some examples of infrastructures of the scientific publishing system can be referred to as public policies and strategies, licenses, standards, players, organizations, associations, and repositories (international, national, organizational, and individual repositories) (Bohlin, 2004; Ogburn, 2008; Maron & Smith, 2009; Woodward, 2010; Kenner, 2014; Estelle, 2017). In emerging infrastructures of scholarly publication, scientists need to feel that new infrastructures, alongside new facilities, can also support traditional methods in their research field (McPherson, 2010).

### **Language Component**

The four significant barriers to global access to scholarly publication include access for the disabled, language, filtering and censorship, and open access policy (Potvin & Sare, 2016). Researchers use various methods to overcome language barriers and expand scholarly outputs, such as publishing their works' full text or abstract in an international language to make the content accessible (Xia, 2008). However, the complete publication of the work in an international language can also create barriers for local researchers. Therefore, the division of scholarly publication's linguistic indicators will help improve management and reduce language barriers. The two main forms of language, "natural language" and "machine language", are used in the scholarly publication system (Hedlund & Rabow, 2009), which are explained in the "bilingual" or "multilingual" formats(Zheng & Gao,2016). The scope of the language of the scholarly work includes "Local language," "National language", "Regional language", "international language," and "Worldwide language" (Saxena et al., 2013; Hedlund & Rabow, 2009). Publishing science in national and international languages aims to provide scientific outputs to national audiences and secondarily distribute domestic works among international readers (Kindelan, 2009). Studies show that "natural language" is divided into "formal" and "informal" languages (Xia, 2008; Hedlund & Rabow, 2009). Translations and interpretations are examples of the language components in the scholarly publication system (Asamoah-Hassan, 2010). It should be noted that some scholarly works are rooted in national security, so based on countries' policy, it is necessary to determine what resources can be translated into another language and what resources are limited (Kindelan, 2009).

### **Material (Information Sources) Component**

Scholarly materials include a wide range of information carriers such as reports, articles, books, data sets, course materials, audiovisual materials, etc. (Rieger, 2008). These carriers have played a significant role in recent changes in scholarly publication. Scholarly works are published in two forms: "formal materials" and "informal materials" (Kling et al., 2002). Based on the scope of access, they are divided into "Subscription materials", "Open access materials," and "limited access materials" (Bosah, Okeji, Clement & Baro, 2017; Herb, 2017; Baro & Eze, 2017). These media are distributed in the form of "printed materials", "non-printed materials," or as "hybrid materials" (Getz, 2005; Swan, 2006; Lawson, Gray & Mauri, 2016; Zhao, 2014; Rieger, 2008; Houghton, 2001). In terms of content, scholarly materials can be divided into "First hand (primary) materials" and "second-hand (secondary) materials" (Potvin & Sare, 2016; Ponte & Simon, 2011; Xia, 2005; Houghton, 2001).

### **Support Component**

It is necessary to take various policies at the international level to achieve an increase in scholarly production. To expand scholarly publication, different countries provide supportive and motivational services to their researchers because the publishing performance of countries reflects their relative share in global knowledge production (Besir Demir, 2018). In the scholarly publication system, support services come in two forms: "formal support" and "informal support" (Hedlund & Rabow, 2009). Each form of support is grouped into "infrastructure support," "policy support", "Functional support," and "Mechanism support" (Collins, 2005; Trotter et al., 2014; Arunachalam & Madhan, 2016; Bohlin, 2004; Ogburn, 2008; Woodward, 2010); in the scopes of "individual (private) support", "organizational support", "Local support", "National support", "Regional support", "international support" and "Worldwide support" (Bohlin, 2004; Dubini & Giglia, 2009; Heath & Duffy, 2005; Brantley, Bruns & Duffin, 2017; Asogwa, 2011).

### **Technology Component**

The technology component is one of the essential components in designing any digital system. This component is divided into "hardware," "application software," and "network" (Fyffe, 2009; Horstmann, Reimer & Schirrwagen, 2006; Conley & Wooders, 2009; Lor, 2017; Houghton, 2001; Asamoah-Hassan, 2010). Printers, scanners, recording technology, supercomputers, servers, clients, fax machines, telephones, and nanotechnologies are examples of hardware; Law management software, organizational software, advertising software, smart software, and translation software are also examples of application software that has been used in various parts of scholarly publication. Blogs and microblogs, wikis<sup>3</sup>, video conferencing, bulletin boards, chat rooms, virtual and social networks, semantic web, and the expert system are examples of technologies of different types of the net at the level of web 1, web 2 and web 3, which should be considered in the scholarly publication (Houghton, 2001; McKee et al., 2014; Aaron, Fritsch & Sullenger, 2000; Widén, 2010; Stewart, Procter, Williams, et al, 2012; Sawant, 2012; Horstmann et al., 2006). Digitization of scholarly publications is a powerful tool for promoting accessibility, but preserving digital content is more critical than digitizing content. There are many dangers to the scholarly publication system, such as storage media

vulnerabilities and hardware and software abuse (Nentwich, 2005). Therefore, it is necessary to emphasize security and the different ways to establish it in the technology component.

### **Economic Component**

Increasing the cost of scholarly publication reduces the access of experts and researchers to scholarly outputs. This is true about the availability of library products because libraries face inflation of 6-10% annually. Therefore, it is necessary to develop and support new models of scholarly publication to increase access and reduce the costs of dissemination and retrieval of information (Potts, Hartley, Montgomery, et al., 2017). The economic component of scholarly publication consists of three leading indicators; "Economic profit function", "financing," and "economic market." Economic profit function includes "prices," "expenses," "income," "profit," "fee," "charge," and "investment." "Budget," "financial resources," "fund," "grant," "subsidy," and "tax" are the main elements of the financing Indicator. "Economic market" also includes "buy", "sell", "supply," and "demand" (Sharma, 2014; Cho, 2007; Allen, 2008; Greco, 2015; Mueller-Langer & Scheufen, 2013; Högberg, 2013; Peekhaus & Proferes, 2016).

### **Evaluation Component**

An inherent principle in scholarly publication is that other professionals should be able to rely on authors' published claims and use them in their work (Smit & Gruttemeier, 2011). Evaluation is the center of all scholarly endeavors, which is especially important in discussing selection with the explosion of scholarly publications. Thus, a significant challenge for the scholarly community is to design a system that will lead to better decision-making, assigning resources that deserve widespread attention, and deep reading, in-depth reading attention (Kriegeskorte, Walther & Deca, 2012).

According to studies, general forms of evaluation can be divided into "content evaluation," "open evaluation", "altimetric evaluation," and "bibliographic evaluation (author evaluation and resource evaluation)" (Halliday, 2001; Bohlin, 2004; Harley, 2013; Higgs, 2018; Kindelan, 2009; Collins, 2005). Each form of evaluation can be defined as "quantitative evaluation", "qualitative evaluation," and "mixed evaluation" (Sutherland, 1977; Johannisson, 2015; Hagner, 2018; Orlandi et al., 2019) and presented in the "technical evaluation," and "non-technical evaluation" formats. Non-technical evaluation includes "researcher-made evaluation," "discussion-based evaluation," etc. (Ramalho Correia & Carlos Teixeira, 2005; Krishnan, 2013).

### **Education Component**

As the level of awareness of the stakeholders of a system increases, the rate of optimal use of individuals will increase. Informal training increases users' skills and experiences to perceive ease of use and provides new research steps for many participants (Goetze, Crowne & Laker, 2018). In the scholarly publication system, the education component consists of three leading indicators: "type of education", "method of education," and "educational content". Types of education include "face-to-face training" and "distance learning" (Mukherjee, 2010; McGreal & Chen, 2011; Collins, 2005). Based on studies, different types of education can be used in various "education methods" such as "webinars," "educational projects," "counseling," "scientific panel," "workshops," "meetings," "seminars," "symposiums," "Contemplation," "lecture," "conference," "exhibition," "online discussions," "online hosting," "online forum"

and "question checklist." The content of these training can include "supplementary reading," "skills," "experiences," "tips," "events," and "instructions" (Mukherjee, 2010; Reagor & Brown, 1978; Steele, 2014; Okore, 2011; Byiringiro, 2013; Islam & Akter, 2013; Rodriguez, 2015; Ezema & Okafor, 2015; Bohlin, 2004; Dobson, 2016; Pantalony, 2016; Schmidt & Görögh, 2017; Haider & Åström, 2017; Brantley, Bruns & Duffin, 2017; Baro & Eze, 2017; Xia, 2017; Mueller-Langer & Scheufen, 2013; Mower, 2018). According to the results of this study, paying more consideration to education and other components in the scholarly publication system helps stakeholders facilitate the utilization of different features such as technology, access, infrastructure, etc.

### **Ethics Component**

The basis of scientific records is the publication of scholarly outputs. This record is not infallible and may distort future research with scientific misconduct and research errors (Qu & Wiwanitkit, 2015). In judging and evaluating scholarly works, professionals must act according to scientific criteria, not based on their prejudices and personal interests. Therefore, it is necessary to state the ethical principles explicitly for the referees (Maxwell & Schwimmer, 2016). In addition, expanding open access policies will help reduce documentation costs, develop ethical standards, and impose scientific rigor to reduce scientific misconduct (Aguzzi, 2015). According to studies, ethics in the scholarly publication system includes the format of "Role and regulation of ethics" and "Codes of ethics" in the "personal ethics" and "professional ethics" types (Xia, 2017; McGreal & Chen, 2011; Zietman, 2015). Every kind of ethics is divided into "editorial ethics," "peer review ethics," "Reviewer ethics", "research ethics," and "information ethics" forms (Kingsley & Kennan, 2015; Maxwell & Schwimmer, 2016; Aguzzi, 2015). Due to the new challenges of the scholarly publication system - open access policies - and the reduction of the quality of resources and their evaluation process, it is necessary to pay attention to the ethics component (Lakhotia & Chaddah, 2019).

### **Discussion**

Most of the components of the scholarly publication ecosystem were extracted from the studies of Brown, 1990; Souto, 2007; Esposito, 2008; Prosser, 2008; Marron & Smith, 2009; Dubini & Giglia, 2009; McGreal & Chen, 2011; Ezema & Okafor, 2015; Morrison, 2013; Kenner, 2014; Quinn, 2015; Heyl, Joubert & Guenther, 2020; Eger & Scheufen, 2021. Infrastructure has the most significant number of indicators. It seems to be the most central aspect of the scholarly publication system. For example, all scientific players and organizations are in the management infrastructure indicator (Waithaka & Onyantha, 2021). The technical infrastructure (Hedlund & Rabow, 2009; Asogwa, 2011) covers all the production, distribution, publication, exchange, and sharing standards of scientific data and information. In addition to standards, the technical infrastructure also includes scholarly information repositories (Eger & Scheufen, 2021; Krawczyk & Kulczyk, 2021) such as open-access repositories, organizational repositories, libraries, exhibitions etc.

Based on the available evidence, in the access component, the most emphasis is on the access form and open access indicator (Oladokun, 2015; Groenewegen, 2015; Peekhaus & Proferes, 2016; Anglada & Abadal, 2023; Alperin et al., 2015). Formal and informal communication in the communication component received considerable attention (Bohlin,

2004; Park & Shim, 2011; Picco et al., 2014; Kousha, 2009). Despite the importance of control form (Random control, dynamic control, semantic control), which promotes information security in the scholarly publication system, it was ignored in the studies. The control concept in these studies is often considered quality control (Xia, 2007; Wei, 2013; Xia, 2017) or censorship (Houghton, 2001; Bosch, 2008; McGreal & Chen, 2011; Wright et al., 2022).

Due to the expansion of scientific information systems and databases, in addition to the international language and native language, the importance of developing machine and natural languages has been emphasized (Hedlund & Brown, 1990, 2009; Wei, 2013; Brown, 1990).

Specialists pay more attention to formal support (Houghton, 2001; Heath & Duffy, 2005; Islam & Akter, 2013; Al-Aufi & Fulton, 2015; Carvalho Neto, Willinsky & Alperin, 2016), especially government support in the scholarly publication area. Governments are the primary beneficiaries of this system (Dam, et al., 2023) and benefit from the quantitative and qualitative growth of scholarly outputs in different parts of society (industry, health, social welfare). The indicators of the economic component also confirm the importance of formal and government support because after the budget (Greco, 2015; Quinn, 2015; Pantalony, 2016; Brainard, 2020), the most emphasis is placed on sub-indicators like funds (Arunachalam & Madhan, 2016; Thi, 2021), grant (Maron & Smith, 2009) and subsidy (Rathemacher, 2012; Högberg, 2013).

According to the critical literature outlined in this paper (Moore, 2020; Rubira-García, Baldiris-Navarro, Venet-Gutiérrez & Magro-Vela, 2020; Hidayat, Sensuse, Elisabeth & Hasani, 2022), the technology component is the core part of any system. Even though some prominent areas, like formal training in scholarly publications, are neglected in studies, some indicators, such as holding scholarly workshops, seminars, and conferences (Waithaka & Onyancha, 2021; Waithaka, Chilimo & Onyancha, 2022) have received significant attention. Due to the expansion of scientific publication concepts and the critical role of education in reducing system problems, formal training in scholarly publication will become necessary. In the evaluation component, the investigation determined that the importance of bibliographic indicators (Kennedy, 2015; Tošić & Vičić, 2021; Nane et al., 2023) remains strong. Furthermore, the beneficiaries have quickly synchronized with the new evaluation indicators like altmetrics (Troost, Webber & Wilson, 2017; Eger & Scheufen, 2021) and open evaluations (Kriegeskorte et al., 2012)

The main issue in the ethics component based on this survey is the development of personal and professional ethics to prevent scientific misconduct (Qu & Wiwanitkit, 2015; Maxwell & Schwimmer, 2016; Wright et al., 2022). Studies also have shown that the lack of a systematic perspective in scholarly publication can cause challenging issues. One of the concerns of the beneficiaries of scientific publication that has been emphasized in studies (Aghili, Mala, Shojafar & Peris-Lopez, 2019; Zhu & Cho, 2021; Qiu, Tian, Du, Zuo, Su, S. & Fang, 2020) is the issue of ownership or open access to scholarly outputs. Although ownership imposes a lower cost on the author, open access can increase the visibility, use, and citation of scientific outputs.

Writing in a native or an international language is another scholarly publication matter that some researchers have discussed (Salton, 1966; Aliakbari, 2002; Manchón, 2009; Tang, 2012; Uysal, 2014; Curry & Lillis, 2017; Chien, 2019; Liu & Buckingham, 2022) if the material is written in an international language, local experts with poor language skills cannot benefit from its output, and if the local language is used for writing, the opportunity to use the resources for foreign audiences is lost. Some researchers (Wu, 2005; Day, 2008; Lawson et al., 2016; Ross, 2107; Yamson, Appiah & Tsegah, 2018; Kumara, Sampath Kumar & Kumbar, 2019) have

pointed out other issues, such as the conflict between information media because some publishers and readers are in favor of traditional and printed formats. Some others choose online and electronic forms. Another challenge is the positive and negative attitude towards the concept of control in the scientific publishing system. According to some experts, control is considered the same as censorship (Biagioli, 2002; Rahimi, 2015; Potvin & Sare, 2016, Dluhošová, 2018); according to others, control is a part of the management (Larivière, Haustein & Mongeon, 2015; Guédon et al., 2019), evaluation (Brien, Burr & Webb, 2010; Guédon et al., 2019) and security (Bohlin, 2004; Wei, 2013; Parkosewich, 2013) of the scholarly publication ecosystem.

Scientific misconduct and ethical issues are other problems in the scientific publication ecosystem (Garte, 1995; Obeid & Hill, 2017). Most of these problems are rooted in the lack of awareness and formal training in the scholarly publication system. Another critical factor in the scholarly publication ecosystem is the anonymity or disclosure of the peer reviewer's identity in the open evaluation indicator (Kulczycki et al., 2019; Bolek, Marolov, Bolek & Shopovski, 2020; Fox, 2021), which is accepted by some reviewers and rejected by other experts. An additional problem is Material Intellectual Property Rights, which is emphasized in scholarly publications (Dutfield & Suthersanen, 2020; Ardani, Utomo & Rahmawati, 2021), but is not seen in the list of components and indicators of the scholarly publication system because it is integrated into a part of economy, support, infrastructure, ethics and technology (Plagiarism checker software).

### Conclusion

Systematic review studies of the scholarly publication system show that this system has 12 principal components, most of which can be divided into form, type, scope, and format. Each component is grouped based on different instances. Therefore, this framework has broader examples, which have been reduced to three primary divisions (components, indicators, and sub-indicators) to present the extract of the findings. Experts have commented on some features, such as economics.

Researchers have focused on some components, such as infrastructure, technology, communication, and access. Others, such as education and ethics, have been less emphasized. However, education can play an important role in developing and applying many concepts of the scholarly publication system, especially ethics, one of the most critical issues in the scholarly publishing area. Therefore, paying more attention to education and ethics components in future research is necessary. Studies have identified various challenges in the ecosystem of scientific publishing, but these issues are not the weak point of the scholarly publication system; on the contrary, these challenges are necessary to ensure the durability of any system because incompatibility is a fundamental part of a dynamic system (Lee, 2000; Rubio-Manrique & Cuní, 2019). With a systematic attitude, many research challenges complement the scholarly publication system.

A big part of the scholarly publication problem, like scientific misconduct, the use of publishing technologies, the development of scientific communication, the identification of investment opportunities, and the promotion of information security, originates from the unawareness of the stakeholders, which will be solved by formalizing scholarly publication training. Identifying the components and indicators of the scholarly publication system in a conceptual framework helps to design various models and determine the strengths and

weaknesses of the scholarly publication system. Furthermore, different countries can evaluate and localize their scholarly publication systems and sub-systems based on the specified components and indicators.

The design of this system is necessary for all countries because it improves scholarly publication ecosystem issues, informing the information cycle and flow, integrating access to scientific data and information, identifying gaps and causes of reduction of scientific production, planning, increasing social and individual awareness about the functions of the scholarly publication system, preparing comprehensive statistics and reports from scientific publication, Encouraging investors to invest and reducing the investor worries about return on investment (ROI), defining scholarly publication budget, having a comprehensive evaluation system for scientific production, forming monolithic rules in scholarly publication and reducing contradictions of laws, growing opportunities for interaction and cooperation with other systems, supporting the scholarly publication ecosystem and protecting copyrights and intellectual rights of stakeholders.

### Endnotes

1. Journal of Scholars
2. Preferred Reporting Items for Systematic Reviews and Meta-Analyses
3. Wikipedia

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