

## Societal Impacts of Open Government Data Use: Systematic Literature Review and Altmetric Evaluation

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### ABSTRACT

The purpose of this research is to investigate the impacts of Open Government Data (OGD) use on the societal-economic sphere and to identify possible gaps in the literature between its several categories. Therefore, this paper led to a deliberate literature study of the OGD research that primarily collected on empirical earlier papers. We systematically reviewed 88 reputable articles connected with the societal impacts of OGD use utilising Scopus Gateway from 2012 to 2022. We followed the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) Protocol, and several software tools such as Mendeley, Publish or Perish, and VOSViewer to support the literature review process. This research provides several essential statistical views related to the social impact in the OGD field using Altmetric. The result shows that there were 26 categories of the OGD used for the societal consequences, with 8 main keywords most frequently used by the authors. Additionally, the highest number of authors who contributed to the discussion of social impact data, especially on the issue of open government, was 19, recorded in 2012. A number of topics overwhelmed the discussion of social impacts, namely, open government, citizen engagement, socio-economic value, and transparency in the period of 2015 and 2017.

**Keywords:** Societal impacts; OGD; SLR; Altmetric

### 1. INTRODUCTION

The term “open data” refers to information that is publicly accessible for anyone to use, reuse, and redistribute in compliance with the most recent Open Government Data (OGD) policies.<sup>1-2</sup> Government data, on the other hand, is described as information and data created or performed by governmental agencies.<sup>3</sup> In order to encourage the development of new information technologies and services for a larger audience by non-profit and private third parties, the public sector makes a variety of datasets publicly accessible.<sup>4</sup> Also, the OGD movements upgrade citizen engagement in conservative policy-making.<sup>5</sup>

In the prior studies, from a societal standpoint, OGD promotes collaboration and participation and makes it possible to include disadvantaged populations.<sup>6</sup> It also encourages citizens to make more knowledgeable decisions by enabling people to contribute to policies that are better suited to their needs and to have more active relationships with their governments.<sup>7</sup> By default,

the OGD initiatives should reap benefits, including their influence on society, as was already mentioned. For example, OGD might have the advantage of being cost-free with limitless use of civil liberties and justices<sup>8</sup>, eliminating two significant boundaries to advance the government’s strategic programs or citizen innovation. As a result, it can prompt new advancements driven by massive information investigation by providing more noteworthy straightforwardness and trustworthiness of the public area.<sup>9-10</sup>

In this study, we used altmetric approach as part of statistical measurement to reveal the impact of a research publication. We found eight main categories in the OGD use from the literature study that influence the societal domain: open government, citizen engagement, socio-economic, transparency, innovation, policy and decision-making, collaboration, and accountability. At the same time, in this paper, we also discovered that the prior literature study had paid little attention to several other potential societal impacts. The societal consequences include social media, democracy, open science, entrepreneurship, public sector information, block chain, business data usage, and the digital divide.

The objective of this study is to look into the effects of OGD use on the societal and economic spheres and to find any gaps in the current literature between its various categories. Therefore, this paper led to a deliberate literature study of OGD research that primarily collected on empirical earlier papers. We systematically collected and reviewed 88 reputable articles connected with the societal impacts of OGD use utilising Scopus Gateway from 2012 to 2022. Afterwards, we followed the PRISMA Protocol to define and identify the necessary search phrases to obtain pertinent publications that fit our research focus.

## 2. METHODOLOGY

### 2.1 Literature Review

The literature review method is employed in this research to achieve a number of objectives. It accomplishes this by first providing research findings and outcomes that are solely pertinent to the study being discussed. The thorough exploration of the research's current position in OGD use and its societal impacts is one of the study's primary goals in conducting a literature review. Additionally, it also identifies gaps and potential blank spaces from earlier research and links a study of continuing discussions about a topic in the literature. This study also takes into account the potential diversity and similarity of key terms, including those for OGD, benefits, and societal effects of disclosing data. As a result, we focus on creating gaps between these crucial terminologies.

To thoroughly address the phenomenon of the research, we synthesised the empirical evidence using a systematic literature review approach. In this study, a systematic review approach provides various advantages.<sup>11</sup> First, explicit approaches allow systematic reviews to compile in-depth study evidence for OGD use in terms

of its societal consequences. Second, systematic reviews examine whether there is a consistent relationship between the societal impact categories and the research gaps in disclosing data. Third, systematic reviews clarify the various research outcomes and explain any potential consistency between study results. Figure 1 illustrates the methodology adapted for the systematic literature review study. Three main steps are used in this literature review process: data collection, data eligibility, and data exclusion.

In the meantime, as shown in Figure 2, we followed the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) Protocol, with three primary sequential processes to collect the data for this study: data collection, data eligibility, data exclusion, and inclusion or included the papers. Utilising the PRISMA Protocol guarantees the effectiveness of the literature review procedure by providing an efficient and easy method.<sup>12</sup>

### 2.2 Data Collection

This research collected data concerning OGD use and its societal impacts through SCOPUS Gateway as one of the academic databases and search engines using several specific keywords from 2012 to 2022. Based on the Boolean search, we found 256 eligible articles represented the key construct of “open government data” AND “societal impacts\*” OR “benefits.” The search terms and rules were as can be presented in Table 1.

### 2.3 Data Eligibility and Exclusion

To verify the material matched our literature objectives rather than looking for extraneous words or contents, this single scientific database was searched on the “abstract”.<sup>12</sup> Subsequently, from 256 relevant articles, we reduced the number of articles by 124 by filtering the abstracts

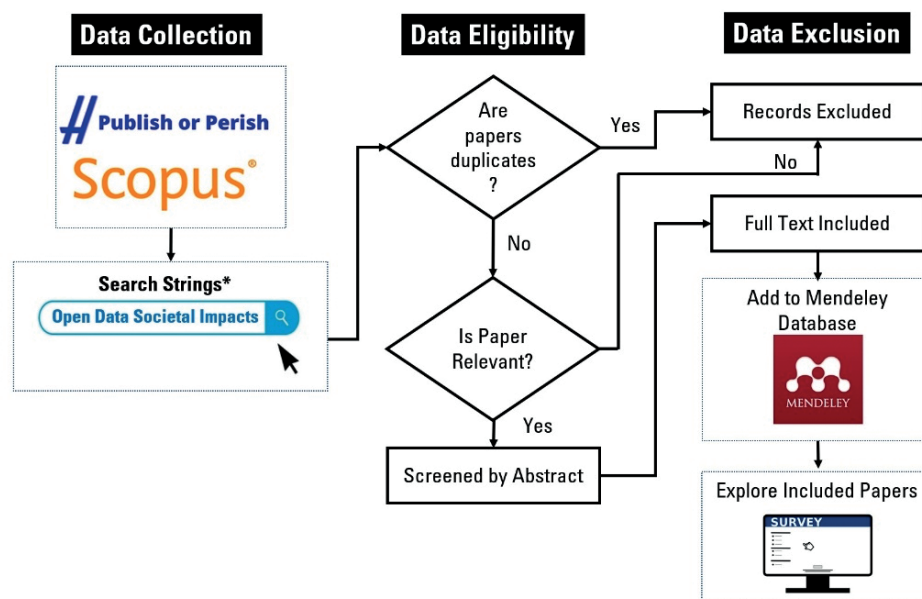


Figure 1. Methodology adapted for the systematic literature study.

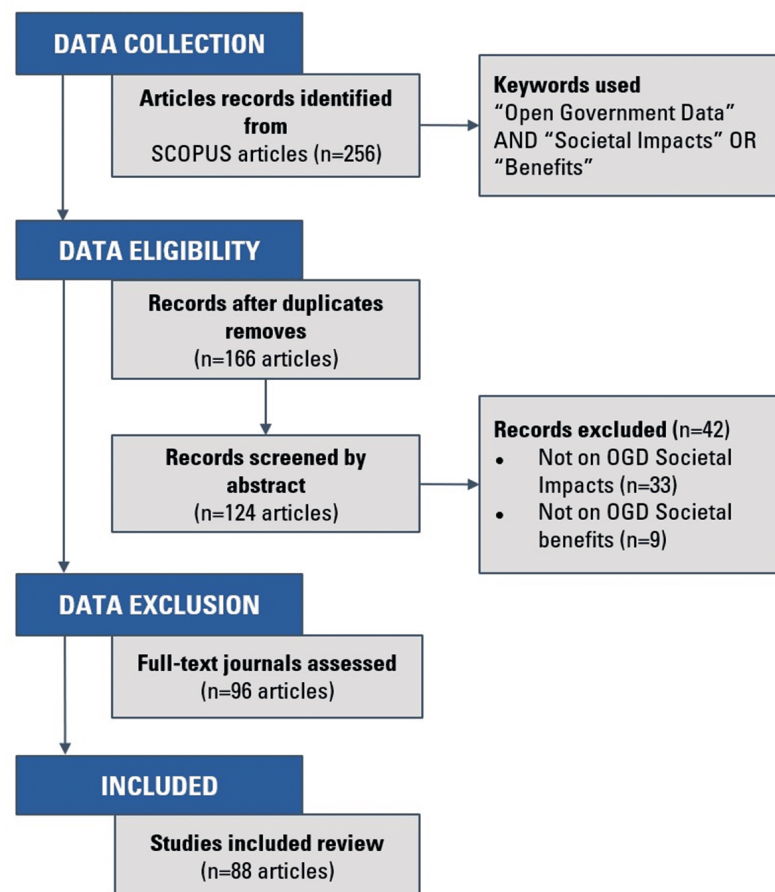


Figure 2. Literature review process using PRISMA protocol in this study.

Table 1. Search terms and keywords used in the literature review process

Key construct	Search strings
Open Government Data	open data, open government data, public data, government data sharing
Societal Impacts	societal impacts*, social effects*, societal benefits*

without explicitly mentioning societal impacts. Next, we conducted a full-text screening by removing non-empirical studies without comparative study objectives. After applying these standards incrementally, we discovered 96 articles that qualified.

#### 2.4 Data Inclusion

Similarly, we performed chain checking or forward and backward references to ensure we did not leave out any relatable articles. Examining publications that reference our example articles is the goal of forwarding checking. Backward checking's goal is to find articles that are listed as references in the 96 articles from the complete screening paper step.<sup>12</sup> Finally, we selected 88 articles for inclusion by capturing relevant articles based on combining the abstract and authors' keywords. In addition, this study also provide the relevance articles from the data inclusion process using VOSViewer tool to visualize the bibliometric networks such as journals, titles, authors, and publications.

### 3. RESULTS AND DISCUSSION

#### 3.1 Retrieves Paper Citations

This section uses the findings from the literature review process stage's inclusion data to map and rank the papers that have received the most citations on OGD themes that expressly address social implications. Therefore, we used Publish or Perish (PoP) technique, which can be used with no license required, to retrieve and analyse academic citations from various data sources.

Ordinarily, publishing or perishing is a method that recovers and investigates academic references.<sup>13</sup> It draws on a variety of data sources to obtain the rough references, then analyzes them and gives a range of reference measurements, such as the number of publications, the total number of citations, and the h-index. Aside from performing a far-reaching search, PoP allows researchers to save all indexed lists. From this process, we found 88 relevant articles in the SCOPUS database. These papers ultimately have relevance to the field of OGD use with specific discussion in the area of social life. According

to Igbal Safarov<sup>14</sup>, *et al.*, transparency and accountability, economic development, citizen engagement, development of public services, social values, and citizen trust are some of the notable aspects that influence the use of OGD in social networks. Meanwhile, according to Melissa A Handel<sup>15</sup>, *et al.*, during the COVID-19 pandemic, the use of OGD had a major contribution to aspects of people's social life related to data needs and rapid knowledge sharing.

### 3.2 Relevant Societal Impact Categories

In this section, we indicated the categories and counts of keyword usage in all 88 articles in the literature study process. These categories are the main keywords used by

the authors to determine the social impacts of using OGD, as shown in Table 2. Regarding the data sources of the relevance societal issues, we use academic social media to develop the altmetric analysis, such as Researchgate, Web of Science, Wikipedia, Academia.edu, Mendeley, and LinkedIn.

Based on the data in Table 2, several findings can be taken. First, from the results of the publish or perish process by combining the SCOPUS gateway publication, there are 26 keywords that authors most often use to describe the social impact of using OGD. Second, we divide the keyword categories relevant to the research topic into three main clusters. Cluster 1 is a keyword category that has occurrences of 9 to 38, in which there

**Table 2. Relevant topics and categories in OGD used in terms of societal impacts**

S. No.	Relevance author's keywords to societal impacts	Data source from academic social media	Occurrences	Cluster of categories
1	Open Government	Researchgate, Web of Science, Wikipedia, Academia.edu, Mendeley, LinkedIn.	38	1
2	Citizen engagement	Researchgate, Web of Science, Wikipedia, Academia.edu, LinkedIn	17	1
3	Socio-economic value	Researchgate, Web of Science, Mendeley Academia.edu	16	1
4	Transparency	Researchgate, Web of Science, Mendeley, Academia.edu	15	1
5	Innovation	Researchgate, Web of Science, Academia.edu	15	1
6	Policy and decision-making	Researchgate, Web of Science, Mendeley, Academia.edu	13	1
7	Collaboration	Researchgate, Web of Science, Mendeley, Academia.edu	11	1
8	Accountability	Researchgate, Web of Science, Mendeley, Academia.edu	9	1
9	Social media	Researchgate, Web of Science, Mendeley, Academia.edu	7	2
10	E-government	Researchgate, Web of Science, Mendeley, Academia.edu	6	2
11	Big data	Researchgate, Web of Science, Mendeley, Academia.edu	6	2
12	Open science	Researchgate, Web of Science, Mendeley, Academia.edu	6	2
13	Education	Researchgate, Web of Science, Mendeley, Academia.edu	5	2
14	Democracy	Researchgate, Web of Science, Mendeley, Academia.edu	4	3
15	Public sector information	Researchgate, Web of Science, Mendeley, Academia.edu	4	3
16	Entrepreneur	Researchgate, Web of Science, Mendeley, Academia.edu	4	3
17	Business data usage	Researchgate, Web of Science, Mendeley, Academia.edu	4	3
18	Digital divide	Researchgate, Web of Science, Mendeley	4	3
19	Effectiveness	Researchgate, Web of Science, Mendeley	4	3
20	Blockchain	Researchgate, Web of Science, Mendeley	3	3
21	Trust	Researchgate, Web of Science, Mendeley	3	3
22	Access to information	Researchgate, Web of Science, Mendeley	3	3
23	Business models	Researchgate, Web of Science, Mendeley	3	3
24	Artificial intelligence	Researchgate, Web of Science, Mendeley	2	3
25	Crowdsourcing	Researchgate, Web of Science, Mendeley	2	3
26	Data quality	Researchgate, Web of Science, Mendeley	2	3

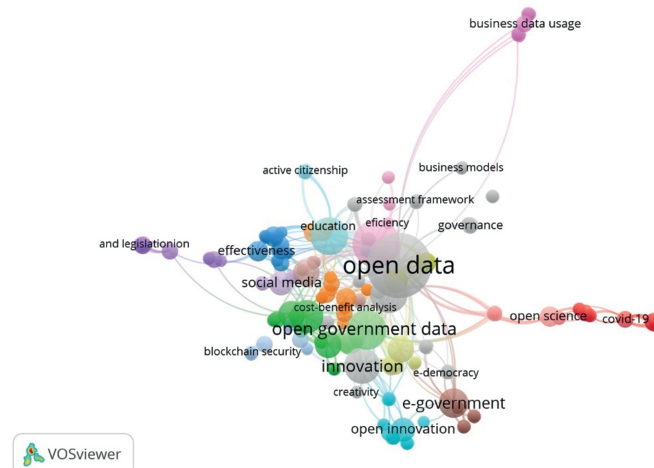


are eight elements of open government (38), citizen engagement (17), Socio-economic value (16), transparency (15), innovation (15), policy and decision-making (13), collaboration (11), and accountability (9).

Furthermore, in cluster 2, six elements fall into the category with the most relevant keyword occurrences related to the use of OGD that has a social impact. Cluster 2 is a keyword category that has an occurrence of 5 to 7. The five categories are social media (7), e-Government (6), big data (6), open science (6), and education (5). In addition, Table 2 presents information on 13 keyword categories that authors frequently engage in their articles to signify essential factors of the usage of OGD in the field of social impacts. With an average of two to four occurrences throughout all selected papers, this category is part of cluster 3. The 13 categories include democracy (4), public sector information (4), entrepreneur (4), business data usage (4), digital divide (4), effectiveness (4), blockchain (3), trust (3), access to information (3), business model (3), artificial intelligence (2), crowdsourcing (2), and data quality (2).

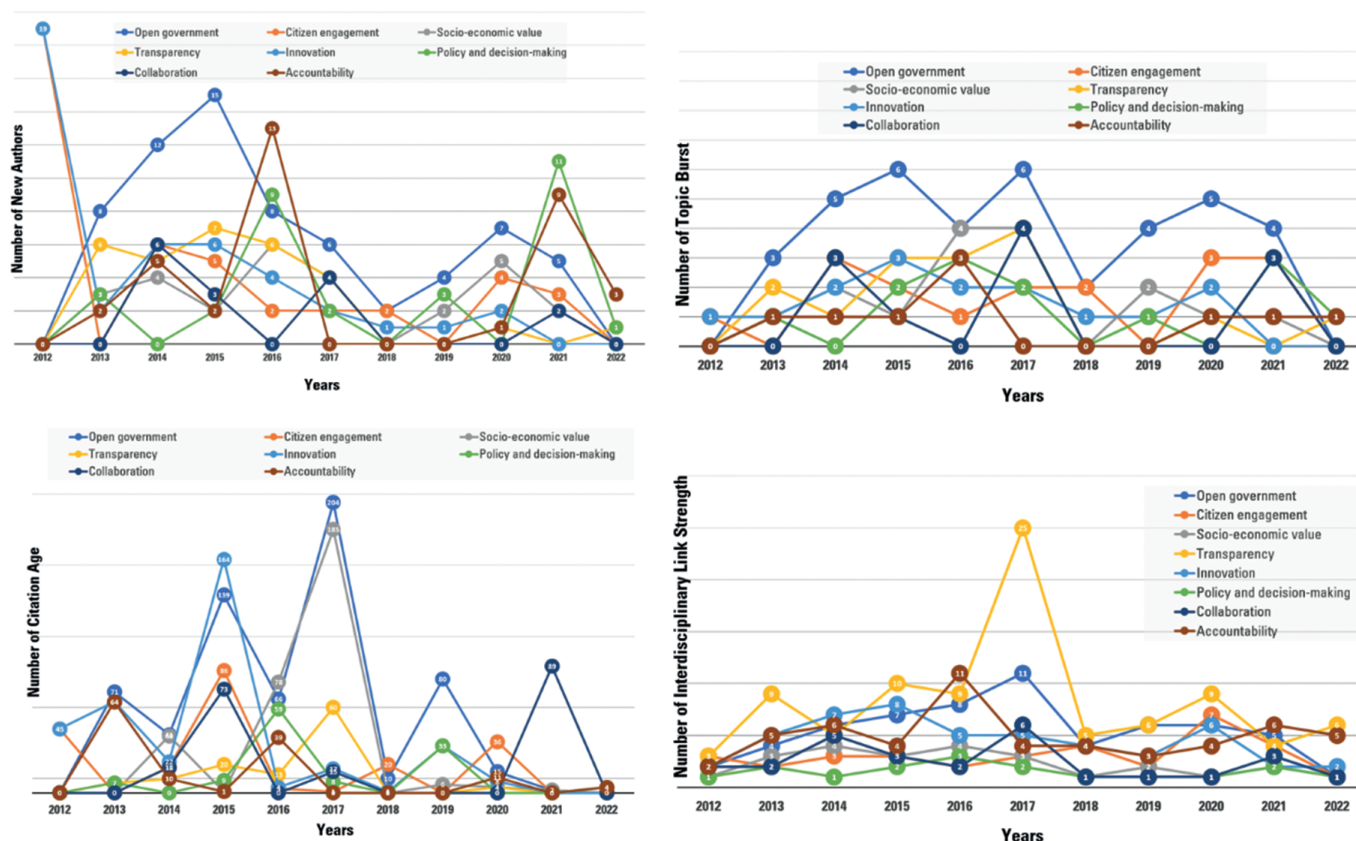
### 3.3 Relevant Topic Distribution in the Societal Impacts

After going through the stages of categorising the relevant elements in the use of OGD in the social impact field, we mapped the distribution of topics relevant to the purpose of this research. The purpose of this topic distribution visualisation is to provide knowledge about which topics are most dominantly discussed by researchers



**Figure 3. Topic distribution of the OGD use for societal impacts.** and to find out which topic areas have not received more attention from current researchers.

Figure 3 presents topics relevant to the discussion area of social influence in the use of OGD. The visualisation results were carried out with the help of VOS Viewer software to generate a topic distribution network map. The figure shows that five significant topics have become social impact discussion icons, as presented in Table 4. The top five topics are transparency, citizen engagement, societal benefits, innovation, and collaboration. In addition, the results of the visual distribution network can also show links between topics of discussion so that we can



**Figure 4. Altimetrics indicator results for the emerging research field.**

see the relationship between one topic or category with other topics or categories.

This research provides some important findings related to the categories and keywords that frequently used in the field of OGD's societal impacts. Figure 4 presents the altmetrics results for the emerging research field. The figure on the top left is the number of recent researchers based on the number of published articles. In this altmetrics, it can be seen that the highest number of authors who contributed to the discussion of social impact data, especially in the issue of open government, was 19, recorded in 2012. Meanwhile, the top right of Figure 4 can be interpreted as the number of topics that flooded the discussion of social impacts, namely, the topic of open government, which occurred between 2015 and 2017.

Furthermore, the figure on the bottom left represents the number of collections of citations in the field of social impact in the use of OGD. Here, it can be seen that the largest number of citations occurred in 2017, with as many as 204 citations on the theme of open government, followed by the theme of the socioeconomic value 185. Besides, the other Altmetrics figure (on the bottom right) explains the strength of the link or relationship on each

cross-topic. Based on this picture, it can be concluded that the topic of transparency is a timely topic for discussion and the most substantial relationship as a liaison for the 26 issues obtained through this research.

Figure 5 indicates the summary of the main issues found in this study using a systematic literature study and altmetrics evaluation. There are four types of the altmetrics-based evaluations, namely new authors, paper per topics, cites age, and interdisciplinary. New authors refer to the number of the new researchers that published the relevance articles. Topic's article cites age refers to time of period from 2012-2022 per four different topic categories (open government, citizen engagement, socio-economic value, and transparency). While the interdisciplinary means that the number of the articles published that having interdisciplinary field beyond the OGD contexts.

As can be seen, one of the potential topics for further research direction is the socio-economic category. The socio-economic value indicates the measurement of people's perceptions of how essential changes in their lives are to them on a relative basis.<sup>16</sup> By utilising resources, inputs, or processes, enhancing

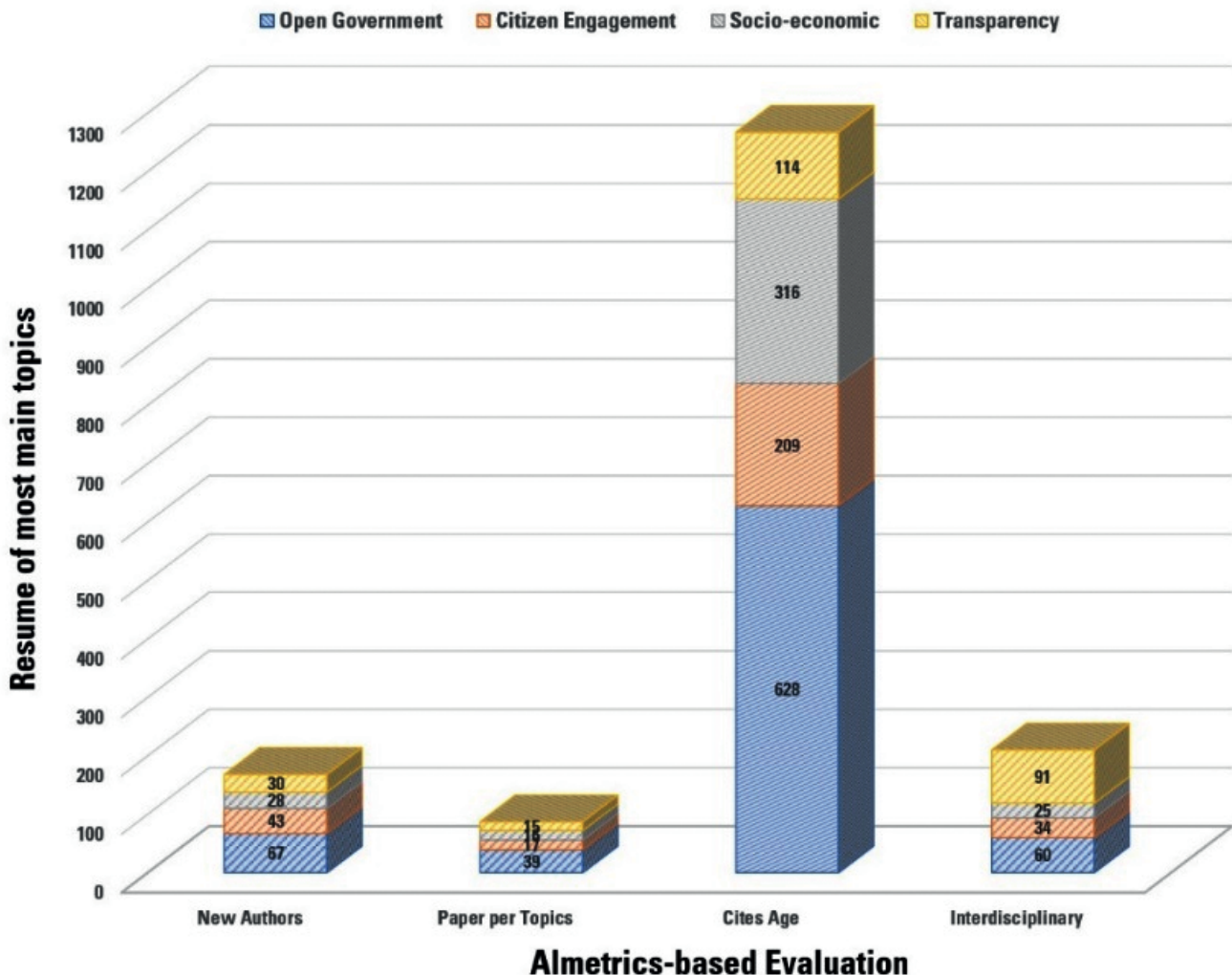


Figure 5. Resume of main topics based on the altmetrics evaluation.

these inputs' value, and resulting in cost reductions for the public environment or system of which the organisation is an element, an entity creates socio-economic value.<sup>16,17</sup>

### 3.4 Critical Point of Empirical Research on OGD Societal Impacts

From the literature review work of this study, we found eight main categories in the OGD use that influence the societal domain: open government, citizen engagement, socio-economic value, transparency, innovation, policy and decision-making, collaboration, and accountability. First, An open government is a form of government built on innovative and long-lasting public policies and practices driven by the principles of accountability, participation, and openness and that support democracy and inclusive development.<sup>18</sup> Second, citizen engagement indicates that OGD provides citizens with the foundational materials they need to interact and engage with their governments and enhance public services.<sup>19-20</sup> For instance, citizens might use government datasets to provide input on public planning or give government agencies feedback on the capability of their services. Although several researchers focused on open government and citizen engagement on the societal impacts, the success of the OGD use cannot be represented at the local or national level of the government institutions.<sup>10</sup>

Furthermore, the third, socio-economic value, indicates the measurement of people's perceptions of how important changes in their lives are to them on a relative basis.<sup>16</sup> An entity creates socioeconomic value by employing resources, inputs, or processes, strengthening the value of these inputs, and ultimately leading to cost savings for the public system or environment of which the entity is a part.<sup>16-17</sup> Fourth, transparency refers to the OGD encouraging citizen scrutiny of governments and, by promoting more openness, aids in the fight against corruption.<sup>21</sup> For instance, open data makes it easier to keep tabs on government activities, such as tracking the effects and expenditures of the public budget.

Subsequently, in the fifth category, innovation refers to social growth and invention, whereby public data and their reuse are essential resources.<sup>22</sup> Governments now have new opportunities to collaborate with citizens and evaluate public services to OGD, giving the public access to information about those services. The sixth societal impacts fall into policy and decision-making. When the government or an institution creates or formulates a specific action plan, this is referred to as policy-making.<sup>23</sup> Making decisions involves choosing a specific strategy or plan of action from a variety of options.<sup>6</sup> Seventh, decision-making is the process by which citizens participate in public deliberation. Depending on how it is interpreted, citizens can be viewed as individuals or institutionalised organisations, and participation may assume the form of either authority or observation.<sup>24</sup> Finally, accountability presents the current trend toward OGD, enabling citizens may keep

up with the regular activities of their local government by staying connected, informed, and up-to-date.<sup>25</sup> To illustrate, governments are held accountable for the outcomes they produce due to the public nature of this valuable information.

## 4. CONCLUSION

The goal of this study is to examine how OGD use affects the sociological and economic environment and to find any gaps in the existing literature among its various categories. There are a few intriguing and significant viewpoints as discoveries to be examined. These discoveries can stick highlight a few things. Regardless, the aftereffects of the writing study have made 26 categories the most predominant conversation points utilised by the writers during 2012-2022. Albeit these subjects are overwhelming, there is a requirement for developing from the logical side of the conversation in the paper.

All in all, the circulation of the point should guarantee the setting of the provincial contextual investigation of the public authority of a specific nation or district. Since it may be the case that topographical contrasts, rules, culture, and innovative status become the most prevailing classification differentiators. In this manner, there is a requirement for additional examination with respect to the partition of classifications in view of the topical cases and the delicate meaning of every classification. Finally, we postulate that it will be very interesting to perform further study directions on clusters 2 and 3, such as societal impacts on social media, democracy, open science, entrepreneur, public sector information, blockchain, business data usage, and the digital divide.

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