The Landscape of Public Art Research: A Knowledge Map Analysis

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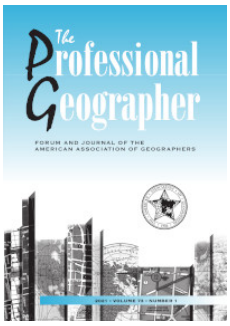

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Abstract

This is the first article to date that employs a knowledge map analysis to provide insights into the landscape of public art research, a multidisciplinary area that is concerned with issues around the geographies of art, space, and community. This study uses bibliometric analysis and knowledge visualization tools provided by CiteSpace mapping software to review scholarly journal output on "public art" since 1964—which is the first occurrence of this term in an article indexed in the Web of Science Core Collection database covering English-language journal publications. The analysis reveals the value of bibliometric analysis for engaging data on the growth and popularity of public art as a research landscape—which is perceived as both a research field and research discourse. Accordingly, this study constructs knowledge maps, and thereby trends, of popular topics and networks of authors and institutions that have emerged in the public art research landscape. Such knowledge maps exhibit a "metageography" of cross-disciplinary connections within public art research (where these knowledge maps in themselves can be rendered as artworks, too). This study, as such, provides new reference points for scholars to position themselves in, and further deepen bibliometric investigation into, the landscape of public art research.

Key Words

CiteSpace, knowledge map analysis, knowledge visualization, multidisciplinary, public art research.

Public art has a complex history, geography, and ontology. It has come a long way from artworks in public venues during the New Deal, or considerably earlier in human history: Think of equestrian statues of Roman emperors, Ancient Greece's Parthenon on the Acropolis, or Altamira cave paintings that remind us of prehistoric public culture. The term *public art*, however, is fairly recent and became popularized in the Western world, especially when the U.S.-based National Endowment for the Arts launched its first Art in Public Places Program (APP) in 1967, which ran until 1995 (see Fleming and Goldman 2005; Kester 2006; Knight 2008).

Public art, in general, has come to stand for artwork (often sculptural objects or installations) that is typically supported by public funding, commissioned by public authorities (Cartiere and Zebracki 2016), and located in spaces that provide free, physical, and visual access (Zebracki and Palmer 2017). The medium ("what"), spatiality ("where"), and temporality ("when") of public art have been straddling, among other avenues, permanent material objects and performance- based work and urban centers, rural areas, and digitally mediated spaces of present-day networked societies (see Paul 2016; Zebracki and Luger 2019). Public art, in so doing, has come to encompass a wider array of spaces of everyday life—as Cartiere and Zebracki (2016) argued: "[it] has crept into every corner of our society and perhaps, in part, that is why it is one of the most controversial and misinterpreted art disciplines and subjects of study today" (3).

Scholarly thought about public art has made large strides, moving beyond traditional art, historical, "formalist" methods that focus on the style of artworks found in typical art exhibition contexts of museums and gallery spaces (e.g., Phillips 1988; Senie and Webster 1992; Hein 2006; Knight and Senie 2018). Along with a mounting presence of art in public community spaces of democratic societies (see Doss 1995; Deutsche 1996), research into public art has evolved in a multidisciplinary fashion, involving case studies that emphasize the wide gamut, and on-going reconfiguration, of relationships between art, public space, audiences, encounters, and participation (e.g., Zebracki 2012; Warren 2013; Vernet 2015; Gurney 2018; Lehtinen 2019). This widening scope of public art has offered rich study material for scholars across the (geo)humanities and social sciences to reflect on the complexity of the social and spatial dimensions and impacts of public art practices and engagement (e.g., Finkelpearl 2001; Kwon 2004; Knight 2008; Bishop 2012; Cartiere and Zebracki 2016; Radice and Boudreault-Fournier 2017).

Hence, a developing, multidisciplinary range of scholars have been examining public art using geographical perspectives, integrating the imperatives emerging from the dynamic contexts of globalization and city marketing (e.g., Miles 1997; Pollock and Paddison 2014; Luger and Ren 2017). Against this background, scholarship has called attention to the critical role that the production and consumption of public art might play in the increasing competition for space and identity expression—especially within contexts of urban regeneration where local communities and cultural and identity politics might clash with each other (e.g., Sharp, Pollock, and Paddison 2005; Zebracki 2018).

Much consideration has been given to how public art has developed into a critical field of inquiry (e.g., Cartiere 2008; Knight 2008; Schuermans, Loopmans, and Vandenabeele 2012; Cartiere and Zebracki 2016). Despite this growing literature, there has been an absence of any bibliometric consideration of the development and rising popularity of public art as a research landscape, construed as both a

research field and research discourse. As the first study to date, we thoroughly review this research landscape by using CiteSpace (version 5.7.R1) to engage data on the emergence of published scholarship on public art.

Created and developed by Chaomei Chen (see Chen 2016), CiteSpace is the leading Java Web-based application for bibliometric analysis and information visualization. The CiteSpace bibliometric mapping software primarily draws from the Core Collection database Web of Science (WoS, version 5.34) of Clarivate Analytics (previously Thomson Reuters). This database has developed as the most comprehensive academic bibliographic citation indexing service to date for English-language journal sources (including sources in languages other than English that have titles, abstracts, and bibliographic data translated into English; Clarivate 2019). The one major caveat of the use of WoS, however, is its Anglophone-centered and dominant Western, Global North focus (see Derudder 2011; Collyer 2018).

We begin this article with a discussion of our study method, followed by the bibliometric analysis. The analysis foregrounds "hotspots" and trends in public art research (which might have remained hidden so far), before concluding with remarks on the study opportunities and limitations, including the value and shortcomings of bibliometric tools for knowledge map analysis and information visualization of the public art research landscape.

Methodology

Knowledge Mapping

Our study methodology has involved a knowledge map analysis of networks of keywords, authors, and cocitations or references, using the bibliometric mapping software CiteSpace (version 5.7.R1). CiteSpace is the tool of choice for research production analysis, following consensus among scholars, notably CiteSpace's founder Chen (2004, 2006, 2013, 2014) and peers such as Wei, Grubesic, and Bishop (2015), Xiao et al. (2017), Pan et al. (2018), and Jiang, Ritchie, and Benckendorff (2019), from whom we have drawn inspiration for the study at hand.

Nevertheless, Jiang, Ritchie, and Benckendorff (2019, 1949) underlined the limitation of WoS by its "exclusive focus on specialist journals," which also includes conference proceedings. Neither academic publications such as books and book chapters nor all journals and proceedings are indexed in WoS. As its Core Collection database exclusively indexes English-language journal output, WoS moreover demonstrates Anglophonic, Western, and Global North dominance, or bias if you will—as we pointed out earlier.

That said, these scholars have still been exclusively using WoS in the absence of competitive alternatives. Wei, Grubesic, and Bishop (2015, 376) claimed that WoS concerns a more complete index, especially for abstracts, keywords, and reference relationships, in comparison with the alternative key index of Google Scholar. They referred to Neuhaus et al. (2006), who problematized that Google Scholar integrates citations of unrefereed and unpublished work, including presentations and blogs.

The issue of the nonindexation of books and book chapters in WoS, according to

McKercher (2008; cited in Jiang, Ritchie, and Benckendorff 2019), could undervalue scholarly practice that revolves around book writing. Nevertheless, just like Jiang, Ritchie, and Benckendorff (2019), we have mitigated this shortcoming by pursuing cocitation analysis that could partially incorporate cited book sources—and, moreover, by referencing key books to discursively contextualize hotspots and trends. Also note that some books, or edited volumes, might include chapter reproductions or updated variants of papers prepublished in peer-reviewed journals or conference proceedings as part of the WoS index.

Data Collection and Analysis

We have collected and analyzed the research output of journal articles indexed or themed as "public art" in the WoS Core Collection database since 1964. This is the date of the first publication of an article (i.e., Crane 1964) with this key term as accommodated in this database (see Trends in the Public Art Research Landscape). Accordingly, we have analyzed the public art journal publication stream to interrogate the state of research to date, including key public art research areas, and the geographical distribution of public art knowledge production in terms of networks of authors and associated institutions. This has revealed trends regarding (1) the type and quantity, including citations, of journal output on public art; and (2) the contents of public art journal output based on keywords, which signify core concepts, and knowledge clusters.

The key measure of CiteSpace is centrality, which this mapping software uses to discover and gauge the importance of and between nodes in the bibliometric network (Chen 2016; see also Freeman 1978; Li, Porter, and Wang 2017; Jiang, Ritchie, and Benckendorff 2019). CiteSpace has enabled the analysis of high-frequency and cooccurring keywords and references and cocitations to uncover "hot" topics and concepts in the research field, thematic patterns including knowledge clusters/front(ier)s, and research clusters: bibliometric networks and relations that are indicative of collaboration across disciplines and authors and institutions.

The bibliometric analysis has been assisted with another key measure of CiteSpace: burst detection, an algorithmic knowledge visualization technique that helps to extract meaningful structures from the publication stream. It is a way of identifying periods of time wherein fads, so-called bursts, signpost events – including themes, scholars, and networks – which show up as popular in the timeline of the data sample (Chen 2006, 2014; see also Kleinberg 2003).

As Chen (2006) specified, CiteSpace allows that "a current research front is identified based on … burst terms extracted from titles, abstracts, descriptors, and identifiers of bibliographic records" (364). We have used burst terms to label clusters, which are a key measure for identifying heterogeneous networks of publications in which those terms appear (see Synnestvedt, Chen, and Holmes 2005; Chen, Ibekwe-SanJuan, and Hou 2010; Chen 2016). Burst detection (after Kleinberg 2003) is, moreover, applied in, among others, textual and sentiment analyses of social media content including news streams (e.g., Xu et al. 2018).

Moreover, CiteSpace has supported the visualization of a "macro-knowledge" map to unravel trends in the research area. The knowledge visualizations are key to our argument. Given the limited article space, we have accommodated a selection of knowledge visualizations including

tables and figures. These visualizations provide an appropriate reflection of the diverse possibilities of CiteSpace for displaying and forming mental pictures of the research landscape.

We have used public art as the key topic or term in the data retrieval strategy, using the WoS search string.[1] Data are considered valid when the term *public art* appears in the item's title, abstract, or keywords. Lemmatization in WoS has also enabled the inclusion of inflected forms of this term, such as *art public*, and, by extension, *art (in) public space*. The total sample included 924 items for the period from 1964 until data collection for our analysis ended on 15 March 2020. This sample covers the main three journal output categories: articles, proceedings papers, and book reviews. We have retained book reviews as part of the sample. Although we realize that book reviews do not typically comprise peer-reviewed output, or original research per se, they can sustain valuable dialogues between the academic and public art worlds. They can, thus, be meaningful in providing reflections on new issues and promoting new scholarly and practical engagements in the research area (see Oinas and Leppälä 2013).

The State of the Public Art in Figures

We have visualized the public art output categories in Figure 1, which expresses the largest share for peer-reviewed journal articles (*n*=645, 61.7 percent). This outcome can be expected from the traditional focus on this type of output in academic publishing. Papers published in conference proceedings (*n*=167, 16.0 percent) take second place, followed by book reviews (*n*=112, 10.7 percent).

Following WoS classifications, we have broken down the total public art output for disciplinary distribution in Figure 2. This exercise should be approached with care. The conventional disciplinary output classifications in WoS might arguably overlap each other in consideration of the highly multidisciplinary nature of public art scholarship. Therefore, the top ten subject categories as visualized in Figure 2 should not be construed as disciplinary "pigeonholes." Rather, we read this figure as a variety of disciplinary dialogues on public art as encountered in published output across the sample outlets (articles, proceedings papers, and book reviews).

At the same time, these WoS subject categories might provide some useful indications of the output's most pronounced research areas—and related epistemological backgrounds. The art category (27.3 percent) accounts for most of the output sample, followed by the cognate categories of humanities multidisciplinary (11.0 percent) and architecture (9.0 percent). Taken together, geography (5.1 percent), urban studies (3.6 percent), and environmental studies" (2.9 percent) represent just a modest share (11.6 percent) of the article output. Nonetheless, geographical scholarship and geographers have been coguiding trends of the public art research landscape, as we show later.

We would like to comment here that the subject composition in Figure 2 might introduce potential confusion over the consistency of the different uses and meanings of the terms *multidisciplinary* and *interdisciplinary*. We observe that, in academic writing, these terms are sometimes used interchangeably or axiomatically— that is, left undefined or taken for granted (see, e.g., Baerwald 2010 for a critical account).

We take multidisciplinarity as scholars' engagement with perspectives across disciplines (although they often still, but not necessarily, position themselves as

working within a distinct discipline; see Domosh 2017 on "radical *intra*-disciplinarity"). Interdisciplinarity not only brings dialogues in and out of disciplines. It also puts scholars in dialogue. This term therefore implies an interaction between scholarship and scholars—both in thought (episteme) and practice (techne). The following analysis suggests how public art scholarship has moved beyond disciplines and institutions, promoting the concerted integration of theory, method, and academic practice.

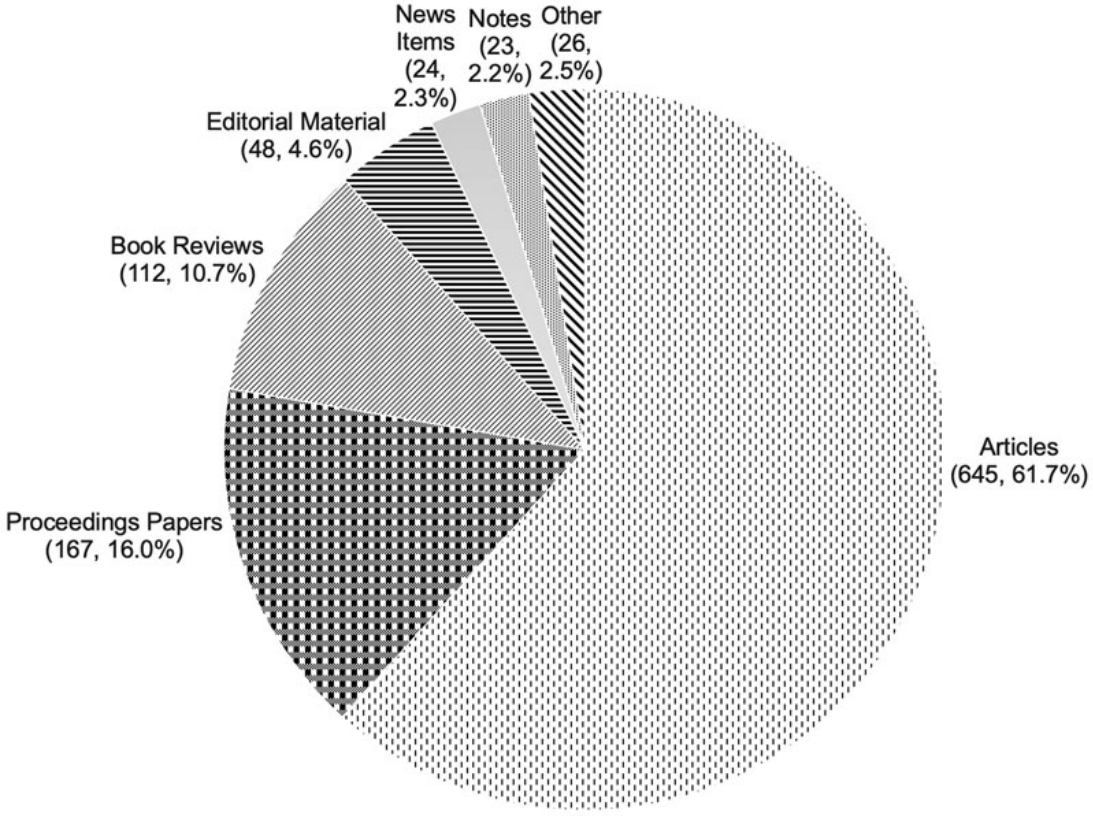

Figure 1 *Types of public art journal output (in absolute and percentage values) as indexed in Web of Science Core Collection (under the lemma "public art") from 1964 to 2020. The Other category comprises, among others, art exhibit reviews, letters, meeting abstracts, and biographical items.*

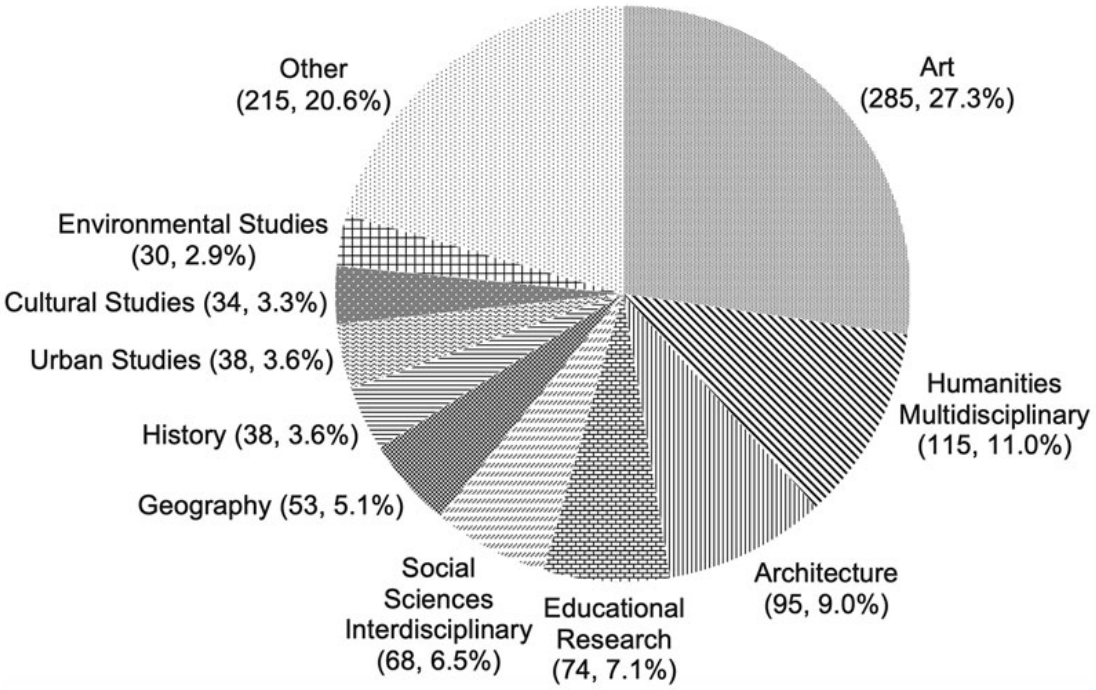

Figure 2 *Top ten subject categories of public art journal output (in absolute and percentage values) as indexed in Web of Science (WoS) Core Collection (under the lemma "public art") from 1964 to 2020. The Other category includes the WoS categories anthropology, computer science, civil engineering, communication, literature, and theater.*

Trends in the Public Art Research Landscape

Citation Counts and Multidisciplinary Attention

As we explained earlier, we have included WoS Core Collection database entries for the three major journal output categories: articles proper, proceedings papers, and book reviews (which discuss and indicate scholarly analyses on public art). As one can infer from Figure 2, the bulk of the sample retrieved from this database consists of journal articles.

We have retrieved the article "The Public Art of City Building," authored by Crane (1964), as the earliest scholarly journal entry under the public art lemma from the WoS Core Collection. This article advocates spatial aesthetics, or city building as a form of public art, "as a legitimate area of governmental concern" in urban planning and renewal (Crane 1964, 84). Sporadic public art-related items predating this publication, which have not been taken into account in this bibliometric analysis, cover news sources announcing the establishment of public artworks and practical matters such as their costings (e.g., Bailey 1900); administrative or policy documents, including the U.S. New Deal Public Works of Art Project and related commentaries (e.g., Watson 1934); and brief communications advocating the purpose of public art beyond the sheer decoration of public buildings (e.g., Nahm 1947).

Changes in the total publication number in our output sample, and by extension citations, reflect the development of the public art research field. We have identified 202 publications for 1964 to 2000, equaling 20 percent of the total sample. So, around 80 percent of the indexed items have been published over the past two decades. We can see an accelerating bulk between 2010 and 2017, followed by a drop (Figure 3). Citations of the output in our sample counted for less than fifty per annum before 2005. Since then, we can detect a significant increase of citations by year, with a peak of about 350 in 2019 (Figure 4), particularly citing and engaging recent literature.

Our analysis has supplemented data on the ten scholars with the overall strongest citation burst counts (Figure 5). Accordingly, we can observe a multidisciplinary engagement with the topic of public art across the following subfields, as summarized in Table 1: art and cultural history, theory and practice; philosophy and sociology of the arts; and human and cultural geography (these subfields span the popular WoS subject categories shown in Figure 2).

The higher counts in Table 1 indicate that the authors' works have been cited by comparatively more publications (which can include self-citations, especially among those with high citation counts and low centrality). Lefebvre, Hall, Miles, Massey, and Zebracki have the relatively highest centrality values, respectively (indicated with purple circles around the nodes in the CiteSpace visualization in Figure 5). This signifies that they are linked with comparatively more authors in this sample. The connections between the nodes in Figure 5 are generally not very close and the centrality value is, therefore, relatively low overall. Although these publication and citation metrics should be interpreted with caution, they are, in this case, suggestive of a growing trend of multidisciplinary attention to, and scope of, the public art research area.

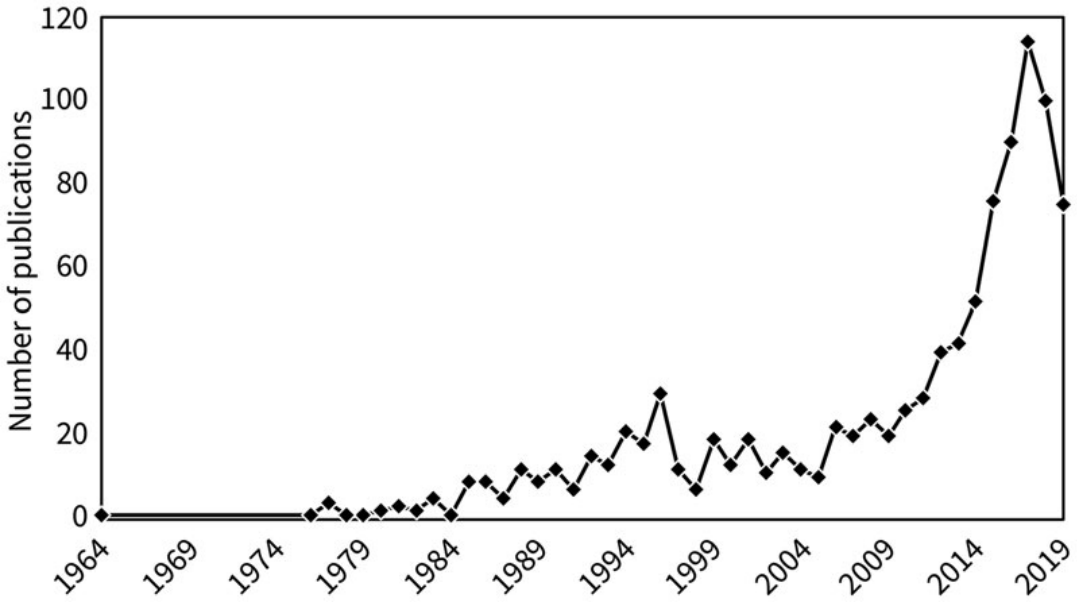

Figure 3 *Number of publications per year for public art journal output, 1964 until 2020 (indexed in Web of Science Core Collection). Note: As the data collection phase ended on 15 March 2020 and the year had not ended as yet as of writing, the period from 1 January 2020 has been left out of this knowledge visualization to avoid an understandable significant drop.*

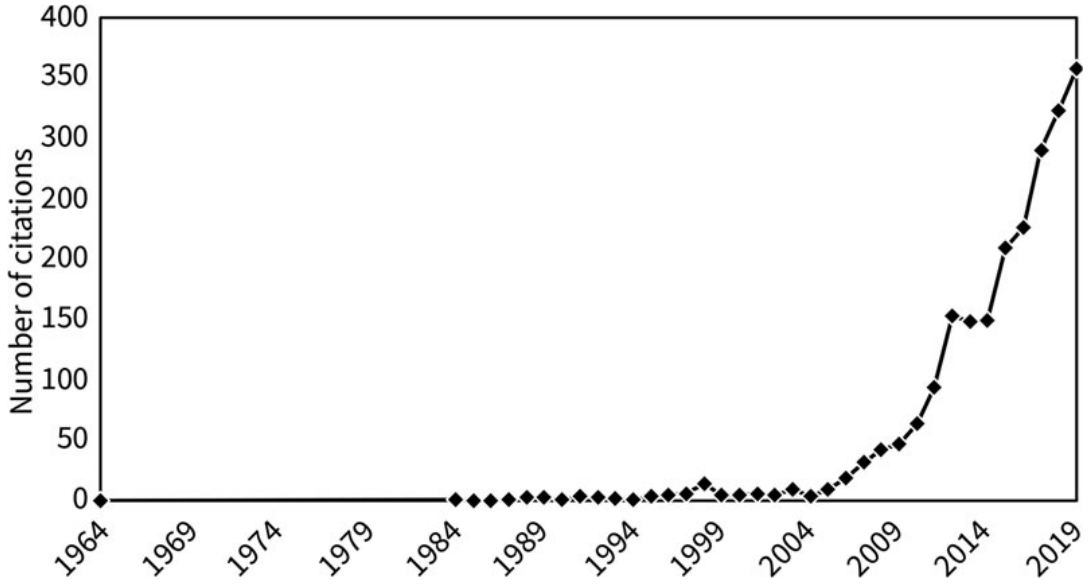

Figure 4 *Number of citations per year for public art output sample, 1964 until 2020 (indexed in Web of Science Core Collection). Note: As the data collection phase ended on 15 March 2020 and the year had not ended as yet as of writing, the period from 1 January 2020 has been left out of this knowledge visualization to avoid an understandable significant drop.*

Table 1 *Ten scholars across multidisciplinary subfields who exhibit overall strongest burst counts in the public art output sample, 1964–2020 (indexed in WoS Core Collection)*

Author	Centrality	Burst count	Period
Subfield: Art and cultural history, theory and practice			
Malcom Miles	0.13	52	2006–20
Suzanne Lacy	0.02	48	2006–20
Miwon Kwon	0.02	33	2010–20
Rosalyn Deutsche	0.10	24	1988–20
Subfield: Philosophy and sociology of the arts			
Henri Lefebvre	0.27	24	2010–20
Jacques Rancière	0.00	21	2015–20
Subfield: Human and cultural geography			
Joanne Sharp	0.04	46	2010–20
Tim Hall	0.20	36	2006–20
Martin Zebracki	0.11	27	2012–20
Doreen Massey	0.12	17	2006–20

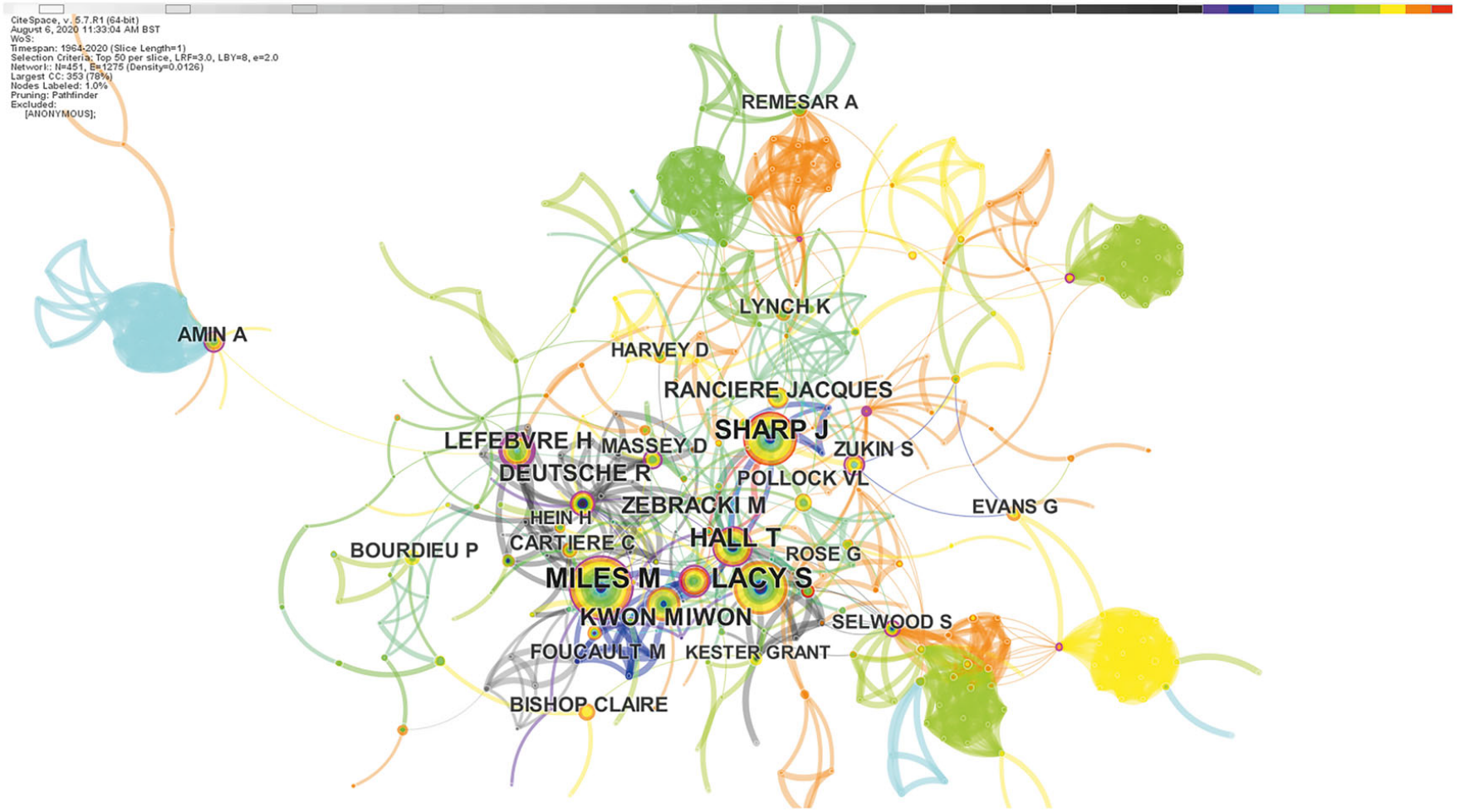

Figure 5 *Authors' citation network for public art output sample, 1964 through 2020 (indexed in Web of Science Core Collection). One-year time slices with older data in "cooler" colors (e.g., gray and blue gradients) and newer data in "warmer" colors (e.g., yellow, orange, and red). Knowledge visualization generated through CiteSpace.*

Keywords, Thematic Patterns, and Discursive Context

We have, moreover, used CiteSpace for the extraction of keywords as indexed in our output sample. Keywords are summary terms that authors perceive as reflective of the core content and "disciplinary vocabulary" of their work, normally in terms of concepts, methodology, study focus, and the overall rationale. The analysis of the aggregation of keywords might, consequently, provide some comprehensive insights into thematic patterns of the contents of the output.

We have employed a burst detection technique to harvest burst terms: keywords with a high-frequency change rate as an indicator of research topic trends for the sample period. Table 2 summarizes the top ten bursts—with public art (#249), public space (#37), city (#30), place (#27), and politics (#19) as the highest five frequency terms, followed by space (#18), community (#17), memory (#17), regeneration (#13), and participation (#13).

Figure 6, constructed by the use of CiteSpace, visualizes the network of burst terms in the shape of circular nodes, the size of which is in relation to the keywords' cooccurring frequency rate. Figure 6 represents the hotspots of the public art research area over the last fifty-five years. The larger the node, the higher the popularity of the keyword. The lines in this figure show the cooccurrence of keywords over time (ranging from the oldest links in "cool" [i.e., blue] to newer links in "warm" [i.e., orange] colors in this CiteSpace visualization). As such, Figure 6 provides an impression of the topic intensity and relationship between keywords.

Public art, obviously the largest node in the output sample, has been hidden from view in Figure 6 for readability, as it would overlap other central terms. Hence, this adjusted visualization highlights the other popular keywords and their relations as embedded under the topic of public art (comporting with Table 2): public space, city, place, politics, space, and community. Nevertheless, the centrality of these keywords, indicated with purple circles around the nodes in Figure 6, is not "thick" (i.e., significant).

Table 2 *Top ten high-frequency keywords (bursts) in the sample of public art output, 1964–2020 (indexed in WoS Core Collection)*

Count	Centrality	Year	Keyword
249	0.51	1993	public art
37	0.15	2011	public space
30	0.13	2007	city
27	0.07	2006	place
19	0.05	2006	politics
18	0.05	2006	space
17	0.07	2007	community
17	0.05	2006	memory
13	0.05	2008	regeneration
13	0.02	2014	participation

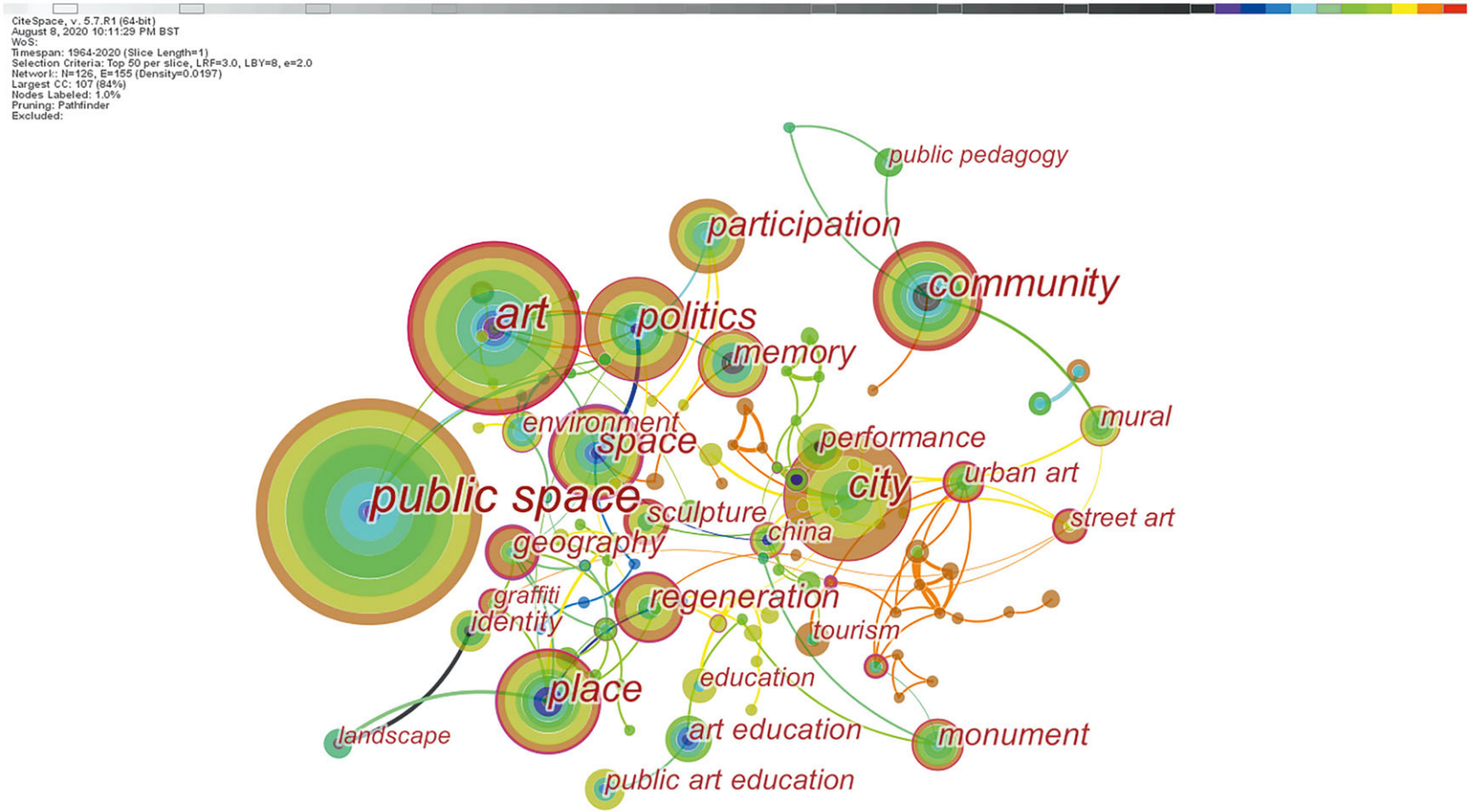

Figure 6 *Top cooccurrence of keywords in the public art output sample, 1964 through 2020 (indexed in Web of Science Core Collection). As explained in the text, public art (as obviously the largest node) is hidden from view to highlight the other popular keywords and their relations as embedded under the topic of public art. One-year time slices with older data in "cooler" colors (e.g., blue gradients) and newer data in "warmer" colors (e.g., yellow, orange, and red). Purple ring thickness indicates centrality value. Knowledge visualization generated through CiteSpace.*

In addition to the analysis of the top cooccurrence of keywords, we have used the time zone tool in CiteSpace to view a temporal series of the output sample. In this place, one key observation of the life cycle of the public art research area is how a rather ontological discussion focusing on the term *public art* (e.g., Hein 1996; Hutchinson 2002), and by extension *public space* (e.g., Lefebvre 1991), has been substantially expanded.

Academic discussions exploring public art definitions, genres, representations, and the like have been complemented with critical inquiries dedicated to examining its social roles and spatial impacts, as Table 3 synthesizes with reference to published scholarship emerging since the mid-1990s. Table 3 should not be read as a comprehensive literature overview. Rather, it concerns a qualitative evaluation articulating some overarching key questions that have led contemporary research endeavors and academic debates regarding public art. As conveyed in Table 3, interrelated issues and contexts at the core of such investigations concern urban regeneration, politics and power, community development, social difference, identity, memory, inclusive engagement, and public pedagogy. On the citation timeline, popular keywords with the strongest citation burst, which are indicative of these central public art research areas, all appear in time periods from the late 2000s, including community (2007–2010), memory (2007–2008), and public pedagogy (2015–2016), respectively.

Knowledge Domains

The clustering of the sample data has allowed the construction of classifications on the basis of the similarity of nodes and keywords as part of the bibliometric network (see Chen 1999). The cluster network in Figure 7 complements Figure 6 by introducing some interesting connections between nodes and keywords. These are visualized under cluster names; that is, knowledge domains (indicated with hash signs), with meaningful values for the network modularity ($Q>0.3$) and cluster mean silhouette (> 0.5; for further explanation, see Chen 2016).

The largest three cluster themes are, in order of magnitude, memorial (Cluster 0), public space (Cluster 1), and urban renewal (Cluster 2). These themes have been inferred from nouns in the titles of cocited output within the clusters concerned. The clusters span the WoS subject categories across the arts and humanities and the social sciences, including geography (Figure 2).

Overall, the picture of the clusters, or public art knowledge domains, uncovers the multidisciplinary nature of the public art output—or rather of the key subjects that engage this research topic. The clusters and citation bursts interact within popular multidisciplinary debates, notably regarding the nexus of place, urban design, regeneration, and memory (e.g., Hall and Robertson 2001; Sharp, Pollock, and Paddison 2005; Stevens and Franck 2015) and politics, space, and participation (e.g., Lacy 1995; Pollock and Paddison 2010, 2014; Bishop 2012; Zebracki and Palmer 2017).

Table 3 *Contextualization of public art discourse since the mid-1990s: A qualitative indication of key overarching, interrelated research areas and questions*

Sample sources	Sample questions posed
Leading question area: What role does public art play within urban regeneration policy contexts and how does it impact community development?	
Sample literature: Hall and Robertson (2001), Remesar (2005), Sharp, Pollock, and Paddison (2005), Grodach (2010), Pollock and Paddison (2010, 2014), Whybrow (2011)	
Hall and Robertson (2001)	"What is the relationship between the public art programme and broader urban regeneration initiatives or policies affecting a locality and what are the impacts of these initiatives or policies?" (22)
Pollock and Paddison (2010)	"Why have cities, otherwise similar in the enthusiasm afforded to the use of 'good design' to re-enhance the public realm, endorsed public art so differently?" (342)
Leading question area: How does public art relate to political discourse and power and to what extent do public art politics facilitate inclusive engagement in everyday spaces?	
Sample literature: Doss (1995), Deutsche (1996), Sharp, Pollock, and Paddison (2005), Knight (2008), Guinard and Margier (2018), Evans (2019)	
Deutsche (1996)	"Why … has [the discourse about art and public space] become so popular, so rapidly, in so many different arenas – the academy, the art world, urban planning, mass media, municipal documents, social movements – and among so many disparate political groups, from neoconservative policy intellectuals to leftist cultural critics? What political issues are at stake in the discourse about art and space? What political relationships organize the space of the discourse?" (xi–xii)
Sharp, Pollock, and Paddison (2005)	"In the deployment of public art, what conditions contribute to or hinder democratically inclusive practices? How is local participation able to counter top–down practices? … Is inclusion seen as an end in itself or a means to an end, and by whom? … Under what conditions does inclusion contribute to a sense of democratic ownership over the inscription of urban spaces?" (1003)

Table 3 *(Continuation)*

Leading question area: How can different uses of public art and their different ascribed impacts on public users and public spaces be critically evaluated?	
Sample literature: Selwood (1995), Belfiore (2002), Zebracki, van der Vaart, and van Aalst (2010), Usher and Strange (2011), Zebracki (2013), Lossau and Stevens (2015)	
Belfiore (2002)	"Who is right? Can a group of elderly people dancing awkwardly be art? And, more importantly, can it be 'quality art' worth of funding? Or should this kind of project be funded merely on the grounds of its positive effect on the participants, regardless of any consideration of quality?" (101)
Lossau, and Stevens (2015)	"Are opportunities for engagement with art in public fairly distributed among different demographic groups? Are there 'good' and 'bad' uses of art? What uses are critical of an artwork and its meanings, and which ones are merely incidental?" (13)
How can public art practice activate participation and collaboration among citizens to promote and reflect on issues around social difference and justice?	
Sample literature: Lacy (1995), Phillips (1995), Kwon (2004), Bishop (2012), Schuermans, Loopmans, and Vandenabeele (2012), Zebracki (2020b)	
Phillips (1995) cited in Lacy (1995)	"What happens when the most in-depth and privileged experience of [public] art is not reserved for the person[s] who distinguished [themselves] by wealth or reputation, but is available to any who cared about the issues and wished to become involved?" (58) … "Can 'public' [art] represent a common place that accepts differences?" (61) … "Does public art attempt to reach new audiences – participants that formulate an equation between viewer and citizen, observer and actor?" (63) … "Does public art involve the viewer in the complexities of urban experience, or is it offered as decoration or distraction, a sedative that quiets legitimate concerns or objections?" (64)
Kwon (2004)	"How does a group of people become identified as a community … as a potential partner in a collaborative [public] art project? Who identifies them as such? And who decides what social issue(s) will be addressed or represented by/through them: the artist? the community group? the curator? the sponsoring institution? the funding organization? Does the partner community preexist the art project, or is it produced by it? What is the nature of the collaborative relationship?" (117)

Table 3 *(Continuation)*

Leading question area: To what extent does public art involve social diversity by giving expression to, and "teaching" about, collective memories and individual and 'other' identities?	
Sample literature: Hein (1996), Hocking (2015), Marschall (2010), Stevens and Franck (2015), Townshend and Madanipour (2008), Zebracki 2018, 2020a	
Hein (1996)	"What, then, remains to render an object a work of public art, if neither collective origin nor spiritual cohesiveness nor central placement nor even popularity serves to determine it?" (2)
Zebracki 2020a	"How might traditional, hegemonic (e.g., heteropatriarchal) public art underrepresent, misrepresent or 'nonrepresent' gender and sexual variance or 'others'? How might public art practices (re)claim space for the representation of the lives of sexually and socially marginalized or disenfranchised communities as well as provide scope for […] critical intersectional analysis?" (7–8)

To provide an impression of recent trends in the public art output, that is over the last decade, we have pursued a cocitation analysis with results presented in Table 4. This technique identifies the key output on the basis of when the same two sources are referenced together in a third source (see Pan et al. 2018).

When selecting the top 5 percent of cocited output since 2010, embedding artist, networked space, engaging geographies, and participatory art appear as the largest clusters (i.e., knowledge domains), respectively, thus marking emerging topics in public art research. We have to note, though, that the similarity of nodes and, hence, the number of clusters here is not as particularly high as one can find in bibliometric data on prominent, widely established fields of inquiry across the life and natural sciences, including biology, biotechnology, and medicine (see Chen et al. 2012; Shi and Liu 2019). For that matter, we could argue that public art is a modest, developing research area. Stronger cluster networks might be formed when revisiting the knowledge map analysis of this area of research at a later point in time.

Knowledge Domains

For visualizing the geographical distribution of public art knowledge production—that is, the "where" of journal output—we used the country network node in CiteSpace. The size of the circle in Figure 8 stands for the frequency of occurrence in the country in terms of the collective journal output of the associated authors. Therefore, the larger the circle, the more publications belong to the corresponding country. Also, the wider the annual ring, the more frequent the output of the authors, who are institutionally based in the respective country, appears in the unit of time concerned (see Chen 2006).

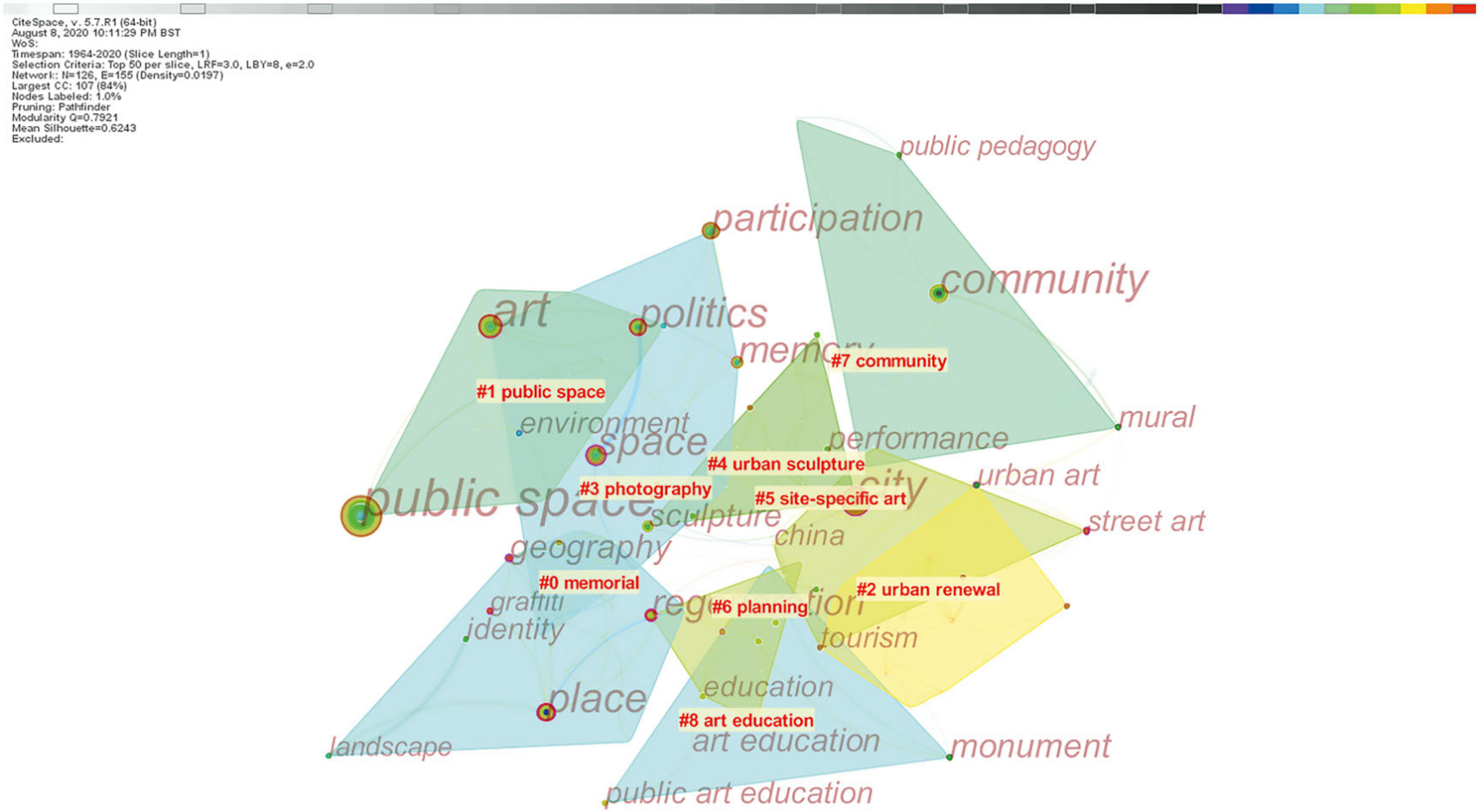

Figure 7 *Cluster network view of top cooccurrence of keywords in public art output sample, 1964 through 2020 (indexed in Web of Science Core Collection). One-year time slices with older data in "cooler" colors (e.g., blue and green gradients) and newer data in "warmer" colors (e.g., yellow). Knowledge visualization generated through CiteSpace.*

Table 4 *Top ten cocited publications in public art output sample since 2010 until 2020 (indexed in WoS Core Collection)*

Count	Centrality	Year	Publication title	Author/s
11	0.06	2005	Just art for a just city: Public art and social inclusion in urban regeneration	Sharp, Pollock, and Paddison
10	0	2012	*Artificial hells: Participatory art and the politics of spectatorship*	Bishop
8	0.03	2010	Deconstructing *public artopia*: Situating public-art claims within practice	Zebracki, van der Vaart, and van Aalst
8	0.18	2010	Embedding public art: Practice, policy and problems	Pollock and Paddison
7	0.06	2008	*Public art: Theory, practice and populism*	Knight
7	0	1991	*Engendering culture: Manhood and womanhood in New Deal public art and theatre*	Melosh
7	0	2001	Public art and urban regeneration: Advocacy, claims and critical debates	Hall and Robertson
6	0.04	2012	Public space, public art and public pedagogy	Schuermans, Loopmans, and Vandenabeele
5	0	2015	The great reimagining: Public art, urban space, and the symbolic landscapes of a "new" Northern Ireland	Hocking
5	0	1995	*Spirit poles and flying pigs: Public art and cultural democracy in American communities*	Doss

In Figure 8, by frequency of output, the United States accounts for the largest "radiation area" and ranks first, China second, and England and the United Kingdom third. The links between the nodes in Figure 8 imply joint outputs between scholars and institutions across countries. It is interesting to point out that there are no collaborative links displayed between China and the United States and that there is just a recent link between China and England—all countries that make the greatest contributions to the public art output in our sample.

Although this knowledge visualization provides a useful understanding of major geographical centers of public art output, it carries some limitations. It does not convey complex, dynamic information about international research mobility and collaboration (as the same scholars might, for example, work at institutions across countries simultaneously or over time) or about the geographical study foci in the output, which we discuss later.

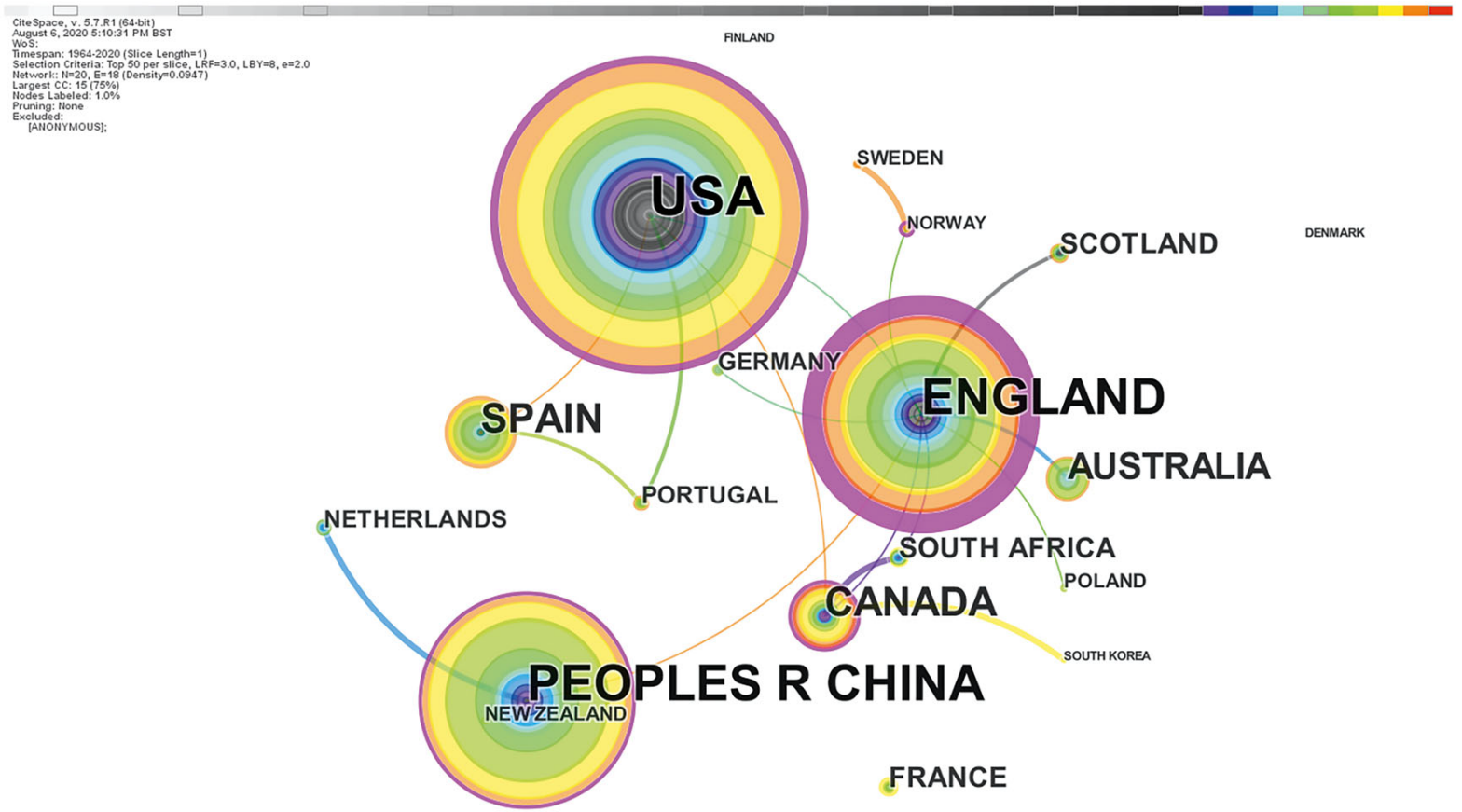

Figure 8 *Geographical distribution view of public art output by country, 1964 through 2020 (indexed in Web of Science Core Collection). The online color figure depicts one-year time slices with older data in "cooler" colors (e.g., gray and blue gradients) and newer data in "warmer" colors (e.g., orange and red). Purple ring thickness indicates centrality value. Knowledge visualization generated through CiteSpace.*

Collaborative Knowledge Production

To further contextualize international collaborative networks in public art research, we have analyzed the output sample for research institutions (with affiliated authors) and cooperative linkages associated with this output. In Figure 9, the nodes (#39) represent these institutions and the connecting lines (#9) visualize cooperation on public art output. In this CiteSpace knowledge visualization, the time axis runs from left to right. The colors of the lines indicate the time by when the node or institution first cooperated (again, older links are depicted in "cooler" and more recent links are depicted in "warmer" colors), and the thickness of the lines displays the degree of institutional collaboration (see Chen 1999 for further context about this visualization technique).

Looking at citation counts alone, the University of Leeds (#7) is followed by the Polytechnic University of Valencia (#6) and Gdańsk University of Technology (#5). The overall public art research landscape, however, shows a relatively dispersed, somewhat "individualized" networked density, with limited cooperation between authors from different institutions and, therefore, no major distinct, collaborative research groups.

In other words, institutions and researchers, both across and within countries, overall have not yet established relatively many collaborations involving shared public art outputs. This suggests a somewhat narrow cohesive research community around this research area—drawing from the output sample at least.

Moreover, the knowledge map analysis shows some striking regional differences in the publication cycle. On the basis of the indexed output data, we observe a comparatively earlier emerging trend of publications on public art (regarding terminologies and ontologies, policies, and democratic processes, most notably) for U.S.-based institutions over the 1960s and 1970s—which happened along with a growth of commissioned art in public places (e.g., Lacy 1995). The picture of interregional and interinstitutional cooperation on output is yet not particularly strong for the United States (centrality = 0.29), with an ever weaker picture for China (centrality = 0.15).

Although the overall volume of public art output for the European counterparts is substantial (with more recent study emphasis on aspects around community and activist art practices; e.g., Zebracki 2020b), we discern that European institutions gained this rather strong position in the public art output cycle considerably later than in the United States. For England and the United Kingdom, we have seen an acceleration of output after 2000, where this trend has been accompanied with a comparatively strong interregional and interinstitutional cooperation effect (centrality = 0.84).

Constraints of Collaborative Network Visualization

As a final point, the collaborative network visualization in Figure 9 does not necessarily impart details about the international focus (including multisite, international field work and transcultural themes) as involved in much published public art research over the past decades. For example, Sánchez (2019), affiliated with the Polytechnic University of Valencia, Spain, has conducted comparative case studies on public art practices in Spain and the United Kingdom. Although this study is not bibliometrically linked with a UK-based institution, it addresses wider collaborative, multidisciplinary debates around art, the public realm, politics, power, and sustainability in the international context concerned (Sánchez 2019).

As another recent example, drawn from Figure 9, we have identified a cross-institutional publication between the Polytechnic University of Valencia and the University of California, Berkeley (de Miguel Molina, de Miguel Molina, and Santamarina Campos 2020). Only deeper scrutiny of the contents of this joint publication lays bare some further specifics about its focus, which is both international and transcultural, beyond the United States and Spain. That is, the thematic focus in this collaborative output appears to be on visitors' experiences of the somewhat "unremembered" African-American muralism movement in the city of Los Angeles between the 1970s and 1990s, developing an argument around the promotion of community development and identity preservation.

In this light, we call for supplemental qualitative analyses of institutional, collaborative networks that probe into the spatial, temporal, and thematic specificities that can be gathered from deeper readings of the output's contents. Such specificities might not be readily identified based on knowledge map analyses alone.

Conclusion and Discussion of Limitations

In this article, we have offered, and visualized, a metageography of the public art research landscape. We have done so on the basis of a knowledge map analysis of public art output as indexed in the WoS Core Collection database for the respective sample period from 1964 to 2020. Public art, and its terminological variants, is an expanding field. It engages cognate key notions such as socially engaged art practice (e.g., Kester 2004; Bishop 2012) and knowledge domains, including memorials, public space, and urban renewal, as we have presented in our knowledge map analysis. The academic field of inquiry into public art has convened multiple disciplines and scholars, which has come to characterize this research topic as both multidisciplinary and interdisciplinary. Our study, as such, has aimed to provide new reference points for scholars across disciplines to position themselves in, and further deepen bibliometric investigation into, the landscape of public art research.

Following our analysis of the public art output sample, we want to stress that this study has not been an attempt to provide an exhaustive (or not to mention representative) understanding of a singular and coherent public art research landscape. Also, the knowledge visualizations are, as are any maps, simplified representations of real spaces. Despite using what might appear as "hard" numbers (i.e., quantitative bibliometric data), such data require nuanced interpretations and geographical specificity of the published content. Grounded, qualitative approaches (e.g., interviews with scholars about researching and publishing in the public art field) might provide some valuable supplemental knowledge of the profound, dynamic geographies of public art knowledge (co)production.

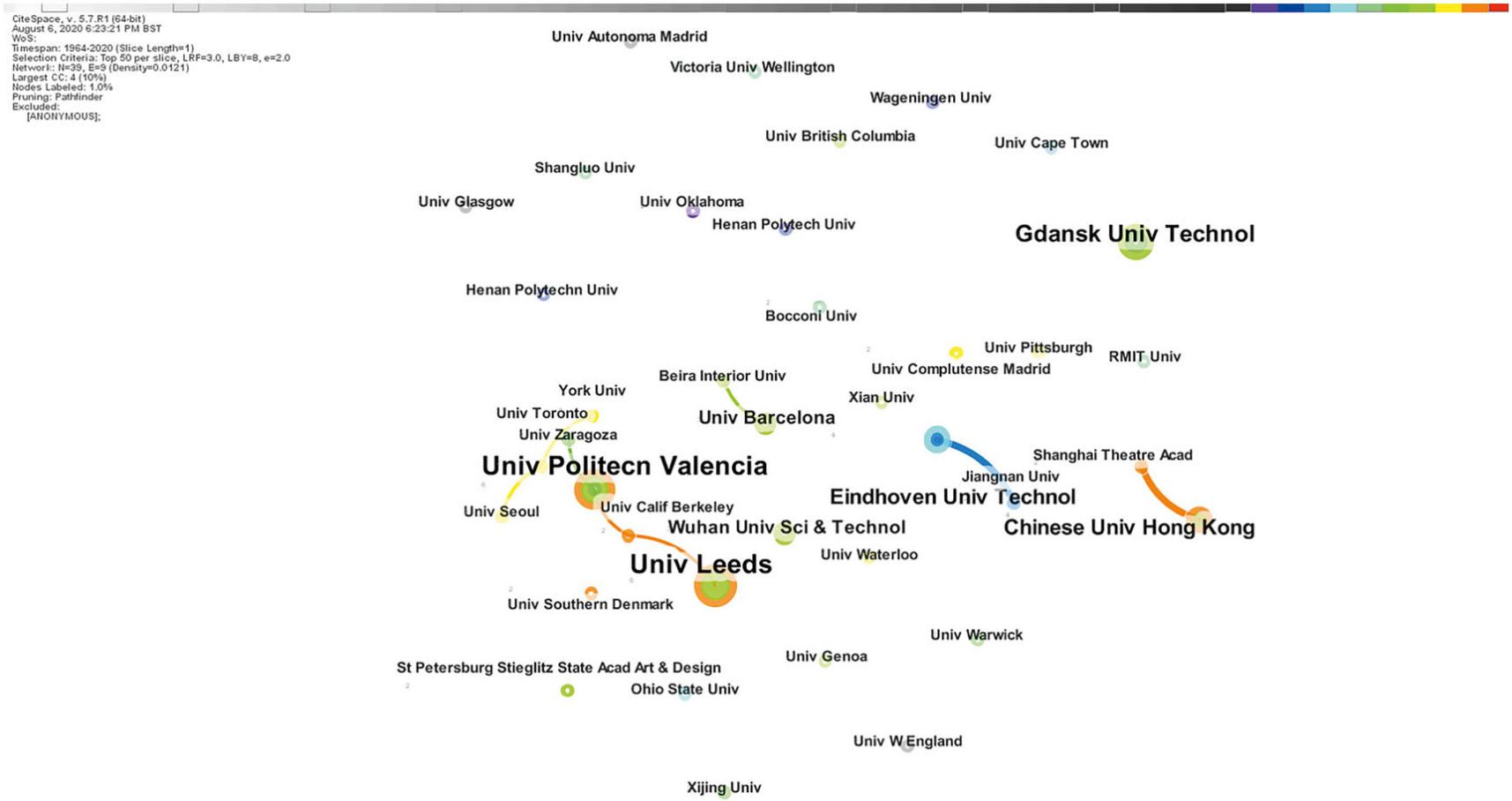

Figure 9 *Institutional collaborative network view, based on public art output sample, 1964 through 2020 (indexed in Web of Science Core Collection). The online color figure depicts one-year time slices with older data in "cooler" colors (e.g., gray and blue gradients) and newer data in "warmer" colors (e.g., orange and red). Knowledge visualization generated through CiteSpace.*

Further to WoS's caveats as raised previously, the selection of search key terms and criteria as part of the data retrieval strategy—as well as the (non)availability of certain bibliographic items including non-journal-based sources—might come with limitations for sample size and challenges around the potentially arbitrary choices of what material is included or excluded from the data sample. Moreover, as Xiao et al. (2017) flagged, the CiteSpace software carries some limitations to its functional design in terms of merging similar cooccurring keywords (e.g., place, memory, and identity with reference to Figure 6). Furthermore, the data cleaning process could be more comprehensive to not overlook any possible valid items. Also, the further expansion of the sample size by potentially using other databases, in addition to the WoS Core Collection, could help to further standardize the output.

On that note, we must acknowledge, once more, the Anglophonic, Western, and Global North hegemony, as embedded in the prevailing WoS bibliographic citation system (see Derudder 2011; Collyer 2018). Yet, in the absence of suitable and complete competitive knowledge and indexing systems— which are accessible and legible to us, the authors, to boot—we have deemed WoS as an appropriate point of departure for our study.

Given the design of the CiteSpace knowledge map analysis technique, our study has instead focused on the macrolevel of the public art research landscape. Hence, we encourage new research to expand further across disciplinary, linguistic, and cultural borders. This could complement bibliometric databases and expand geographical data and foci to contrast and deepen insights into the landscape of public art research, also at a more microlevel. Thus, such efforts could aid in analyzing further situated knowledge of the geographical variety of public art scholarship and frontiers of knowledge, which hitherto have remained bibliometrically unmapped.

There is a myriad of alternative forms of public art knowledge production, including performative and embodied creative practices (e.g., Hawkins 2014; Boyd and Edwardes 2019). Although these creative outputs often fall beyond conventional modes of academic writing as listed in bibliometric systems, they could—or should—be mapped as an integral part of the public art research landscape. Such alternative forms of knowledge could harbor the visual in itself, too (which blends concept and creative practice). So, perhaps knowledge maps, including those presented on the pages of this article, can be rendered computer-generated artworks that provide meta-artistic impressions of the research landscape. Nevertheless, we recognize that wordless variants of knowledge maps would heighten their visuality and, thus, accentuate the "artscape" over the "datascape."

In conclusion, we should, thus, exercise caution in approaching the published, text-based public art scholarship, as indexed in the WoS Core Collection, as an all-encompassing and all-coherent data set; as such, we ought to be guarded in pursuing citation metrics as the (sole) indicators of research quality (see Aksnes, Langfeldt, and Wouters 2019). The public art research landscape is a palimpsest, a multilayered landscape of which the bibliometric data just map onto one of the many different layers of its knowing.

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Note

[1] The sample has been retrieved using the following WoS key indexes: the Science Citation Index Expanded (SCI-Expanded), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), Conference Proceedings Citation Index–Science (CPCI–S), and the Conference Proceedings Citation Index–Social Sciences & Humanities (CPCI–SSH).

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