

Coworking spaces and makerspaces: Mapping the state of research

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ABSTRACT

Coworking and its merits and benefits have been under heavy scholarly investigation. Also in practice, the phenomenon with its characteristics and manifestations becomes increasingly relevant on many levels and for many different types of people and organizations. But why is that so, and how are the research activities distributed between researchers, countries, and journals? To answer these questions, we first analyzed existing literature and extracted the focal points of the respective approaches. We conducted a cluster analysis on the existing literature by analyzing data from the Web of Science. With these clusters, we show the development of the research stream and how the studies are connected. The findings point towards the relevance of coworking spaces for innovative behavior and knowledge exchange, making them a place for work and social exchange and a tool for pursuing daily work, innovative ideas, knowledge creation, and interaction. With these findings, we contribute to the understanding of this research stream as a whole and provide a deeper understanding of the available studies and how they are connected. This allows researchers to understand where the interest came from, where it is going and how they can contribute to the topic. Our study indicates that scholars should take a broad approach towards the phenomenon coworking. It set food in many different research areas and all of them are important for a holistic understanding, showing potential for interesting studies. On a practical note, the factors that coworking influences need to be rethought throughout the whole work environment.

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Introduction

As the number of remotely working people increases, many feel increasingly isolated (Garrett, Spreitzer, & Bacevice, 2017). For these reasons, many freelancers choose to work in coworking spaces: Shared spaces where individuals pursue their own careers and jobs but in the presence of others with the aim of being part of a community (Garrett et al., 2017). Thus, the collaborative economy with the idea of sharing created a new phenomenon known as coworking spaces (Bouncken & Reuschl, 2018). During the past years, the rise of digital nomadism increased the demand for mobile workplaces. This change in behavior and the associated need for flexible offices set the ground for the growth of coworking spaces and boosted the increasing demand. The desire to combine leisure time and work while traveling around the world additionally expanded the intended use (Orel, 2019). Thus, the number of coworking spaces and people

choosing to work in them is constantly growing (Jakonen, Kivinen, Salovaara, & Hirkman, 2017; Rus & Orel, 2015). In the past 3 years, the number of coworking spaces worldwide increased from 16,000 to around 23,500, that being during pandemic times with contact reduction (statista, 2021a). During the same time, the number of people using coworking spaces increased from 1.6 million to 2.5 million – again, during times of contact reduction and isolation (statista, 2021b). It is expected that till the year 2024, there will be around 5 million people working in around 42,000 coworking spaces worldwide (statista, 2021b; statista, 2021a). The changing life- and work-style, the tremendous increase in demand and the respective figures as well as the importance of social interaction that we learned about during the ongoing COVID-19 pandemic show that the practical phenomenon of coworking is of utmost importance and relevance for practitioners.

Besides freelancers, entrepreneurs, and start-ups, established companies increasingly use coworking spaces for their everyday business as well as for innovative projects and ideas (Bouncken, Ratzmann, Barwinski, & Kraus, 2020b). The relevance of

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coworking manifest itself for example in companies such as WeWork. WeWorks is a company that operates coworking spaces all over the world (Source). With their business model, they generated a loss of \$3.2 billion in 2020 (Koutoumanos, 2021). Yet, the company is currently valued at approximately \$6 billion (December 2021, *Börse Online*, 2021). Again this shows the potential of coworking.

In this article, we pursue a bibliographic analysis which is proven as meaningful analysis (c.f. Ferasso, Beliaeva, Kraus, Clauss, & Ribeiro-Soriano, 2020; Rovelli, Ferasso, De Massis, & Kraus, 2021) and we provide a literature overview on the topic of coworking spaces and makerspaces. With this, we show how the research output is spread over different countries, institutions of the researchers, and journals. We also explain how these studies map potential research avenues for the topic. To do so, we 1) investigate how the research activities are distributed between researchers, countries, and journals, and 2) lay out (potential) reasons for the distribution. The topic is highly interesting and important for both research and practice. On the research side, mapping the topic and explaining the as-is status shows that the topic is already booming on many different levels. Second, laying out research aspects and potential avenues for investigation is important in order to understand that the topic is relevant for many different fields of research and thus many different scholars. Knowing this it becomes obvious that applying different theories from different research fields is necessary to comprehensively investigate and eventually understand the topic. With our research we contribute to several shortcomings in the literature and the public understanding of the topic. First, there is no recent literature overview on the topic of coworking or makerspaces available although the topic is clearly highly relevant for research and practice. Second, although the topic is under heavy scholarly investigation, especially in the context of innovation, knowledge exchange, organizational development and interaction of social and material elements, many researchers struggle to understand the potential that the topic offers. With our study we explain and map the potential of this topic and lay out research avenues for different types of studies. For practitioners, by explaining the wide array of the topic, we can clearly express the need for action. Practitioners cannot rely on their established systems and mechanisms that they implemented and maybe optimized in the past. If organizations and companies want to maintain or gain a competitive advantage, they need to rethink their structures, their incentives and overall the whole way they pursue their business.

In our paper, we first provide a structured literature overview. We then pursue a cluster analysis with data from the Web of Science. Finally, we extend the results with basic indicators and a co-citation analysis. The discussion and conclusion conclude our paper.

Theoretical background

Definition of coworking spaces

Coworking and coworking spaces emerged as a phenomenon of the sharing economy (Blagoev, Costas, & Kärreman, 2019; Bouncken, 2018; Bouncken, Clauss, & Reuschl, 2016) and are especially encouraged by technology. As a trend that is about to change the way we work, coworking is a significant area of interest in organization science and entrepreneurship. Consequently, numerous researchers defined “Coworking” and elaborated on different elements (see Table 1) by shining light on the place where coworking happens – the coworking space (Waters-Lynch & Duff, 2021).

Generally, the term “coworking place” describes places that allow coworking. A google search illustrates that coworking is part of various spaces with different focus and configurations, resulting in numerous pages about coworking in coworking spaces (with focus on knowledge-intensive work), makerspaces and fablabs (with focus on craftsmanship), incubators (with focus on supporting highly innovative start-ups), or cafes. Parrino (2015) addressed this issue and

stated that “Coworking” refers to multiple types of spaces. Thus, it is vital not to exclusively bind the definition of coworking on coworking spaces (Merkel, 2015, 2019). In the coworking space literature stream, Spinuzzi (2012) study also assessed the definition of coworking. He deployed interviews with coworking space providers and users to define the coworking space literature stream. As a result of his study, Spinuzzi (2012: 432) defined coworking as a “(…) superclass that encompasses the good-neighbors and good-partners configurations as well as other possible configurations that similarly attempt to network activities within a given space.”. Spinuzzi's findings also explain the differences in definitions based on different perceptions of the providers and users. Users tend to perceive a single model in workspaces, while the providers perceive multiple models. This difference in perception raises the question of what does coworking encompass? In an attempt to answer this question, Parrino, 2015, p. 5) characterized coworking as geographic colocalization of various workers within the same environment and workers heterogeneity by occupation. Merkel (2019) emphasized that collaborative and supportive relationships are the roots of coworking. This is consistent with the work of Servaty, Harth, and Mache (2016), who highlighted collaboration as a result of sharing activities to achieve a shared identity.

Examining the various definitions in Table 1, they all have in common that they highlight the physical space as the differentiator. However, these definitions emphasize different aspects of actions that take place in these physical spaces. Moriset (2013) definition is an exception who stated that coworking is an atmosphere. This definition refers to the community as the core of coworking. Coworking encompasses sharing the physical space and going beyond, including sharing as a form of social support or collaboration. Not everyone is willing to collaborate with other individuals in a shared space (Rese, Kopplin, & Nielebock, 2020). Thus, it is essential not to limit the definition of coworking on collaboration. As a result, the definitions of Spinuzzi (2012) and Papagiannidis and Marikyan (2020) fulfill the characteristics and can explain coworking the best.

In brief, coworking can be bound to a physical shared space of individuals who do not necessarily share the same employer. Moreover, social interactions and a resulting community are vital characteristics of coworking. Moriset (2013) proposed a different definition, but he highlighted the sense of community in coworking spaces. Interesting is the perspective of coworkers who perceive coworking as a global movement (Gerdenitsch, Scheel, Andorfer, & Korunka, 2016; Servaty et al., 2016) and underline five distinct core values of coworking: Community, openness, collaboration, accessibility, and sustainability (). These values originate from the coworking space “Citizen Space”, one of the first coworking spaces worldwide (Waters-Lynch, Potts, Butcher, Dodson, & Hurley, 2016). However, Merkel (2015) exchanged accessibility with diversity as a core value.

The standard of working remains to be the work in a traditional company office. Coworking offers an alternative between the home office and traditional company office (Capdevila, 2014). Many researchers referred to coworking as the concept of “third-place”. A third-place describes a place that is neither home nor company office and resembles a bridge between these two forms of work (Waters-Lynch et al., 2016; Wilhoit Larson, 2020). Coworking, home office, and traditional office work are separable by (1) accessibility, (2) flexibility, (3) diversity of organizations, and (4) diversity of workers.

(1) A traditional office building is primarily accessible for employees during traditional working times. The own home as office allows the individual to work any time. Coworking places as a third-place can either be 24/7 accessible or operate during regular office hours. Most of the serviced offices, which are also part of third places, offer 24/7 access. In contrast, coworking spaces are commonly accessible during regular working hours (Kojo & Nenonen, 2017). Coworking places are timewise accessible by choice of the worker. This offers more flexibility than traditional offices but less flexibility compared

Table 1
Coworking definitions.

Author	Journal/Book	Definition
Jones, Sundsted, and Bacigalupo (2009)	Book	"Coworking is the burgeoning movement of people coming together to work in a shared workspace." (p. 21)
DeGuzman and Tang (2011)	Book	"(...) a diverse group of people who do not necessarily work for the same company or on the same project, working alongside each other, sharing the working space and resources" (p. 22)
Spinuzzi (2012)	Journal of Business and Technical Communication	"Coworking is a superclass that encompasses the good-neighbors and good-partners configurations as well as other possible configurations that similarly attempt to network activities within a given space." (p. 432)
Moriset (2013)	Proceeding of 2nd Geography of Innovation	"Beyond the room layout, coworking is first an atmosphere, a spirit, and even a lifestyle." (p. 7)
Uda (2013)	Discussion Paper	"(...) a way of working in which individuals gather in a place to create value, while sharing information and wisdom by means of communication and cooperating under the conditions of their choice." (p. 3)
Rief, Stiefel, and Weiss (2014)	Book	"Coworking is the flexible work of largely independent knowledge workers in a common, institutionalized location." (p. 43)
Merkel (2015)	Ephemera	"Coworking refers to the practice of working alongside one another in flexible, shared work settings where desks can be rented on a daily, weekly or monthly basis." (p. 122)
Sebstava, Sperka, Malecka, and Luczka (2017)	Proceeding of Forum Scientiae Oeconomia	"One concept of this collaborative learning and creative space is coworking." (p. 24)
Kopplin and Baier (2020)	Book	"(...), the expression for participating in a CWS as a member (...)." (p. 1)
Papagiannidis, Harris, and Morton (2020)	International Journal of Information Management	"Coworking is the phenomenon when individuals share workplaces with employees representing different organization teams." (p. 7)
Waters-Lynch and Duff (2021)	Human Relations	"Coworking describes the varied practices of a heterogeneous collection of independent knowledge workers (Rather than employees of the same organization) sharing physical space, interacting and sometimes collaborating on shared projects." (p. 2)

to the home office. (2) From the perspective of organizations, coworking places offer more flexibility in terms of the contract by allowing flexible and scalable agreements (Bouncken & Reuschl, 2018; Gauger, Pfnür, & Strych, 2021). (3) Home office indicates that individual works in the absence of anyone besides family members. Compared to traditional offices in which individuals work alongside workers from their organization, coworking encompasses the collocation with workers from various organizations (Papagiannidis & Marikyan, 2020). (4) In the same way, these forms of working are separable by the class of users. Any user can conduct home office and coworking. However, traditional offices in times of rising real-estate prices are costly. Thus, entrepreneurs and start-ups may not afford their own offices in major cities (Richter, Kraus, Brem, Durst, & Giselsbrecht, 2017). In conclusion, traditional company offices are instead devoted to workers of established companies.

Methodology

Data collection

This study analyzes all documents published indexed in the Web of Science Core Collection™ about coworking spaces. Only the Web of Science (WoS) publications were considered, as it is considered the most accepted database for the collection and analysis of scientific papers (Van Nunen, Li, Reniers, & Ponnet, 2018). In our study, we focused on the following indexes: Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), and Emerging Sources Citation Index (ESCI).

An advanced search string was performed, using the following search string in the field "title" (TI) using the following query: ((coworking) OR (co-working) OR (makerspace*) OR (make* space*)). The search string was delimited to these research areas: *Management, Business Economics, Public Administration, Social Sciences other topics, Operations Research Management Science, Economics, Multidisciplinary Sciences, Sociology, and Business Finances*. The search string was performed on 16th September 2021. It is vital to present the date of

collection of the documents because the database is constantly changing and updated (Liu, Jiang, & Heer, 2013). The study was limited to research articles and reviews, including only original papers and reviews (Kraus, Breier, & Dasi-Rodríguez, 2020). The following documents were excluded: editorial, book reviews, conference abstracts, letters, editorials, and news and bibliographic articles. Moreover, the filter English in the language section was selected. The initial search retrieved 81 documents until the date of the search string.

All documents were downloaded in plain text to select the final articles. This procedure was followed to discard those documents that were not related to the study topic. The authors followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol (Moher, Liberati, Tetzlaff, Altman, & Group, 2009) to review the literature documents. This procedure has been used in some previous bibliometric studies (eg., Bartolacci, Caputo, & Soverchia, 2020; Ferasso et al., 2020; (Mas-Tur, Kraus, Brandtner, Ewert, & Kürsten, 2020); Rovelli et al., 2021). In the second step (screening process), it was not necessary to delete any document because all the documents were eligible. In the third step, the eligibility of the documents was assessed. The authors analyze the relevance of the 81 articles by reading the titles, abstracts, and keywords. The criteria selected to exclude the documents were: (1) coworking was not related with spaces where knowledge is shared, and (2) makerspaces were not related with spaces where knowledge is shared. All the authors participated in the process of assessing the eligibility of the articles. We sorted out any discrepancies we found by consensus and discussion with the correspondence author. After this procedure, 76 documents remained in the final database (see Fig. 1). Lastly, we downloaded these remaining documents in plain text with authors, year of publication, author affiliation, title, abstract, journal, references, and the number of citations data.

Data analysis

Duplicate records were identified and homogenized in the plain text document. One of the most critical problems was the duplicity of

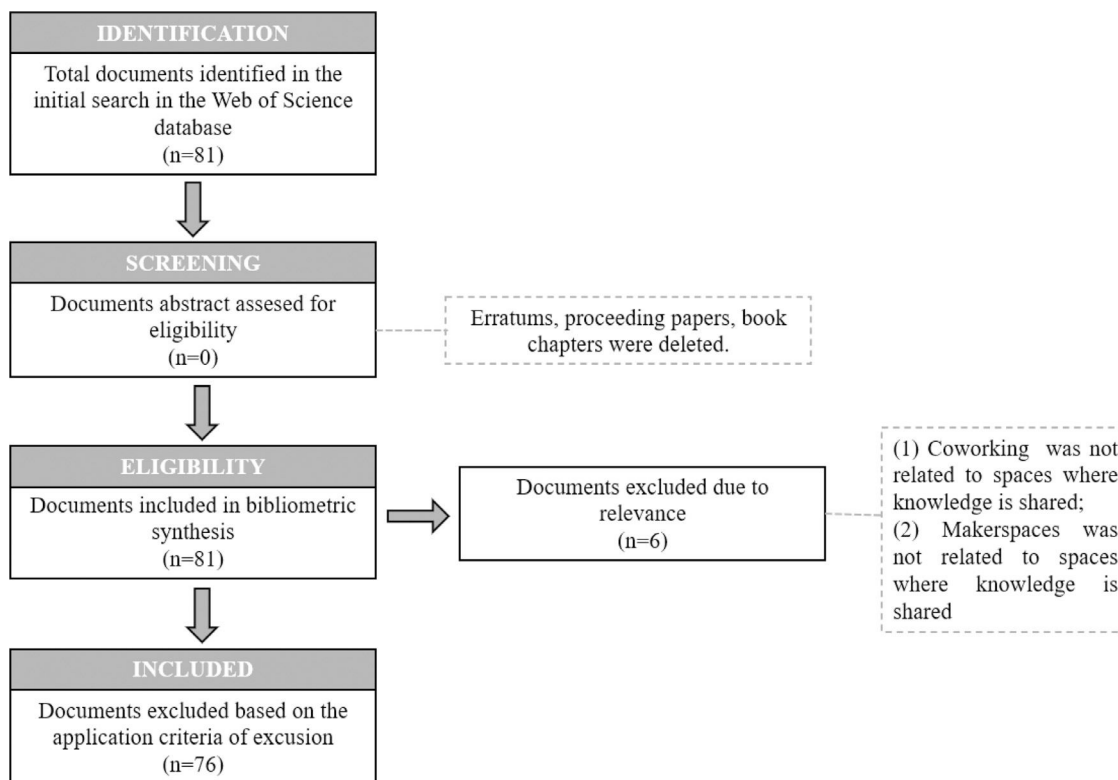


Fig. 1. PRISMA flow diagram detailing steps in the identification and screening of sources.

authors identified by different letters, especially when the authors have two first names or two surnames. Hence, the total number of articles was reviewed to avoid duplicity and errors. We then added the missing data of some records (institution, country, and publication year). After having prepared all the data, two sorts of analyses were performed. Firstly, we calculated the basic quantitative bibliometric indexes (number of articles published by year, author, journal, and country) using the HistCite software (version 2010.12.6; HistCite Software LLC, New York). Secondly, co-authoring analyses were performed using BibExcel software (version 2011.02.03; Olle Persson, Umea University, Umea, SWE) and Pajeck software (version 3.14, 2013.11.12; Batagelj and Mvar, University of Ljubljana, Ljubljana, Slovenia). Finally, bibliographic coupling analysis was performed using VOSviewer software.

HistCite (version 10.12) software was used to organize the data collected by authors, years, countries, journals, and cited references. The number of articles per year, number of articles per author, number of articles per journal, and number of articles per country were analyzed with this software. Besides quantitative indicators, the statistics software also presents quality indicators: Total Global Citation Score (GCS) and LGCS (Local Global Citation Scores). The Total Global Citation Score (GCS) represents the total number of citations received by the articles selected in the analysis performed in the whole WoS. The Total Local Citation Score (LCS) refers to the number of citations in WoS received only by the articles selected in the specific search string performed.

BibExcel (version 2011.02.03; Olle Persson, Umea University, Umea, SWE) was used to prepare the data to create the co-authorship networks. Then, Pajeck (version 3.14, 2013.11.12; Batagelj and Mvar, University of Ljubljana, Ljubljana, Slovenia) was used to visualize these networks on a map. To interpret these maps, it is essential to consider that size of the vertices indicates the frequency (number of articles published by the authors or frequency of keywords). A large vertex indicates a high frequency, and a small vertex indicates a low frequency.

Moreover, the thickness of the lines refers to the relationship between the vertices; the thicker the line, the higher the correlation between the authors and the keywords.

Finally, we used VOSviewer software to perform the bibliographic coupling. Bibliographic coupling measures the similarity between two articles by considering the mutual number of references. Because the number of cited references in the articles does not change over time, this analysis, compared to other (e.g., co-occurrence analysis), is not influenced by the time it is performed (Bartolacci et al., 2020). Consequently, this approach is beneficial when performing systematic literature reviews (Caputo, Marzi, Pellegrini, & Rialti, 2018; Kraus, Mahto, & Walsh, 2021). For its proper interpretation, it is necessary to consider that each color represents a different cluster. The darker the color of the cluster, the higher is the density of the cluster.

Results

After revising all the documents, the search string performed in the WoS database has retrieved 76 articles published in 53 journals by 141 authors from 141 different institutions from 28 different countries. This section presents the chronological evolution of the papers published by year, country of author, journal, and author with the largest number of papers and citations.

Basic indicators

In this first section of the results, we present the primary indicators. Furthermore, we present the evolution of the papers published by years and the number of citations, papers, and citations per author, per institution per country, and by journal.

Years

The number of articles published on this topic has increased over the years. The first article was published in 2012, and until 2017

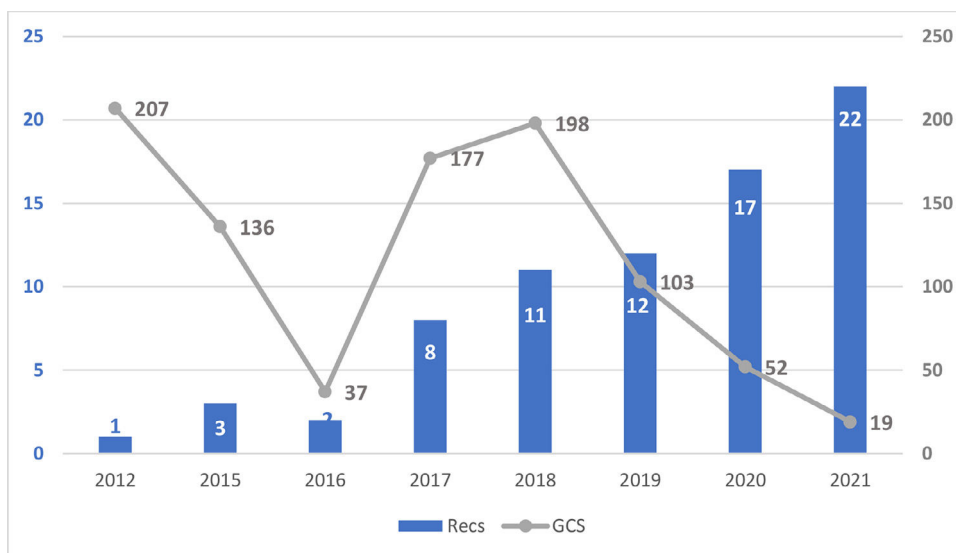


Fig. 2. Number of articles and received citations per year.

published articles were scarce. Since then, there has been a significant increase in the number of publications on this topic, with 2021 (until September) being the year most articles have been published (22 articles). Regarding the number of citations, the articles published in 2018 are those that have received the most citations until now (GCS = 198). Figs. 2 and 3 below shows the evolution.

Authors

A total of 141 researchers have published at least one article on coworking spaces or makerspaces. Regarding the citations, considering the GCS, Spinuzzi C is the author who received the highest number of citations (GCS = 242), despite his limited number of publications (Recs = 2). The second place by number of citations is

Bouncken RB with 171 citations, followed by Orel M with 50 citations (See Table 2).

However, only 20 researchers have published two or more articles. The author with the highest number of published articles is Bouncken RB with nine publications, followed by Orel M with eight articles published. Gauber F, Mayerhoffer M and Pfuner have published three articles, while the rest of the 15 researchers who appear in Table 2 have published two articles.

Countries

Focusing on the author's country institution in Table 3, the three countries with the highest number of citations are the USA,



Fig. 3. Number of published articles and citations received per year and cluster.

Table 2
Authors with the highest number of publications and citations.

Author	Institution	Recs	LCS	GCS
Bouncken RB	University of Bayreuth	9	66	171
Orel M	Prague University of Economics and Business	8	23	50
Gauger F	Technical University of Darmstadt	3	0	3
Mayerhoffer M	Prague University of Economics and Business	3	1	0
Pfnur A	Technical University of Darmstadt	3	0	3
Akhavan M	Politecnico di Milano	2	0	5
Aslam MM	Universität Bayreuth	2	8	15
Barwinski R	University of Bayreuth	2	8	25
Görmär L	University of Bayreuth	2	12	29
Halbinger MA	Baruch College	2	4	19
Kopplin CS	University of Bayreuth	2	1	4
Kraus S	Free University of Bozen-Bolzano	2	9	25
Laudien SM	University of Bayreuth	2	15	36
Mariotti I	Politecnico di Milano	2	0	5
Nenonen S	Aalto University	2	9	33
Qiu YX	Bayreuth University	2	1	2
Rese A	University of Bayreuth	2	1	2
Spinuzzi C	University of Texas at Austin	2	61	242
Strych JO	Karlsruhe Institute of Technology	2	0	1
van Holm EJ	University of New Orleans	2	0	23
121 researchers	–	1	–	–

Note: Recs-number of articles; LCS-Local Citation Score; GCS-Global Citation Score.

Table 3
Top ten countries with the highest number of citations.

Country	Recs	LCS	GCS
USA	13	103	379
Germany	17	73	192
UK	12	38	124
Italy	6	38	107
France	6	4	80
Finland	4	19	64
Slovenia	1	16	31
Australia	6	0	28
Denmark	2	9	28

Note: Recs-number of articles; LCS-Local Citation Score; GCS-Global Citation Score.

Germany, and the UK. The author's country institution that produced the most articles on coworking spaces or makerspaces are the same countries but in a different order: Germany, the USA, and the UK. Thus, as we expected, the countries that contribute

the most to research outputs in this field are in the top three positions regarding citation number.

Journals

Concerning the analysis of the citations received by journals presented in Table 4, Journal of Business and Technical Communication (GCS = 242), Review of Managerial Science, (GCS = 118), Organization Studies (GCS = 66), and Knowledge Management Research & Practice (GCS = 62) are those journals whose papers attracted most citations. Review of Managerial Science has welcomed several papers on the topic (Recs = 5), while the number of articles published in the other journals is rather limited.

Co-citation analysis

In this second section, the co-citations analysis is presented. Firstly, the co-authorship network is represented, followed by collaborative networks between countries in second place, and in third place by the bibliographic coupling analysis. All these results have been represented in the maps and tables below.

Co-authorship

We set the cut-off point in one or more collaborations. With the 137 researchers who published articles on coworking, we formed 36 co-authoring networks. Specifically, there are 12 networks of two researchers, 12 networks of three researchers, six networks of four researchers, and six networks of four researchers. Moreover, there are two extensive networks of researchers. The largest one is composed of 18 researchers. The leading researcher in this network is Bouncken RB, presenting her strongest collaborations with Laudien SM, Goermär L, Kraus S, Aslam MM, and Qiu YX.

The second biggest network consists of up to 15 researchers. Its leading researcher is Orel M, presenting his strongest collaborations with Mayerhoffer M. Fig. 4 shows the different collaborative networks.

Collaboration between countries

The following map shows those countries that have published at least one article on co-working spaces or makerspaces (countries painted in different shades of blue). The shade of blue refers to the number of articles published, with the blue color representing the countries that have published the most articles on this topic. As for the collaborations between countries, the thicker the lines, the greater the number of collaborations. As Fig. 5 shows, the United States, Spain, and Germany are among the most collaborative countries. Regarding the highest number of collaborations between researchers from institutions in different countries, those between the USA and Finland stand out, as well as those between Germany and England.

Bibliographic coupling

Subsequently, a bibliographic coupling analysis was performed to identify the different sub-thematics in this research field. A point of eight citations was set on the number of citations per document. Then, only the related documents were selected, leaving the final analysis with 26 documents, which were distributed in four different clusters (one color per cluster). Fig. 6 visualizes the respective clusters.

Then we classified all documents according to the cluster color in Table 5. We included the authors, publication year, and the number of citations (GCS).

Cluster red (10 articles – 220 citations): benefits, prototypes, and sustainability of coworking spaces. The red cluster is one of the largest and is made up of ten documents. It has received a total of 220 citations. The theme of these articles is related to the benefits of

Table 4
Top 14 journals in the dataset by the number of citations received per publication.

Journal	Recs	LCS	GCS	JCR
Journal of Business and Technical Communication	2	61	242	1.77
Review of Managerial Science	5	39	118	7.13
Organization Studies	1	25	66	6.31
Knowledge Management Research & Practice	2	24	62	2.74
International Journal of Innovation Management	1	0	50	–
Research Policy	2	7	31	8.11
Teorija in Praksa	1	16	31	–
Organization	2	8	30	5.12
Facilities	1	9	29	–
Scandinavian Journal of Management	1	10	26	2.43
Economic Development Quarterly	1	0	23	1.70
Review of Social Economy	1	0	20	–
Journal of Business Research	2	5	19	7.55
Cambridge Journal of Regions Economy and Society	1	2	19	8.30

Note: Recs-number of articles; LCS-Local Citation Score; GCS-Global Citation Score.

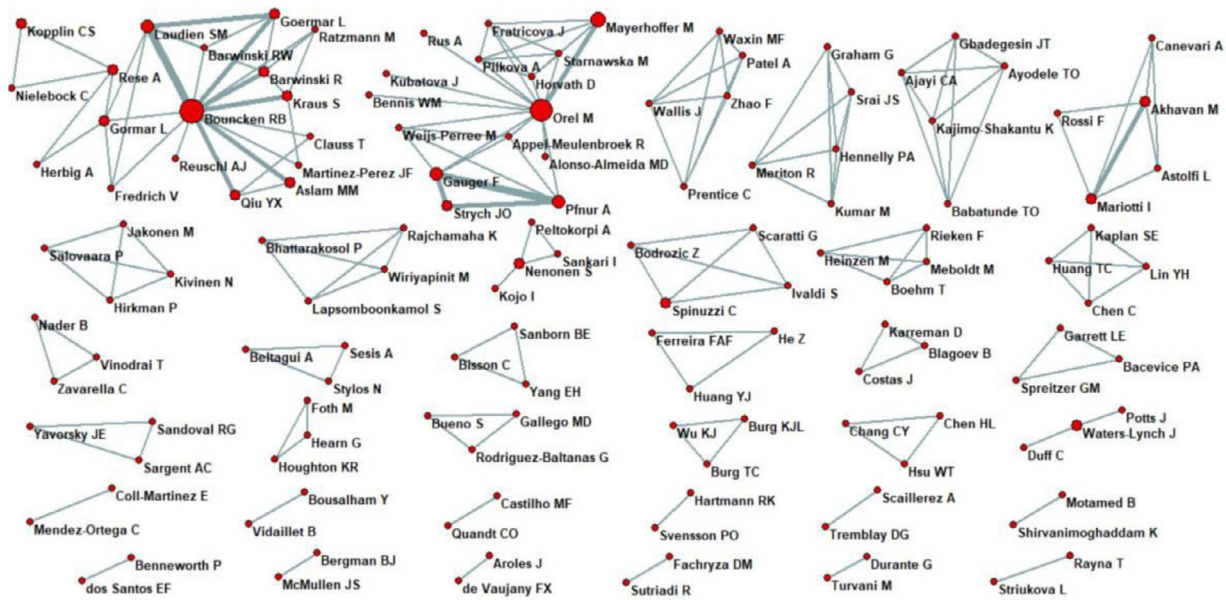


Fig. 4. Co-authorship networks (1 or more collaborations).

coworking spaces related both for productivity and quality of life of their users, the different prototypes of co-working spaces, and the future of these spaces from a sustainable perspective.

Within this cluster, the article by [Bouncken and Reuschl \(2018\)](#) has received the most citations (84 citations). These authors introduce coworking spaces into management research by understanding coworking spaces and identifying key factors for creating a conceptual model. From the same perspective, [Bueno, Rodríguez-Baltanás and Gallego \(2018\)](#) explored the relationship between coworking spaces and

productivity. In the same vein, [Butcher \(2018\)](#) sought to understand the learning process in coworking through an ethnographic study.

From another perspective, this cluster explores the processes of knowledge exchange within these spaces. Specifically, [Bouncken and Aslam \(2019\)](#) analyzed the processes of knowledge exchange in coworking spaces. Along the same lines, this cluster's third most cited article ([Waters-Lynch & Potts, 2017](#)) is based on ethnographic data from case studies of coworking spaces.

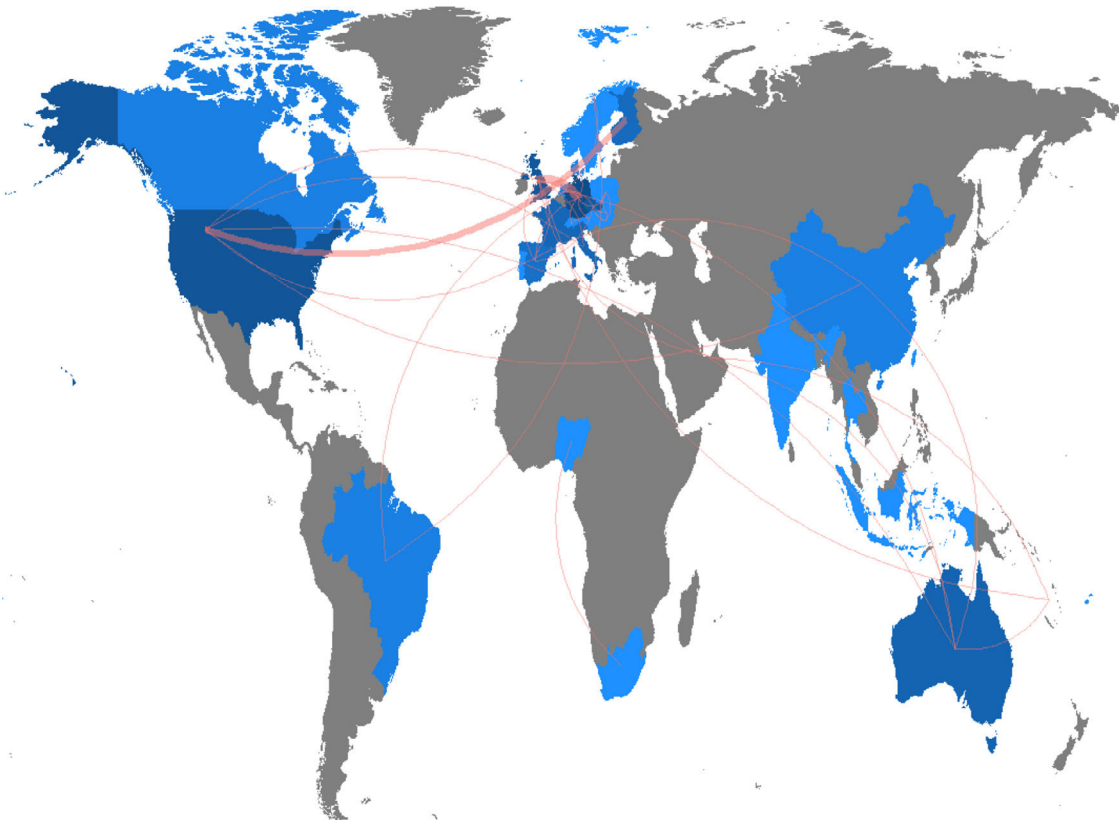


Fig. 5. Collaboration between countries.

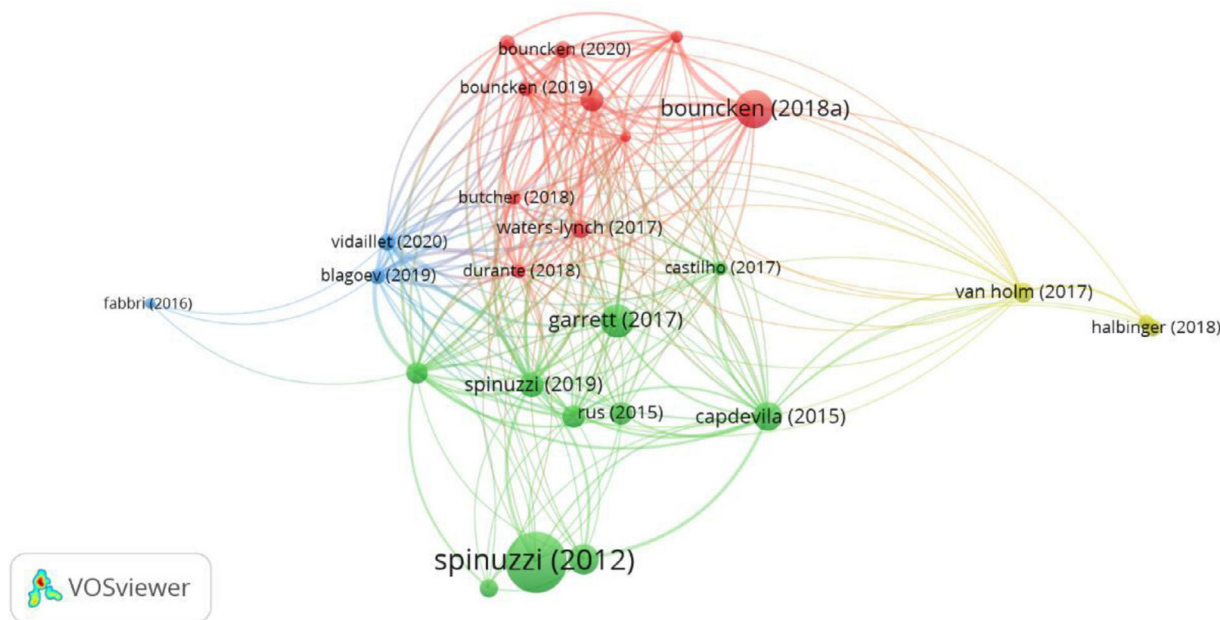


Fig. 6. Bibliographic coupling.

Furthermore, Bouncken (2018) conducted a conceptual study in which she analyzed how coworking spaces in universities could enrich entrepreneurial universities (such as the development of self-efficacy, inspiration, autonomy, knowledge flows).

On another note, it is vital to contemplate the trend towards digital nomadism. This development led to an increase in the use of coworking spaces to improve the quality of their lives and productivity and meet the challenges associated with both work and leisure time (Orel, 2019). A year later, this concern for workers' quality of life using coworking spaces was also captured by Bouncken et al. (2020b), but with a focus on job satisfaction.

The growth of coworking spaces has led to the diversification of coworking spaces. Specifically, the second most cited article of this cluster (Bouncken, Laudien, Fredrich, & Görmar, 2018), through interviews and secondary sources, explained four prototypes of coworking spaces. However, the tremendous growth and diversification that occurred in coworking spaces in recent years have also been a matter of concern for researchers (Durante & Turvani, 2018), who have analyzed the economic viability of coworking companies.

Cluster green (10 articles, 527 citations) – definition, typologies, and understanding of coworking community building. The second green cluster is also composed of ten articles, which have received 527

Table 5
Documents organized into clusters (authors, publication year, and GCS) to analyze sub-themes in the coworking spaces and makerspaces research field.

Authors	Year	GCS	Authors	Year	GCS
Cluster I red (220 Citations, ten papers): Benefits, prototypes, and sustainability of coworking spaces					
1. Bouncken, & Reuschl	2018	85	6. Bouncken, & Aslam,	2019	13
2. Bouncken, Laudien, Fredrich, & Görmar	2018	29	7. Butcher	2018	12
3. Waters-Lynch, & Potts	2017	20	8. Durante, & Turvani	2018	12
4. Bouncken, Ratzmann, Barwinski, & Kraus	2020	18	9. Bouncken	2018	10
5. Bueno, Rodríguez-Baltanás, & Gallego	2018	13	10. Orel	2019	8
Cluster II green (529 citations, ten papers): Definition, typologies, and understanding of coworking community building					
1. Spinuzzi	2012	207	6. Rus & Orel	2015	31
2. Garrett, Spreitzer, & Bacevice	2017	66	7. Kojo, & Nenonen	2016	29
3. Parrino	2015	55	8. Jakonen, Kivinen, Salovaara, & Hirkman	2017	26
4. Capdevila	2015	50	9. Richardson	2017	19
5. Spinuzzi, Bodrožić, Scaratti & Ivaldi	2019	35	10. Castilho & Quandt	2017	11
Cluster III dark blue (44 citations, three papers): Understanding the factors of coworking spaces and their influence on the organizations					
1. Vidaillet, B., & Bousalham	2020	16	3. Blagoev, Costas & Kärreman	2019	14
2. Fabbri	2018	14			
Cluster IV yellow (54 citations, three papers): Makerspaces to promote consumer innovation and economic development					
1. Van Holm	2017	23	3. Svensson & Hartmann	2018	14
2. Halbinger	2018	17			

Note: GCS-global citations.

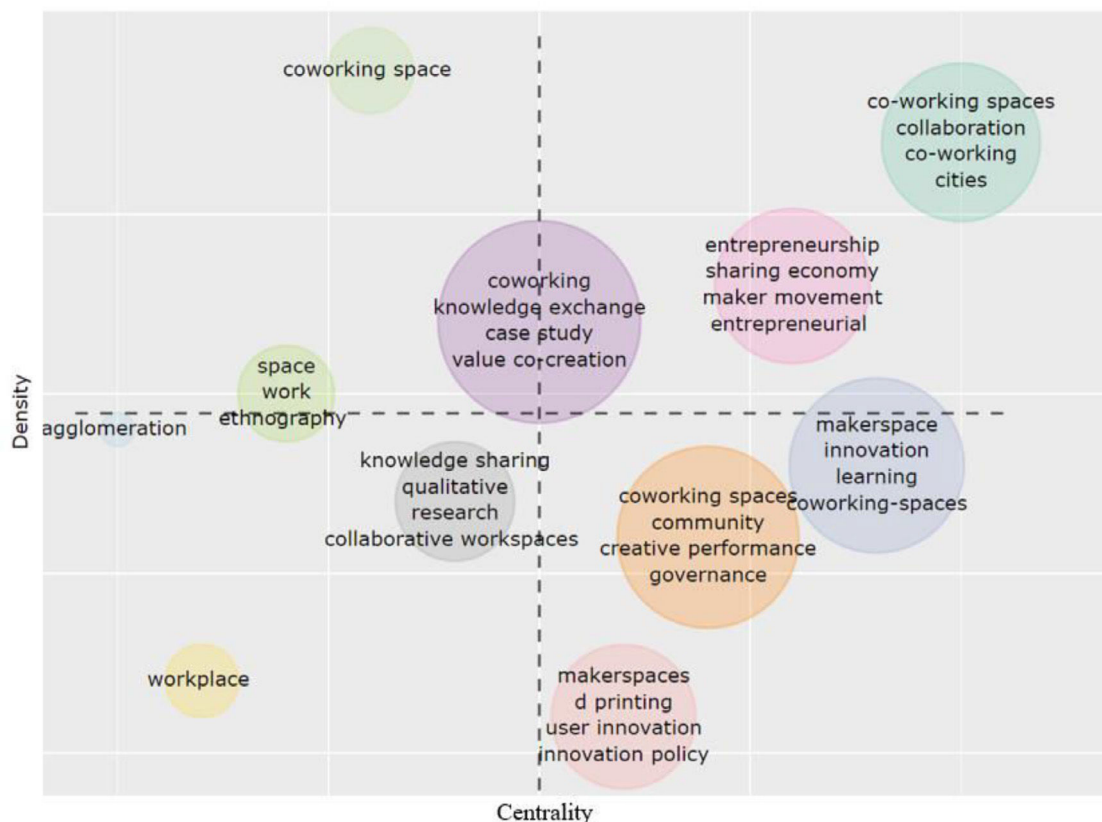


Fig. 7. Strategic diagram coworking spaces and makerspaces.

citations. The subject matter of these is based on the definition and conceptualization of coworking spaces, the different types of coworking spaces, and the process of creating coworking communities.

The article that has received the highest number of citations within this cluster is Spinuzzi (2012) with 50 citations. This author analyses why professionals choose to work in coworking spaces rather than in other facilities, how they describe the service, and the objectives, results, and actors of this activity. Along the same lines, Rus and Orel (2015) analyze the growing phenomenon of coworking spaces, explaining what is driving this growth and where this increasing demand is originated. In addition, this high demand may also be mainly due to digital technology, which has changed the way and content of work through digital sharing (Richardson, 2017).

However, despite the advances in understanding this coworking phenomenon, the definition of coworking has also been a concern for researchers in recent years due to the inconsistencies found in the literature (Spinuzzi, Bodrožić, Scaratti, & Ivaldi, 2019). These authors reviewed the literature on coworking to analyze and discover how the community relates to collaboration. The categorization of coworking types is also one of the issues that has attracted the attention of researchers (Kojo & Nenonen, 2016). These researchers analyzed different coworking spaces using two axes: the business model (for-profit or not-for-profit) and the level of user access (public, semi-private and private).

Also, the generation of a sense of community and the affective bonds that favor the exchange of knowledge in coworking spaces captured the attention of researchers in the field. Specifically, Parrino (2015), the third most cited article in this cluster (55 citations), contextualizes the coworking phenomenon based on the theoretical framework of proximity and knowledge sharing. A couple of years later, Jakonen et al. (2017), through a case study of three coworking spaces (two open and one closed), introduced the concept of the encounter economy, based on the premise that both intentional and

unintentional encounters are a form of production in the new knowledge-based economy. In the same year, the second of the most cited articles (66 citations) of this cluster (Garrett et al., 2017), through a qualitative case study, analyses how members of a coworking space work to build a sense of community through their daily interactions in this space.

Finally, the growth and diversification of these spaces allowed for different collaboration and innovation processes to rise in these coworking spaces. In this line, Capdevila (2015) conducted a qualitative study. From a multilevel perspective, he analyzed the role of individuals and communities that are not part of the companies in the dynamics of innovation.

A couple of years later, Castilho and Quandt (2017) analyzed the development of collaborative capacity in coworking spaces. To do so, they conducted interviews with owners, managers, and workers of these spaces and identified different factors and proposed a model based on four main dimensions.

Cluster blue (3 articles, 44 citations) – understanding the factors of coworking spaces and their influence on the organizations. This third blue cluster is composed of only three articles, which have received a total of 44 citations. The theme of these articles is based on the analysis of coworking spaces to theorize them and discover their effect on companies' organizational processes.

In this cluster, the article by Vidaillet and Bousalham (2020) is the most cited one (16 citations). It is a qualitative study of several coworking spaces carried out over three years. Relying on Foucault's reflection on heterotopias, the authors develop a new concept of "syntopia" to theorize this type of space. With the same aim of understanding coworking spaces, Blagoev et al. (2019), through an ethnographic study, went deeper into the study of these spaces but considered it as an organizational phenomenon. The authors demonstrated that coworking spaces generate a sense of community and

influence the shaping of the work activities of their members. Also through an ethnographic study, Fabbri (2016) analyzed how a shared organizational workspace can play an essential role in the temporally and spatially constituted everyday activities of a group of entrepreneurs.

Cluster yellow (3 articles, 54 citations) – makerspaces to promote consumer innovation and economic development. Finally, the yellow cluster is also composed of three articles, which have received a total of 54 citations. The subject matter of these articles is related to makerspaces as spaces to promote consumer innovation as well as the economic development of countries.

Within this cluster, van Holm (2017) is the most cited article (23 citations). This author explored how makerspaces can contribute to economic development by generating and sustaining businesses through interviews. The second most cited article (17 citations) in this cluster is by Halbinger (2018), who analyses the role of makerspaces in fostering and supporting consumer innovation. The study is conducted empirically by administering a survey to makerspace participants around the world. The third and last article in this cluster (14 citations) is written by Svensson and Hartmann (2018). These authors focus on user-centered innovation policies, specifically makerspaces in hospitals.

Strategic thematic analysis

Finally, the strategic diagram for the coworking space and makerspaces research field is presented in Fig. 7. We used the author's keywords to generate this diagram. The size of the circles represents the number of occurrences of the keywords. The upper-right quadrant is motor-themes, the lower-right quadrant is basic themes, the upper-left quadrant is very specialized themes, and the lower-left quadrant is emerging or disappearing themes.

The theme in the upper-right quadrant is collaboration in coworking spaces in cities and entrepreneurship in sharing economy. Both are important and well-developed themes for the structuring of this research field. Themes in the lower-right quadrant are important for this research field but are not developed yet. So, in this quadrant, terms are innovation and learning in coworking spaces and makerspaces, communities and creativity performance, and user innovation.

Themes in the upper-left quadrant, such as are “coworking spaces” and “space”, “work,” and “ethnography,” have well-developed internal ties but unimportant external ties. So, they are of only marginal importance for the field. However, the terms “coworking”, “knowledge exchange,” and “value co-creation” due to their centrality and density will seemingly be the driving forces in the upcoming years. Themes in the lower-left quadrant are both weakly developed and marginal, mainly representing either emerging or disappearing themes. In this case, “workplace” seems to disappear.

Thematic analysis shows that we can merge the research focus “coworking spaces” with “collaboration” and “entrepreneurship” with “sharing economy”. It also shows that we can merge the rather important but underdeveloped research focus “communities in coworking spaces” with “creative performance”, “innovation” with “makerspaces”, and “maker spaces” with “user innovation”.

Discussion and conclusion

As laid out in our paper, the increasing amount of research on the topic of coworking spaces, innovation centers and knowledge sharing in entrepreneurial surroundings as well as the practical relevance is evidence enough for the sheer importance of the topic, not only for research but also for practice. In order to explain some of the remarkable findings, a look behind the curtains seems necessary. When looking at the cluster of Bouncken RB and extending the view on her research, we found a research project on coworking (Hierda). With

the start of the project in 2017, the publications on coworking within her network sky rocketed. Since the research project started, not only the amount of research articles spiked but also the quality increased with publications such as Bouncken and Tiberius (2021), Bouncken et al. (2020b), and Bouncken and Aslam (2021). For the context of Orel M the context of increasing coworking publications is based in his past. He already started publishing research pieces on coworking in 2015 (Orel, 2015; Rus & Orel, 2015). Consequently, Orel had a head-start on the topic once it completely blew research as well as practice.

Elaborating on the country-specific findings it is interesting that the most research output and the most citations are related to western countries. First, the mindset of western countries is rather individualistic and materialistic (Li, Lim, Tsai, & O, 2015), which contradicts the idea of sharing assets as opposite to owning them. Second, the idea of sharing work space is explicitly famous in countries or areas with little space available and a rather community-oriented culture, such as China (Bouncken & Winkler, 2010; Bouncken, Qiu, & Clauss, 2020a). Thus, obviously we cannot blame the practical relevance of the topic for certain geographic areas or cultures. After having a deeper look at the researchers and the research output, it would also not be appropriate to argue with overall amount of publications, the amount of researchers, or the general quality that these researchers provide. Consequently, the most probable reasoning is according to research interest and prevalence of the respective topic. Given the wide range of research topics and the preliminary mentioned lack of understanding the topic and its potential, this country-specific finding supports the mentioned need for investigation and we hope that our findings draw the much needed attention.

Overall, the results suggest the need for further research into the nature of successful makerspaces (Gantert, Fredrich, Bouncken, & Kraus, 2021), highlighting the value of public investment in societal well-being (Halbinger, 2018) and considering the interplay between social and material aspects (Aslam, Bouncken, & Görmar, 2021). The overview we presented stresses the importance of this literature stream for knowledge creation and innovation.

When condensing the existing research and this very study, we can point out several implications for both research and practice. For research, this study shows the broad approach that scholars can and should take upon coworking. It is a phenomenon that made its way to organizational structures, influences knowledge creation and -sharing, improves innovative behavior and is influenced by social factors as well as material equipment. Eventually, the success that coworking creates is manifold, from emotional wellbeing and happiness and individual business success to company-wide improvements. Consequently, the topic needs research support from many different research areas to holistically encompass the field. Also, when looking at Fig. 4, we want to call for cooperation between the research clusters. Since cooperation and collaboration is so effective in coworking it probably is for researchers as well. This can offer new insights and open the path for new approaches to analyzing the topic coworking.

For practice, our research has just as many important implications. Considering the broad range of factors that coworking influences in the scientific field, exactly these aspects need to be rethought throughout the whole work environment. Since a coworking-like surrounding makes people happier and emotional healthy, companies can consider applying the gained expertise and knowledge in their organization, making employees more willing to stay with the company on the one hand and more productive and successful on the other hand. Furthermore, coworking as an innovative environment offers potential for innovative behavior and activities. Because we know that these factors are fundamental to long-term success and core of remaining competitive, applying these findings in an

organization will again benefit the success and well-being of the company. All in all, the variety of possible research in this field shows the variety of approaches that companies can follow in order to make employees happy and healthy while simultaneously improving the company's overall situation.

However, our study contains some shortcomings. Because of the regency of the topic, it is basically impossible to always have the latest data for our analysis. Research articles are constantly published so we had to draw a stop-line in September 2021. By then, not all articles that we can draw on while writing the paper were also listed in the Web of Science. Also, the commodification of the coworking does not consider the precariousness of work in today's society (Jakonen et al., 2017). Yet, when thinking about these shortcomings they only state the even more vital and overarching role that coworking and coworking spaces will play in the future. Consequently, only extensive research in various fields of research besides management and organizational studies can grasp the variety and richness of this topic.

Concluding our research, we found that especially researchers from western countries contributed to the topic of coworking spaces with research focusing on mostly management-related topics. The research output tremendously increased for many reasons since the year 2017. With our study we show the potential of the topic by drawing the attention of different research fields we are expecting more publications in journals with non-management focus. Especially social sciences as well as architectural related journals can benefit from the increasing interest in the topic.

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