Job Crafting and Re-design in a Rapidly Changing World of Work: A Bibliometric Analysis and Review

Christina Pantoja

Abstract As a result of the COVID-19 outbreak and associated stay-home-orders, the world of work in the US suddenly radically changed. In early 2020, more than 16.8 million Americans lost their jobs, some became furloughed, and those who continued working saw dramatic shifts in their work responsibilities and environments (Associated Press, April 9, 2020). In this study, job crafting and redesign are explored as potentially useful tools for individuals and organizations in navigating the sudden, necessary changes to their work environment caused by the massive reorganization of US workplaces during the COVID-19 pandemic. Through bibliometric analysis, this study seeks to describe the job-crafting and redesign literature by providing the leading authors, resources, and topics of interest within these bodies of literature to gain a deeper understanding of the utility of job crafting and redesign for individuals and organizations during this COVID-19 pandemic. Co-citation, cluster, author, and content analyses (of data mined from several large databases) were conducted, using bibliometric analysis tools (Harzing, VOSViewer, Author Mapper, MaxQDA, Cite Space). Through these tools, leading authors, resources, and "key terms" of the job crafting and redesign literature were identified. Findings suggest job crafting and redesign are positive and proactive tools that should be considered by employees and organizations in navigating through the massive, sudden, and necessary changes this COVID_19 pandemic has created in the world of work.

Keywords Job crafting · Job re-design · Proactivity · Work engagement · Job demands-resources model

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1 Introduction

1.1 Employment Trends

As a result of the COVID-19 pandemic and associated stay-home-orders, our former world of work has recently and suddenly, radically changed. In early 2020, more than 16.8 million Americans lost their jobs, some became furloughed, and those who continued working saw dramatic shifts in their work responsibilities and environments (Associated Press, April 9, 2020). A recent search of Twitter data on Vicinitas in the US, using the keyword "employment", confirms this is an emerging topic. Findings demonstrate Americans tweeted about "employment" more than 2000 times 4 h, with an engagement of 1.3 million and an influence of 23.1 million [29].

1.2 Job Crafting and Re-design

Job crafting" is an individual approach to "job redesign". Through this process, individuals proactively seek ways to create a work environment that is a better fit for their interests and needs [26]. According to Wrzesniewski and Dutton [7], individuals craft their jobs (1) physically (changing task boundaries), (2) cognitively (changing how they think about their job), or (3) relationally (changing their work interactions) (p. 180). On the other hand, Tims and Bakker [26] view job crafting as "individual-level job re-design" and consider it from a job design theoretical perspective (p. 2). More recently, Tims and Akkermans [27] proposed a job crafting model based on the widely cited and empirically tested job demands-resource model (JD-R) developed by Demerouti et al. [10]. This model, utilized by management and organizational psychology scholars, is considered a job design model with many human factors and ergonomic concepts, including task motivation and job design. According to this model, individuals redesign their jobs by increasing their resources, modifying their demands, or both.

2 Problem Statement

Job crafting and redesign are emerging topics, with growth expected to continue at high rates due to work and organizational changes resulting from the COVID-19 pandemic. A search of keywords "job crafting" OR "job redesign" conducted using AuthorMapper indicates a 5-year growth rate of 2.3 for the topic (# articles in 2019/# articles in 2014 = 274/119) (Figs. 1 and 2). Search results also suggest the persistence of this topic (a total of 1898 articles in 823 different publications) and an increasing network of authors (4128). The growth, persistence, and expanding network of scholars that focus on "job crafting" or "job redesign" suggest this is an

emergent topic. By the end of 2020, these emergence indicators (growth, persistence, and network) are likely to be even stronger. This bibliometric analysis seeks to describe the existing job crafting and redesign literature by providing the leading authors, resources, and key topics of interest within these bodies of literature.

The purpose of this review is to add to our understanding of the utility of job crafting and redesign to individuals and organizations as they navigate rapidly changing work environments due to the recent COVID-19 pandemic. Collaboration on job-redesign between employees and management during organizational change is beneficial to employee well-being, motivation, and performance; outcomes that traditional "top-down" approaches to job design alone cannot provide [11, 26]. These benefits make job crafting a great potential tool for organizations and individuals alike during times of massive organizational change, such as the recent widespread restructuring of work-life in America.

Fig. 1 AuthorMapper trend graph

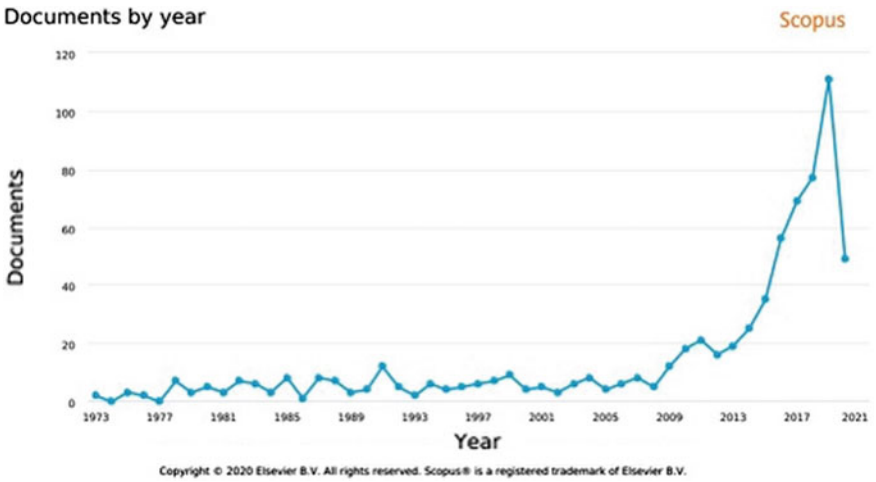


Fig. 2 Scopus trend graph

Table 1 Databases, search terms, and # articles found

Database	Search terms	Number of articles
Web of science core collection	"Job redesign (re-design)" OR "job crafting"	589
Scopus	"Job redesign (re-design)" OR "job crafting"	685
Google scholar (Harzing)	"Job redesign (re-design)" OR "job crafting"	74
Springer (AuthorMapper)	"Job redesign (re-design)" OR "job crafting"	1894
Springer (AuthorMapper)	"Job redesign (re-design)" OR "job crafting" narrowed by keywords "job crafting"	28

3 Procedures

3.1 Data Collection

To gather bibliometric data, I searched multiple databases across all years, using the keywords "job crafting" OR "job redesign", including the alternate spelling, "job re-design". For these searches, I utilized the databases listed in Table 1.

3.2 Data Analysis

Using bibliometric analysis tools (Harzing, VOSviewer, AuthorMapper, MaxQDA, Cite Space), I conducted the author, source (co-citation), and content analyses (cluster and network) described in the following sections. These analyses increase our understanding of the leading authors, resources, and key topics from the "job crafting" and "job re-design" literature across all years.

Author Analysis

VOSviewer from Google Scholar Data. First a co-authorship analysis was conducted using Google Scholar data imported from Harzing [15] into VOSviewer. This search resulted in 104 authors. When I set a minimum requirement of two documents by a given author, 15 authors met this threshold. These authors were included in my analysis, even those disconnected from the rest of the group. The resulting image is shown below in Fig. 3.

AuthorMapper from Springer Data. Utilizing AuthorMapper, I conducted an "author analysis" of the Springer database. This analysis resulted in 1894 articles from over 4121 authors [2]. To further narrow this search to a more manageable data set and to better understand job crafting in the United States, the search was limited

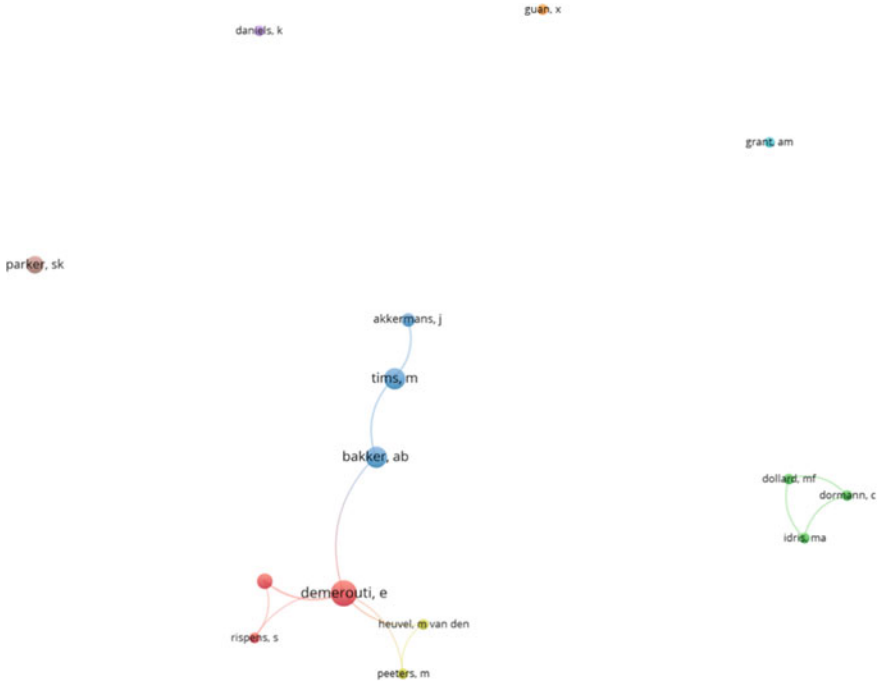


Fig. 3 VOSviewer author analysis of Google scholar search on keywords "job redesign" OR "job crafting", across all years

by geography, resulting in 346 articles by 902 authors, of which 659 authors had two or more included manuscripts. From this Springer database search, I identified nine leading authors that were also on the list of leading authors from the Google Scholar data (number of articles): Maureen Dollard (16), Christian Dormann (7), Evangelia Demerouti (6), Arnold Bakker (4), Mohd Awang Idris (4), Kevin Daniels (3), Sharon Parker (3), Machtel Huevel (2), and Maria Peeters (2). Interestingly, four of these authors (Parker, Dollard, Dormann, and Idris) are unconnected with the other leading authors in the network (Fig. 3); thus, suggesting that their work has a different focus or approach.

By selecting the keyword "job crafting" the AuthorMapper search was narrowed further, resulting in 71 key authors with two or more documents. In this narrowed search, only four authors (number of articles) from the previous Google Scholar search appeared again: Arnold Bakker (1), Evangelia Demerouti (1), and Maria Peeters (1), and Sharon Parker (1). Interestingly, after I restricted the search by the keyword "job crafting", Maureen Dollard, Christian Dormann, and Mohd Awang Idris no longer appear as a leading author, suggesting their work is related but not directly focused on job crafting. A Google Scholar Profile search for Maureen Dollard confirmed her work focuses on "work and stress" and broadly on "organizational psychology"; instead of directly focusing on job crafting and redesign.

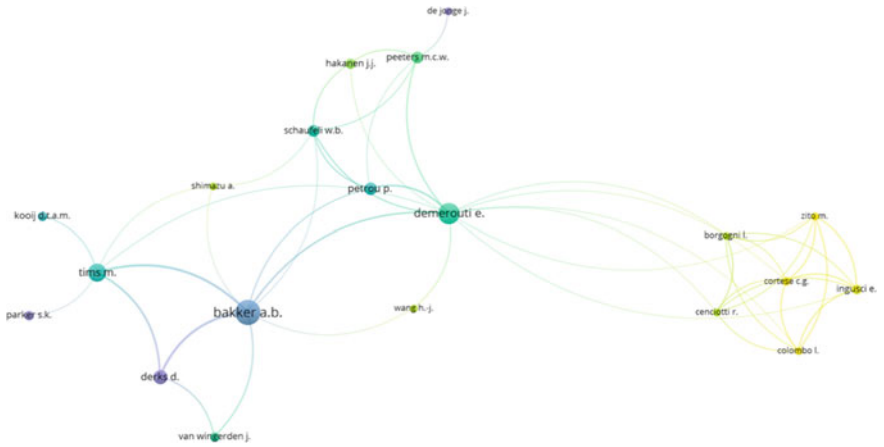


Fig. 4 Author analysis of Scopus data in VOSviewer to identify leading authors

VOSviewer from Scopus Data. Given the lack of consensus from the previous analyses, I conducted a third author analysis. I imported Scopus data (1973 – 2020) into VOSviewer and conducted a co-authorship analysis. Figure 4 shows the clusters that resulted from this analysis. Findings from this VOSviewer analysis of Scopus data and the previously described analysis of the Google scholar data were consistent, except that three additional leading authors were identified (Derks, Petrou, and Schaufei).

By importing the Scopus data into Excel, I constructed a Pivot chart; thus, providing a more detailed comparison of the number of articles by each of the leading authors (Fig. 5).

Table 2 includes additional details about the leading authors identified in the Scopus search. To obtain the authors' research interests and affiliations, I conducted a Google Scholar Profile search through Harzing [15].

Table 2 provides a useful list of key leading authors across all three analysis methods; however, Jos Akkermans is a leading author who is not on this list. While the Google Scholar author analysis suggested he is a highly cited, leading author, it is unclear why his related work is not included in the Scopus database.

Source Analysis

Database Searches. From each of the databases in this study, I selected a key source. For example, from the Google Scholar search, I identified Tims and Bakker [26] as a key source because Tims is a leading author, and the article is highly cited. This article links "job crafting" to human factors theories and models, viewing it through the job-demands resources model framework. In this manner, the authors frame "job crafting" as an individual approach to "job re-design". The job demands-resources model explains how individuals re-design their jobs by increasing their resources, modifying their job demands, or both.

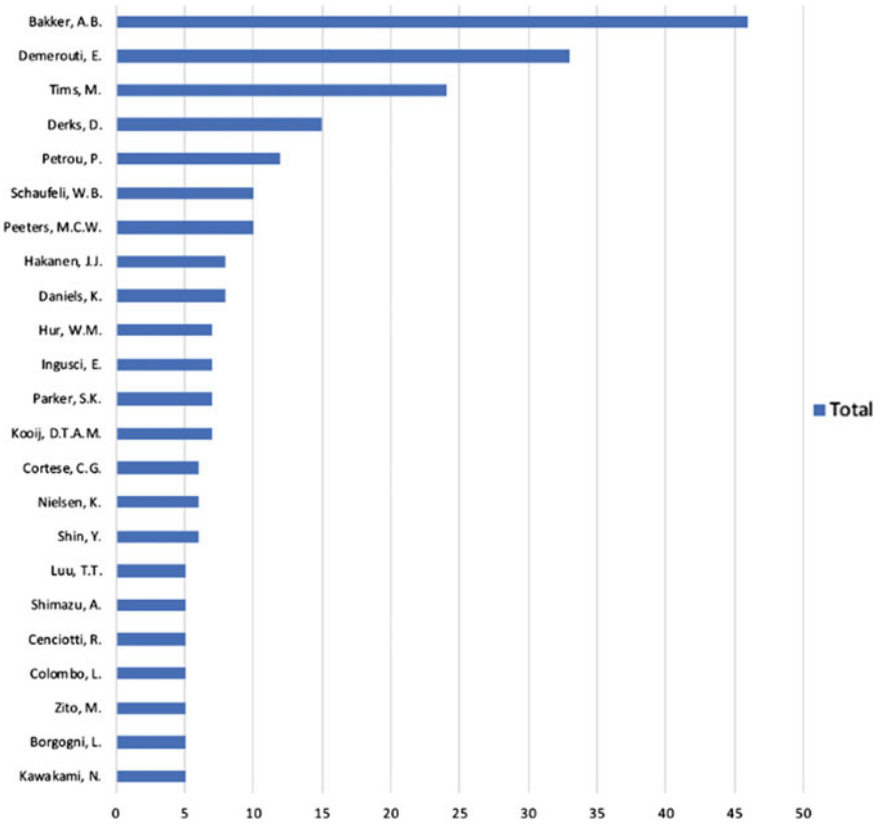


Fig. 5 Job crafting and redesign leading authors from Scopus (all years)

From the SpringerLink database search, I selected Demerouti et al. [11] as a key source, because Demerouti is a leading author, and this source is highly cited. This book chapter describes some specific job crafting interventions that companies can use during re-organization. The authors provide the underpinning theory of job crafting (social cognitive, experiential learning, situated experiential learning), evidence of its effectiveness, and share benefits to employers and employees alike. This information supports organizations and individuals' use of job crafting as a tool during the COVID-19 pandemic.

From ResearchGate (RG), I selected two articles. Savino [24] is considered a key source because of its contribution to our understanding of job crafting and re-design in a changing workplace, though it is only moderately cited. This article discusses the role and effects of continual changes in technology on ongoing employee tasks and organizational business processes. According to Savino [24], the dynamic nature of the workplace causes ongoing job redesign (often subtle and informal). The COVID-19 workplace changes were not subtle or informal, however, state closures and quarantines required more remote work and a greater reliance on technology. As a result,

Table 2 Leading authors, research interests, and affiliations from Scopus VOSviewer and Harzing analyses

Author	No. of articles	Number of citations	Related research interests[a]	Affiliated institution[a] (geographical location)
Bakker, A. B	46	3188	Work engagement, burnout, job demands-resources model (JD-R)	Erasmus University Rotterdam (Netherlands)
Demerouti, E	33	1072	Human performance management: work characteristics, individual job strategies (crafting and decision making), occupational well-being, work-life balance[b]	The Eindhoven University of Technology (Netherlands)
Tims, M	24	1649	Proactivity, work design, job crafting	Vrije Universiteit Amsterdam (Netherlands)
Derks, D	15	1678	Organizational psychology, media psychology, industrial and organizational psychology, well-being[c]	Erasmus University Rotterdam (Netherlands)
Petrou, P	12	508	organizational psychology	Erasmus University Rotterdam (Netherlands)
Peeters, M. C. W	10	465	work and organizational psychology, occupational health psychology, positive psychology, stress at work	Utrecht University (Netherlands)
Schaufeli, W. B	10	533	Occupational health psychology	Utrecht University (Netherlands) and Leuven University (Belgium)

[a]Interest and affiliation data was collected through a Harzing analysis of Google Scholar Profiles unless otherwise noted [15]
[b]Interest data was collected from The Eindhoven University of Technology. Evangelia Demerouti Profile, retrieved from https://www.tue.nl/en/research/researchers/evangelia-demerouti/
[c]Interest data collected from Research Gate (n.d), retrieved from https://www.researchgate.net/profile/Daantje_Derks2

in many organizations, jobs had to be re-designed. Tims and Akkermans [27] is also a key source because it uniquely connects the job crafting literature to career competencies and the job market. I completed a detailed review of this article utilizing the "list of ten 10 ways" to analyze new and existing research [12].

Handbook of Human Factors and Ergonomics [23]. Three chapters from the Handbook of Human Factors and Ergonomics are considered foundational sources for this study. In the following sections, I describe these chapters, their relevancy to job crafting and job re-design, and the purpose for their inclusion in this current bibliometric analysis.

The task design and motivation chapter of the handbook expands our understanding of job crafting and job re-design [18]. Work serves essential functions such as activity and competency, structure, cooperation and contact, social appreciation, and identity. People consider five aspects to be important in their work: the content of their work, working conditions, organizational environment, social conditions, and financial conditions. Several work motivation theories exist, including content theories (needs and rewards that drive behavior) and process models (processes for determining actions). One of the more popular content theories is Hackman and Oldham's Job Characteristics Model. The concepts of autonomy and meaningfulness of work described by Hackman and Oldham's Model of Work Motivation are particularly useful in understanding how and why individuals engage in job crafting ([18], p. 404).

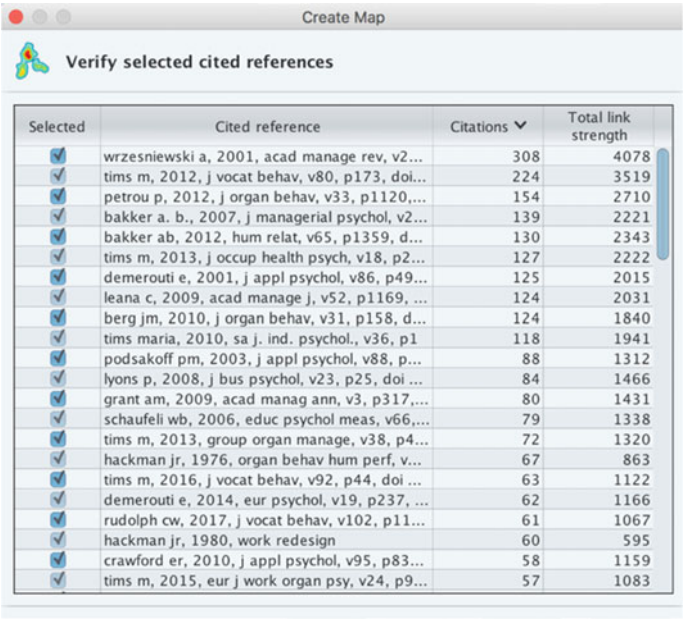
Job and team design, topics related to job crafting and re-design, are covered in Chap. 14 of the handbook [20]. Job design, a key aspect in managing organizations, influences outcomes such as productivity, job satisfaction, work motivation, staffing, mental fatigue, stress, job involvement, absenteeism, turnover, etc. There are many approaches to job design, each with its own recommended uses, benefits, and costs, summarized in Morgeson et al. ([20], Table 1, p. 444). The motivational approach to job design most closely relates to job crafting.

The discussion in Chap. 9 on the social and organizational foundations of ergonomics [25] adds to our understanding of how and why job crafting and redesign are necessary. The psychosocial aspects of work are important to employee productivity and health. High physical and psychological demands are known to influence health and motivation. In job design, these demands must be considered, in addition to the organizational factors. Work design must consider individual, organization, and systems levels. Similarly, job crafting and redesign, must take into account both the social and organizational factors.

Web of Science Co-Citation Analysis. I imported Web of Science search data into VOSviewer and conducted a co-citation analysis, using the full counting method, with the cited references as the unit of analysis. I set the minimum number of citations for each reference to twenty-five. Of the 17,254 cited references found in the search, 86 met this threshold. Using the total number of citations for the references and the total length strength calculated by VOSviewer, I identified leading sources (Fig. 6).

From the list of leading sources and the network visualization diagram above, Wrzesniewski and Dutton [31] was identified as an additional key resource (Fig. 7). This article has the largest total number of citations, contains the highest link strength, and is the largest node. Additionally, it has appeared in the other database searches and analyses included in this study. This VOSviewer analysis confirms Wrzesniewski and Dutton [31] is a key source on job crafting and design; furthermore supporting the utilization of job crafting as a tool for individuals and organizations.

Springer AuthorMapper Analysis. A search of AuthorMapper using search terms "job redesign (re-design)" OR "job crafting" returned 1935 articles and 4189 authors. The search findings are inconsistent with those from other database searches (Web of Science, Google Scholar, Scopus). A review of the abstracts of frequently cited articles suggests this search provides a much broader set of resources, including many



Selected	Cited reference	Citations	Total link strength
☑	wrzesniewski a, 2001, acad manage rev, v2...	308	4078
☑	tims m, 2012, j vocat behav, v80, p173, doi...	224	3519
☑	petrou p, 2012, j organ behav, v33, p1120,...	154	2710
☑	bakker a. b., 2007, j managerial psychol, v2...	139	2221
☑	bakker ab, 2012, hum relat, v65, p1359, d...	130	2343
☑	tims m, 2013, j occup health psych, v18, p2...	127	2222
☑	demerouti e, 2001, j appl psychol, v86, p49...	125	2015
☑	leana c, 2009, acad manage j, v52, p1169, ...	124	2031
☑	berg jm, 2010, j organ behav, v31, p158, d...	124	1840
☑	tims maria, 2010, sa j. ind. psychol., v36, p1	118	1941
☑	podsakoff pm, 2003, j appl psychol, v88, p...	88	1312
☑	lyons p, 2008, j bus psychol, v23, p25, doi ...	84	1466
☑	grant am, 2009, acad manag ann, v3, p317,...	80	1431
☑	schaufeli wb, 2006, educ psychol meas, v66,...	79	1338
☑	tims m, 2013, group organ manage, v38, p4...	72	1320
☑	hackman jr, 1976, organ behav hum perf, v...	67	863
☑	tims m, 2016, j vocat behav, v92, p44, doi ...	63	1122
☑	demerouti e, 2014, eur psychol, v19, p237, ...	62	1166
☑	rudolph cw, 2017, j vocat behav, v102, p11...	61	1067
☑	hackman jr, 1980, work redesign	60	595
☑	crawford er, 2010, j appl psychol, v95, p83...	58	1159
☑	tims m, 2015, eur j work organ psy, v24, p9...	57	1083

Fig. 6 List of cited references from a VOSviewer co-citation analysis of the Web of Science data

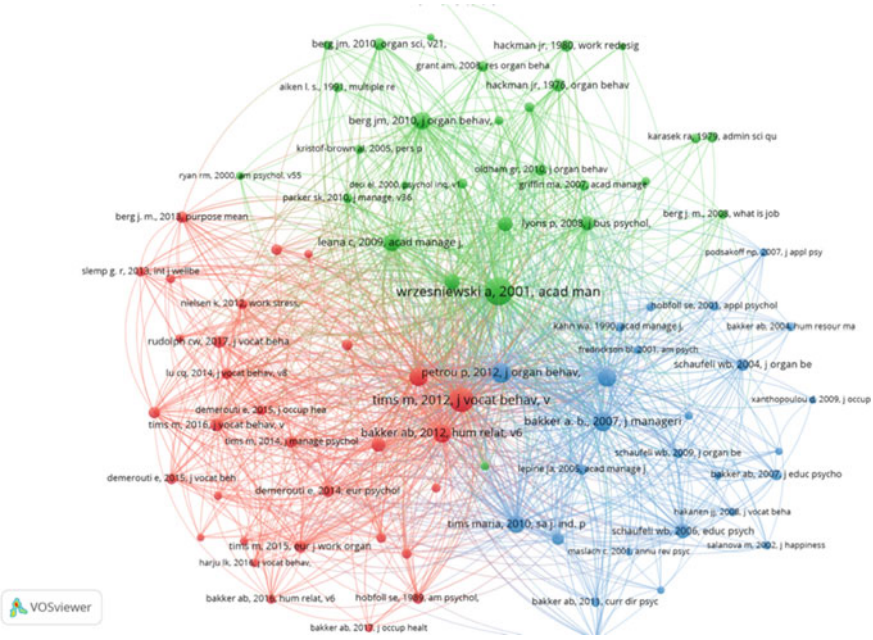


Fig. 7 Network visualization diagram from a VOSviewer co-citation analysis of Web of Science data

of which mention very little about job crafting or job redesign. I further narrowed the search by selecting "job crafting" as a keyword, resulting in a more focused and relevant dataset. This refined search resulted in 28 articles, 71 authors from 51 institutions, including many leading articles and authors previously identified, further suggesting this narrowed search provided more meaningful, consistent data. Using this narrowed dataset, I created Table 3.

CiteSpace Analysis. Search data from Web of Science was imported into the CiteSpace program, leaving the analysis terms at the default settings. The "Burstness" function was utilized to create the following "Citation Burst" analysis (Fig. 8).

From this "Citation Burst" analysis, I identified two additional leading sources. Bakker and Demerouti [5] was selected for its high strength and Lyons [19] because of its high place on the citation list. Bakker and Demerouti [5] builds upon the Job Demands-Resources Model (JD-R) developed by the authors in 2001 and is highly cited (over 4000 citations). The authors provide an overview of the JD-R model, a model that has been extended job crafting, and used as the foundation for many job crafting interventions.

Table 3 Leading institutions identified via AuthorMapper analysis of Springer data [2][a]

Institution	Country	Leading keywords
Erasmus Univ. Rotterdam	Netherlands	"Job crafting", "Flow", "Identity", "Occupational development", "Playful work design", "Self-determination theory", "Self-leadership", "Strengths use", "The Netherlands"
Hongik University	South Korea	"Job crafting", "Job performance", "Employee's spirituality", "Employees' CSR perceptions", "Intrinsic motivation", "Perceived organizational support"
Inha University	South Korea	"Job crafting", "Job performance", "Employee's spirituality", "Employees' CSR perceptions", "Intrinsic motivation", "Perceived organizational support"
University of Johannesburg	South Africa	"Job crafting", "Arbeitsengagement", "Arbeitsleistung", "Burnout", "Flow", "JD-R model", JD-R Modell", "Job Crafting", "Job performance", "Playful work design", "Self-determination theory", "Self-leadership", "Strengths use", "Work engagement"
Utrecht University[a]	Netherlands	"Burnout", "Work engagement", "Job demands-resources model", "Sickness absence", "Stress", "Academic achievement/Student job design", "Academic performance", "Active coping", "Authenticity at work", "Care process", "Cognitive intervention", "Coping resource", "Coping skills", "Decision authority"

[a]Two leading authors are from this University; thus it was added to this list

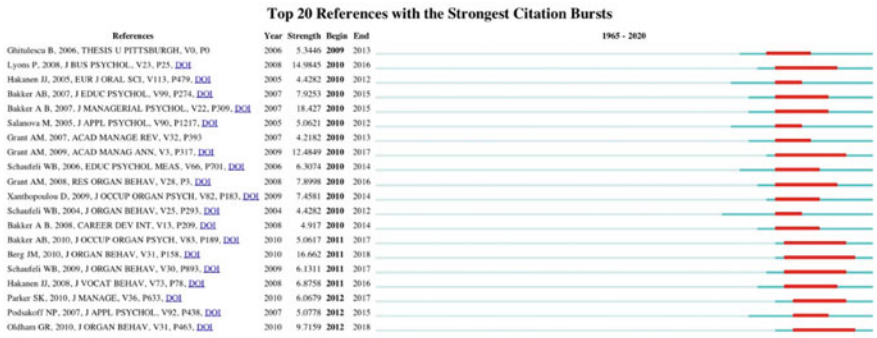


Fig. 8 Citation burst from CiteSpace analysis of Web of Science data

The Lyons [19] article did not surface in previous searches. This article captured my attention because of its focus on individual differences in employee job crafting behaviors. It is an empirical study of outside salespersons. In the study, the authors [19] found that work modifications correlate to self-image, perceived control, and readiness-for-change. I included this study because it examines the role of individual factors in job crafting, thus bringing in a perspective that our other resources thus far have not considered.

Additional Resources. I selected other relevant resources, not previously identified, using the criteria described in Table 4. Additionally, I utilized Fahimnia et al. [14] as a bibliometric analysis reference.

Content Analysis

Network Visualization of Google Scholar Data. I imported Google Scholar data from Harzing into VOSviewer and conducted a content analysis by data mining of all titles and abstracts. This analysis resulted in 609 terms. I set the minimum number of occurrences of a term to three, and 54 terms met this threshold. When limited to the most relevant terms (60% default), 32 terms were identified. Of these terms, I screened out 12 that were irrelevant and two that were unconnected. The resulting *VOS*viewer image is below (Fig. 9).

From this VOSviewer analysis, three key clusters were identified and named. These are displayed in Table 5.

Cluster 1 terms are positive outcomes (benefits) of job crafting. VOSviewer grouped research, theory, manager (practice), and career competency into Cluster 2. The first three concepts are related in their function as key elements of basic and applied research, whereas "career competency" cannot be described in this same manner. Given that "career competency" is strongly linked to the three other terms that make up this category, using it as an umbrella term provides a useful taxonomy to connect all of the concepts in this category. "Theory" was identified as the most frequently utilized term in this content analysis. Because of this, it made it an excellent choice for the naming of cluster 3. The third cluster concepts have stronger links to "Theory" than other terms identified in this analysis. JD-R theory is frequently

Table 4 Additional key resources not previously identified

Author	Title and publication	Rationale for inclusion
van Wingerden [28]	"The impact of personal resources and job crafting interventions on work engagement and performance." *Human Resource Management* 56, no. 1 (2017): 51–67	Leading authors (van Wingerden, Derks, and Bakker)
Costantini et al. [9]	"The Theory of Planned Behaviour as a Frame for Job Crafting: Explaining and Enhancing Proactive Adjustment at Work." In *Theoretical Approaches to Multi-Cultural Positive Psychological Interventions*, pp. 161–177. Springer, Cham, 2019	Leading keyword (proactivity)
Bakker et al. [4]	"Proactive personality and job performance: The role of job crafting and work engagement." *Human relations* 65, no. 10 (2012): 1359–1378	Leading institution (Erasmus University Rotterdam)
Berg et al. [7]	"Perceiving and responding to challenges in job crafting at different ranks: When proactivity requires adaptivity." *Journal of Organizational Behavior* 31, no. 2–3 (2010): 158–186	Co-citation analysis (citations and link strength)
Zhang et al. [32]	"Can job-embedded employees be satisfied? The role of job crafting and goal-striving orientations". *Journal of Business and Psychology* (2020): 1–13	AuthorMapper (keyword: job embeddedness)
Berg et al. [6]	"When callings are calling: Crafting work and leisure in pursuit of unanswered occupational callings." *Org. Science* 21, no. 5 (2010): 973–994	Web of Science (co-citation analysis)

(continued)

Table 4 (continued)

Author	Title and publication	Rationale for inclusion
Wessels et al. [30]	"Fostering flexibility in the new world of work: A model of time-spatial job crafting." *Frontiers in Psychology* 10 (2019): 1–13	Scopus (Topic relevant to currently changing workplace)
Bakker et al. [3]	"Key questions regarding work engagement." *European journal of work and organizational psychology* 20, no. 1 (2011): 4–28	Highly Cited Article (Scopus # Citations)
Dutton and Wrzesniewski [13]	*"What job crafting looks like."* Harvard Business Review (2020). https://hbr.org/2020/03/what-job-crafting-looks-like	News Article
Burton et al. [8]	*Strategic organizational diagnosis and design: Developing theory for application.* Springer Science and Business Media, 1998	NSF Award Search

utilized as a framework for job redesign and crafting; and, these interventions involve theory testing. This analysis suggests job crafting and job design interventions are similar but distinct.

MaxQDA. I loaded sixteen key resource files into MaxQDA and created a word cloud. The word cloud was limited to 50 words, with a minimum of at least five occurrences. I removed irrelevant articles, conjunctions, numbers, etc. The following word cloud resulted from this content analysis (Fig. 10).

From this analysis, the key terms "***employee***", "***work***", "***organization*(al)", and "***resources***" were identified in addition to the original search terms "job" and "crafting". Interestingly, our additional search term "re-design" does not appear. "***Proactive***", "***intervention***", "***demands***", *and* "***engagement***" are also considered key terms from this word map as these have also surfaced in multiple other analyses.

CiteSpace Cluster Diagram. Search data from Web of Science was imported into the CiteSpace program, leaving the analysis terms at the default settings. Using an automated feature of the program, the clusters were named utilizing the abstract data. The imaged that resulting from this analysis is shown in Fig. 11.

From this diagram, four key clusters were identified and are described below.

The "***job engagement***" cluster was selected because "engagement" was also a key term identified by the MAXQDA analysis. This cluster contains six articles by six different authors, ranging in years from 2014 to 2016. Based on the titles of articles in this cluster, engagement appears to be a construct associated with job crafting. The representative sentences for this cluster, demonstrate the relationship between

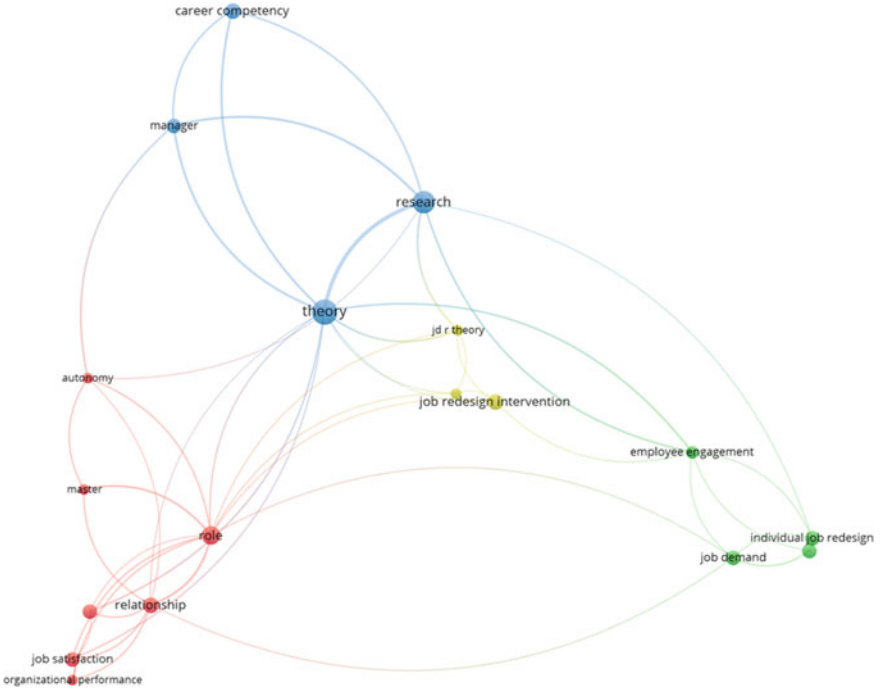


Fig. 9 VOSviewer content analysis of imported titles and abstracts from Google scholar search on keywords "job redesign" OR "job crafting", across all years

Table 5 Key clusters identified via VOSviewer analysis of Google scholar data

Cluster 1: benefits of job crafting (red)	Cluster 2: career competency link (blue)	Cluster 3: theory testing (green + yellow)
Employee performance	Research	JD-R theory
Job satisfaction	Theory	Job crafting intervention
Organizational performance	Manager (practice)	Job redesign intervention

Fig. 10 MaxQDA content analysis of 16 key resource files

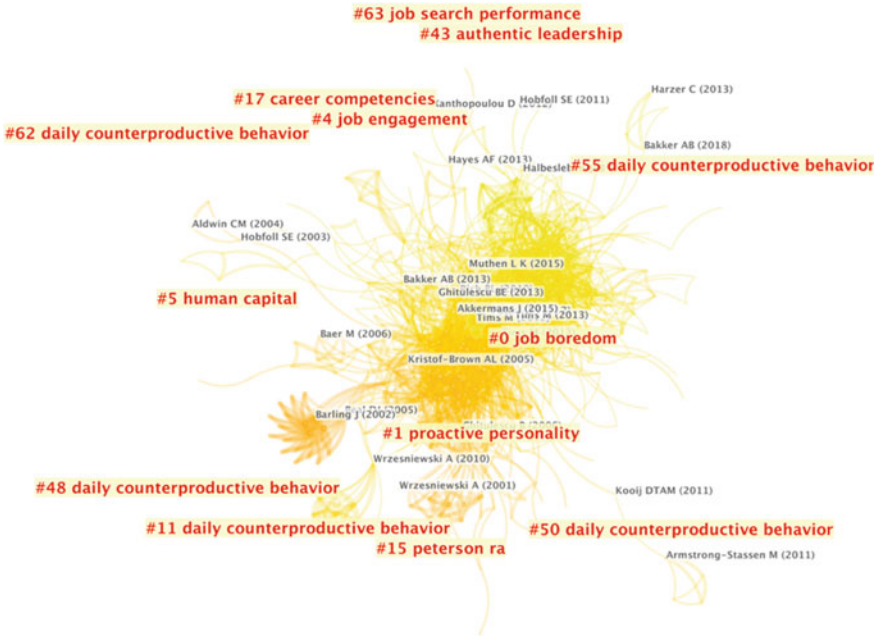


Fig. 11 CiteSpace cluster image with labels extracted from abstracts

work engagement and personal characteristics of individuals; and the relationship between work engagement and organizational change.

The "***proactive personality***" cluster was selected because "proactivity" has appeared in other analyses in this study (e.g. Max QDA on keywords). This cluster contains many articles by a variety of authors between 2010 and 2020. Bakker, Tims, Berg, and other leading authors have written articles that are part of this cluster. From the titles of the included authors, proactivity appears to be a significant aspect of job crafting. Similarly, proactivity is also related to work "*engagement*". The representative sentences pulled from articles in this cluster discuss the development, reliability, and validation of scales. Additionally, these sentences focus on exploratory and factor analysis, further suggesting the need to develop accurate measures of proactivity.

The "***career competencies***" cluster was selected to further our understanding of how individuals might apply job crafting to their job and career self-management. This cluster contains six articles by five different authors over the years of 2017 to 2020. Through this analysis, additional resources were identified that connect job crafting to career management. In addition to the previously identified [26] article, I identified others, such as "*Crafting your career: how career competencies relate to career success* via *job crafting*" [1], through this MaxQDA analysis. Based on the article titles in this cluster, job crafting appears to be an activity that can be done frequently (daily or weekly). It also seems to be a tool that may be useful in personal development and career planning. While the connection

between job crafting and career self-management is understudied, this analysis adds to existing literature that suggests crafting may be useful across jobs, not just within a particular job or organization.

The"***job search performance***" cluster was also selected because of its potential usefulness in connecting job crafting to workplace aspects. However, upon further examination of the cluster, it contained limited data. It only included two articles, Hulshof [16] and Hulshof [17], and zero sentences were extracted with the cluster. Interestingly, the two articles that comprised this cluster were part of the previously analyzed "career comptency" cluster. Based on this, I decided to subsume data from the job performance cluster into the "career competency" cluster.

4 Results

Leading authors, resources, and key terms of the job crafting and re-design literature were identified through this bibliometric analysis according to the procedures outlined in the data analysis section. The following leading authors were identified: A. B Bakker, E. Demerouti, M. Tims, D. Derks, P. Petrou, M. C. W Peters, and W. B. Schaufeli. Key resources listed in the reference section of this paper were identified according to the procedures outlined in the "Sources Analysis" sub-section. A detailed content analysis was conducted utilizing three different forms of analysis as described in the "Content Analysis" sub-section. Key terms from these analyses are found in Table 6 and related terms from the human factors and ergonomics literature are summarized in Table 7.

Based on the keywords identified in the content analysis, a review of relevant chapters from the Handbook of Human Factors and Ergonomics [23], and other key literature reviewed in this search, the following themes were identified: (1) job crafting involves the employee, work, and the organization, (2) job crafting is beneficial to both employees and organizations; (3) job crafting is linked to career competencies; (4) job crafting fosters work engagement; (5) job crafting requires individuals to be proactive; (6) adjusting job demands and resources can facilitate job crafting (JD-R

Table 6 Key terms from identified through content analysis

VOSviewer analysis of Google scholar data	MaxQDA analysis	CiteSpace analysis
"Benefits of job crafting" (employee performance, job satisfaction, organizational performance)	"employee" "work" "organization"	
"Career competency link" (research, theory, manager (practice))	"engagement" "proactive"	"career competencies" "job engagement" "proactive personality"
"Theory testing" (JD-R Theory, Job crafting intervention, Job redesign intervention)	"demands" "resources" "intervention"	

Table 7 Related human factors and ergonomics concepts [23]

Task design and motivation [18]	Job and team design [20]	Social and organizational foundations [25]
Task design Balance of needs and rewards	Job design Outcomes influenced: productivity, job satisfaction, work motivation, staffing, mental fatigue, job involvement, stress, absenteeism, turnover, etc	Psychosocial aspects must be considered in job design Psychosocial aspects of work influence: productivity and health Work design must consider individual, organizational, and systems levels
Motivation for engaging in task redesign (autonomy, meaningfulness in work, etc.)	Various approaches, motivational approach overlaps most with job crafting	

model); (7) organizations can promote job crafting by providing interventions to assist their employees (8) a motivational approach to job redesign could facilitate individuals and organization in the job crafting process.

5 Discussion

Without much notice, organizations across the US have restructured to continue operations while adhering to social distancing and stay-at-home guidelines. Many individuals have had to adapt to a new work environment (online service delivery), work location (remote from home), and changes to their job content (tasks, roles, responsibilities). Organizations across the United States and globally have had to restructure rapidly to create new work environments and structures. Given that these changes rapidly made, and that this pandemic doesn't appear to be going away any time soon, it is postulated that both employees and organizations could benefit from job crafting to increase employee satisfaction and productivity. This bibliometric analysis suggests job crafting and redesign should be considered by employees and organizations, as a positive and proactive tool for navigating the massive, sudden and necessary changes this unfortunate COVID-19 pandemic has created in the world of work, as we formerly knew it.

6 Future Work

While there is an expansive body of literature on job crafting and re-design little attention has yet focused on utilizing job crafting during a major reorganization, especially during a national crisis such as the kind we are experiencing with the

COVID-19 pandemic. More research in this area would be beneficial. A review of previously funded National Science Foundation projects on job crafting and re-design returned very few funded awards (National Science Foundation [21]). It is unclear why more projects have not been funded, especially when the emergence indicators (growth, persistence, and network) described in the introduction section suggest job crafting and re-design is an important topic worthy of consideration. Perhaps the topic has not been heavily examined from an industrial engineering and ergonomics perspective. The related human factors and ergonomics concepts outlined in Table 7 from the Handbook of Human Factors and Ergonomics [23] provide additional support for this topic from the industrial engineering discipline. Most of the related projects that were funded by NSF consider the use of technology in the workplace. The heavy focus of NSF job crafting awards on projects related to technology suggests that a job crafting project related to COVID-19, which also relates to the movement of masses of people to remote, online work may be an emerging area. Future review and analysis to connect the job crafting (re-design) literature to technical changes in the workplace may further the ideas in this current project.

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