Sustainable Crafts: Describing Conceptual Evolution Through a Bibliometric Analysis and Systematic Literature Review

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Sustainability has been progressively incorporated into all dimensions of society as a response to the negative externalities of the traditional production model, and the craft sector has been no stranger to this. Thus, the present work constitutes a bibliometric analysis of 894 research articles from the Scopus database on sustainable crafts in the 21st century, identifying the growth trends, published articles, and the most productive journals, authors, institutions, and countries. Additionally, we have identified the main research topics that have emerged in sustainable crafts in three time periods: before the international financial crisis, the post-crisis period, and, finally, within the 2030 Agenda and the Sustainable Development Goals set out by the United Nations (UN). Based on the bibliometric indicators analysed, we conclude that this research area has grown exponentially, particularly in response to the Sustainable Development Goals, increasing the abundance and diversity of the issues investigated.

Keywords: sustainable crafts, environmental sustainability, social sustainability, scientometrics, literature review

1 INTRODUCTION

Modern society has become increasingly aware of the need to incorporate economic, social, and environmental concerns into a model characterized by globalization, climate change, the depletion of natural resources, and an ageing population, which invite us to modify our current habits. As a result, sustainability has acquired considerable significance in recent years (Nguyen et al., 2021), even more so after the United Nations established its 17 Sustainable Development Goals (United Nations, 2015a).

However, the concept of sustainable development is not so novel and emerged in the early 1970s to protect the environment and ensure development without the associated destruction (Nguyen et al., 2021). It was defined by the World Commission on Environment and Development (WCED) in 1987 as “meeting the needs of the present without compromising the ability of future generations to meet their needs” (WCED, 1987). Subsequently, the United Nations has shown its commitment through Agenda 21 (United Nations, 1992), the Millennium Development Goals (United Nations, 2000), and the recent Sustainable Development Goals (United Nations, 2015).

In addition to the support of supranational institutions, over the last 50 years, several currents of economic-environmental thought have focused on sustainability. One of the first was industrial economics, introduced by Stahel and Reday (1976), which refers to the combination of factors of production for generating products and services destined for the market. Years later, Stahel himself...
introduced the need to evolve from the concept of ownership to that of use, thus limiting the exploitation of natural resources (Stahel, 1982). Then, in 1996, Lyle introduced the notion of regenerative design (Lyle, 1996), which prolonged the useful life of products, making them more sustainable, and in 1997 Benyus began to analyse natural models for this purpose, thus introducing the concept of biomimetics (Benyus, 1997). By the 21st century, the concepts of cradle-to-cradle (McDonough and Braungart, 2010), loop and performance economy (Stahel, 2010), blue economy (Pauli, 2010), and ecology (Commoner, 2020) had already emerged. Moreover, recent years have seen the introduction of the Circular Economy, which figures centrally in a proposed model that considers the balance between technical and biological cycles to favour the conservation of natural resources (Ellen Macarthur Foundation, 2012; Birat, 2015).

However, sustainable development is more than a concern for environmental issues; it is a concern for the longevity of the planet and all its life forms, and, consequently requires a commitment to social equality and democratic and inclusive processes, as well as a concern for the needs of future generations (Ferraro et al., 2011). Therefore, sustainable development encompasses cultural, social, economic, environmental, ethical, and political aspects (Thackara, 2014; Leal-Filho et al., 2015).

The volume of production in the craft sector has gradually decreased over the last century and has been replaced by industrial production. In today's post-industrial era, the artisan has to compete nationally and internationally with products that industrial production. In today's post-industrial era, the artisan has to compete nationally and internationally with products that decreased over the last century and has been replaced by industrial production. In today's post-industrial era, the artisan has to compete nationally and internationally with products that have more sustainable, and in 1997 Benyus began to analyse natural models for this purpose, thus introducing the concept of biomimetics (Benyus, 1997). By the 21st century, the concepts of cradle-to-cradle (McDonough and Braungart, 2010), loop and performance economy (Stahel, 2010), blue economy (Pauli, 2010), and ecology (Commoner, 2020) had already emerged. Moreover, recent years have seen the introduction of the Circular Economy, which figures centrally in a proposed model that considers the balance between technical and biological cycles to favour the conservation of natural resources (Ellen Macarthur Foundation, 2012; Birat, 2015).

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The volume of production in the craft sector has gradually decreased over the last century and has been replaced by industrial production. In today's post-industrial era, the artisan has to compete nationally and internationally with products that appear to have been made by hand, when in fact they are mass-produced (Fillis, 2012). However, in recent decades there has been a resurgence of crafts and artisanal processes (Fox-Miller, 2017), as new markets have emerged, particularly among urban consumers, who have attributed ethical, environmental and sociocultural value to crafts (Wood, 2011). According to Fuller-Love et al. (2006), crafts are a source of creativity and innovation, with a positive impact on the development of the rural economy. This change has reestablished the links with sustainability, creating a context in which both crafts and artisans have become more valued (Zhan and Walker, 2019).

According to these authors, the environmental impact of crafts has traditionally been considered low. On the one hand, the materials used are generally renewable. On the other hand, manual skills and human energy are an important part of the process (Zhan & Walker, 2019). Furthermore, handmade objects often have a long lifespan and their traditional designs give them an appearance of timelessness (Nugraha, 2012). Yair (2010) highlighted the importance of craft materials to ensure appearance of timelessness (Nugraha, 2012). Yair (2010) highlighted the importance of craft materials to ensure longevity of the planet and all its life forms, and, consequently requires a commitment to social equality and democratic and inclusive processes, as well as a concern for the needs of future generations (Ferraro et al., 2011). In this context, our research aims to analyse the degree of development of the concept of sustainable crafts. To this end, we propose the methodology of scientometrics or bibliometric analysis to map the evolution of the concept (Donthu et al., 2021; Kumar et al., 2021) and analyse the degree of current knowledge and future research trends in this area of knowledge. Therefore, we address the following research questions:

Q1. What is the trend of scientific publications on sustainable crafts?
Q2. What are the main thematic areas and the most relevant publications in sustainable crafts?
Q3. Which are the most prolific authors, journals, institutions, and countries in sustainable crafts?
Q4. What are the main Global cooperation networks of authors, institutions, and countries?
Q5. What are the main current and future research topics in sustainable crafts?

2 METHODOLOGY

2.1 Database and Methodology of Bibliometric Analysis

Scientometrics or bibliometric analysis is a technique that mainly aims to identify, organise, and analyse metadata to examine the evolution of an area of knowledge over a specific period (Lievrouw, 1989; Cronin, 2001; Keathley-Herring et al., 2016; Rey-Martí et al., 2016).
For the data, we used the Scopus database. However, the main scientific repositories such as Web Of Science, Scopus, PubMed, and Google Scholar have been consulted, following the recommendations of Harzing and Alakangas (2016) and Mongeon and Paul-Hus (2016). Scopus was selected because 1) it is the repository that contains the largest volume of information in terms of authors, countries, and institutions (Zhang and Eichmann-Kalwara, 2019); 2) it contains the greatest volume of articles and journals that meet the scientific quality requirements of peer review (Ackerson and Chapman, 2003; Mingers and Lipitakis, 2010); 3) although its metrics correlate highly with Web of Science, the coverage provided by the latter is lower (Bakkalbasi et al., 2006; Archambault et al., 2009); and 4) it shows detailed attributes and variables of publications (Nascimento and Rodrigues, 2015). Thus, Scopus has been selected as the most suitable repository for bibliometric reviews (Donthu et al., 2021).

2.2 Methodological Procedure

The bibliometric or scientometric analysis was carried out in three phases (see Figure 1).

First, the search criteria were selected to identify the records in the repository (identification phase). Then, having obtained the records that met the search requirements, the data were exported for analysis using the Vosviewer v.1.6.18 software (analysis and visualisation phase). Finally, the connections and associations between the scientific documents were established, and a discussion was established (results and discussion phase).

2.2.1 Identification Phase

The search for the selected terms was carried out using the fields "article title", "abstract", and "keywords." Accordingly, the search terms used were as follows: (TITLE-ABS-KEY ("craft" or "craft" or "craft practice" or "craft product" or "crafts" or "craft production" or "handcraft" or "handcrafts" or "craft industry" or "craftsmanship") AND TITLE-ABS-KEY ("sustainable" or "sustainability" or "sustainable development") AND (EXCLUDE (PUBYEAR, 2022) OR EXCLUDE (PUBYEAR, 2000) OR EXCLUDE (PUBYEAR, 1999) OR EXCLUDE (PUBYEAR, 1998) OR EXCLUDE (PUBYEAR, 1997) OR EXCLUDE (PUBYEAR, 1996) OR EXCLUDE (PUBYEAR, 1995) OR EXCLUDE (PUBYEAR, 1994) OR EXCLUDE (PUBYEAR, 1993) OR EXCLUDE (PUBYEAR, 1992) OR EXCLUDE (PUBYEAR, 1991) OR EXCLUDE (PUBYEAR, 1990) OR EXCLUDE (PUBYEAR, 1989) OR EXCLUDE (PUBYEAR, 1986)) AND (LIMIT-TO (DOCTYPE, "ar")).

The data were downloaded in January 2022, obtaining 1,537 documents that met the search requirements.

The first filter applied in Scopus was the type of scientific paper. Next, research articles were selected since, according to Paul et al. (2021), these are evaluated based on novelty and undergo a rigorous blind peer-review process, ensuring higher scientific quality. Consequently, we excluded 585 publications that did not meet the search criteria.

The time horizon filter was then applied, selecting 2001–2021. As a result, the total number of documents meeting the search requirements was 894.

2.2.2 Analysis and Visualisation Phase

Additionally, we used Vosviewer v.1.6.18 to generate network maps, which allows us to cluster and process words (Sedighi, 2016; Meseguer-Sánchez et al., 2021a; Gálvez-Sánchez et al., 2021). Consequently, from the sample of articles meeting the search requirements, we analysed the interactions between authors, countries, and the evolution of keywords. This procedure has been widely used in many review studies for visualising co-citations and co-occurrence maps based on keywords (Van Eck and Waltman, 2010; Belmonte-Ureña et al., 2021; Meseguer-Sánchez et al., 2021b). The keyword analysis allowed us to examine the conceptual domains and detect the existing interrelationships.
2.2.3 Results and Discussion Phase
Authors, journals, subject areas, countries, institutions of affiliation, Global cooperation networks, and keywords were analysed. In the case of authors, institutions, and countries, Global cooperation networks have been established based on the analysis of co-authorship. Thus, as the frequency of co-authorship increases, the interrelationship between them intensifies, increasing the conceptual relationship between them. The keyword analysis is based on the co-occurrence method, developed to identify a conceptual and thematic structure. The results show an overview of the most explored research themes in the relationship between crafts and sustainability.

### 3 PUBLICATION TRENDS IN SUSTAINABLE CRAFTS

This section presents the results concerning the main characteristics of the scientific production of sustainable crafts in 2001–2021 (see Table 1). Specifically, the results are presented on the number of published articles, authors, countries, institutions, citations, journals, the average number of citations, and the average number of authors in the research area.

The first publication in sustainable crafts was by Stahel, W. R. in 1986, concerned with optimising the lifespan of craft products (Stahel, 1986). Since then, at least 953 articles have been published in this line of research and are available in the Scopus database. Table 1 shows the significant annual increase in all the scientometric indicators analysed in 2001–2021. This line of research has grown considerably and has acquired a relevant position in the current scientific literature, particularly since 2015.

However, as shown in Figure 2, there are three distinct periods in the evolution of scientific output on sustainable crafts. The first period runs until 2008 when the international financial crisis was declared and is characterised by a practically residual scientific production: a trend that has continued since this line of research began in 1986. The second period begins just after the financial crisis. It covers up to 2015, when there was a slight increase in research, possibly caused by changes in consumer habits resulting from the profound international economic and financial crisis. In fact, for Antal and Van den Bergh (2013), after the global crisis of 2008, "decoupling growth and environmental..."
pressures is the main hope and focus of policy and a large part of the economy,” alluding to the increasing popularity of green growth. Finally, the third period from 2015 onwards has seen exponential growth, possibly triggered by the 2030 Agenda and the 17 Sustainable Development Goals of the United Nations (United Nations, 2015), which seems to have prompted researchers to more readily adopt the guidelines of the international community and apply these to the craft sector.

4 MOST INFLUENTIAL SUBJECT AREAS AND PUBLICATIONS IN SUSTAINABLE CRAFTS

This section describes the results of the main thematic areas of publications on sustainable crafts, along with the most influential articles in this line of research.

Figure 3 shows the distribution of published research articles on sustainable crafts according to the various thematic areas of the Scopus database.

Twenty-five thematic areas were identified concerning this line of research. Social Science is the subject area with the highest volume of scientific papers \( n = 351; 20.53\% \), followed by Environmental Science \( n = 225; 12.84\% \); Business, Management and Accounting \( n = 173; 9.87\% \); Arts and Humanities \( n = 159; 9.08\% \); and Agricultural and Biological Sciences \( n = 150; 8.56\% \). The remaining 39.61% of the publications are distributed across 20 thematic areas, indicating that the research topics in sustainable crafts are widely distributed. Therefore, this line of research is being approached from a multidisciplinary perspective.

Table 2 shows the most relevant publications in this research area according to the number of total citations.

We have found different trends within the most relevant contributions to research on sustainable craftsmanship.

One trend is concerned with the sustainability of the craft sector based on the benefits of sustainable agriculture. Thus, while McCabe (2003) analysed agriculture to overcome the pressures of population growth, Calvo-Iglesias et al. (2006) explored the management of farmers’ knowledge to protect local cultural heritage and promote changes in the landscape.

Pieroni (2008) analysed how botanical taxa contribute to sustainable trade activities based on food, medicines, and craft products, while Schmidt et al. (2007) examined the effects of harvesting on population ecology for craft sustainability. Other research articles address sustainability in the crafts sector from a broader perspective. For example, Wiek and Iwaniec (2014) critically reviewed sustainability criteria and their applications in crafts. Panseara and Sarkar (2016), on the other hand, studied how new craft entrepreneurs are creating innovations that offer solutions to meet unaddressed and ignored consumer needs while achieving higher levels of sustainability, productivity, poverty reduction, and local inclusion. Feng and Chen (2018) also studied the impact of environmental regulation on green innovation in the craft sector.

Finally, the most cited research articles include proposals to protect the property rights of artisan cultural models (Santagata, 2002). Some of these articles also explore the impact of sustainable tourism on the generation of jobs and wealth in local communities (Mbaiwa, 2011) and the development of new concepts such as direct manufacturing resulting from the combination of artisanal production, mass production, and mass customisation (Chen et al., 2015).
5 MAJOR CONTRIBUTIONS AND GLOBAL COOPERATION NETWORKS

This section presents the productivity results of authors, institutions, countries, journals, and their Global cooperation networks. Global cooperation networks provide insight into the relationships between researchers and the dissemination of knowledge (Chen, 2006), while collaborations enable new high-impact research by generating synergies that contribute to exchanging ideas (Acedo et al., 2006). In the international cooperation maps, the size of the circles indicates the number of published scientific papers, the colours indicate the clusters of cooperation, and the distance refers to the frequency of co-authored publications. Table 3 shows the ten most productive authors in sustainable crafts in 2001–2021 and their main characteristics.

Bernal, R. and Galeano, G., both of Colombian origin, are the most productive authors, with six published research articles, five of which have been co-authored. In addition, all the articles published by the other Colombian author in this line of research, García, N., were co-authored with his compatriots. The same is true of the British authors Walker, S. and Zhan, X., who have co-authored all their publications in this line of research.

Bernal, R., and Walker, S. are the two authors with the greatest dissemination of their research outcomes (37 and 34 total citations, respectively), the latter having the highest average number of citations per article (8.5). The low number of citations, respectively), the latter having the highest average citations per article (8.5). The low number of citations, respectively), the latter having the highest average citations per article (8.5).

Figure 4 shows the global cooperation networks of the co-authors in sustainable crafts. For 2,394 authors, co-authorship on a minimum of two published articles was selected. A total of 132 authors were obtained, of which 36 form the eight clusters of international cooperation in sustainable crafts.

Table 4 shows the ranking of the 10 most productive institutions and their international cooperation results in the period 2001–2021 in the research line of sustainable crafts.

The most productive institutions are the American Arizona State University and the British Oslo Metropolitan University (both with eight research articles). The American institution has the highest citation volume and average number of citations per
article (186 and 23.25, respectively). However, Lancaster University and The University of British Colombia achieve the highest H index in the research area (both with H index = 5).

Regarding the research outcomes of global networks, only the National University of Colombia publishes more articles from international collaborations than domestic co-authors (CI = 57.1%). In contrast, the Arizona State University and the Chinese Academy of Sciences published the same number of articles with international co-authors as those with domestic co-authors. At the other extreme are the two African institutions that have not published any articles with other international co-authors in this line of research. These findings suggest that the average number of citations is higher for articles published with domestic co-authors in 70% of the institutions, except for the Universidad Nacional de Colombia, Universidade de São Paulo, and the University of Waterloo.

Figure 5 shows the global cooperation networks of the institutions in sustainable crafts research. For 1,685 identified institutions, an interaction of at least two published research articles was selected, and 19 international institutions were identified.

There is a lack of connections between the institutions identified, indicating no Global cooperation network between the institutions working in this research area.

Concerning the most productive countries and their cooperative research results, Table 5 presents the top 10 in sustainable crafts in 2001–2021.
TABLE 5 | Top 10 most productive countries in sustainable crafts and their cooperative networks. Source: Authors’ own.

| Country          | A  | TC    | TC/A  | H index | NC | Main collaborators                                                                 | CI (%) | TC/A  |
|------------------|----|-------|-------|---------|----|------------------------------------------------------------------------------------|--------|-------|
| United States    | 154| 2,786 | 18.09 | 20      | 37 | The United Kingdom, Brazil, Canada, China, India                                     | 27.9   | 14.47 |
| United Kingdom   | 92 | 1,168 | 12.70 | 18      | 34 | The United States, Australia, Netherlands, South Africa, Belgium                   | 39.1   | 9.05  |
| India            | 72 | 400   | 5.56  | 12      | 10 | The United States, Australia, Netherlands, Romania, Saudi Arabia                  | 12.5   | 7.11  |
| China            | 66 | 866   | 13.12 | 18      | 11 | Japan, The United States, Australia, Egypt, Macao                                  | 24.2   | 5.31  |
| Brazil           | 48 | 496   | 10.33 | 11      | 11 | The United States, Canada, Germany, Portugal, The United Kingdom                  | 27.1   | 7.11  |
| South Africa     | 43 | 361   | 8.40  | 11      | 22 | The United States, Canada, Kenya, Sweden, The United States                        | 27.9   | 5.65  |
| Italy            | 26 | 461   | 13.17 | 10      | 11 | The United States, Spain, Chile, Colombia, France                                 | 22.9   | 13.74 |
| Australia        | 34 | 444   | 13.06 | 8       | 18 | The United States, China, Germany, The United States, Canada                      | 50.0   | 4.53  |
| Canada           | 30 | 334   | 11.13 | 10      | 17 | The United States, Brazil, New Zealand, South Africa, The United Kingdom           | 50.0   | 9.40  |
| Germany          | 28 | 915   | 32.68 | 12      | 19 | France, Australia, Brazil, Netherlands, The United Kingdom                         | 53.6   | 39.62 |

(A): number of articles published (TC): total citations; (TC/A): average citations per article; (H index): Hirst index in the research area; (CI): cooperative index; (TC/A CI): average number of citations from international cooperation; (TC/A NIC): average number of citations without international cooperation.

FIGURE 6 | Global cooperation network of countries in sustainable crafts. Source: Authors’ own.

The United States and the United Kingdom are the most productive countries in sustainable crafts research, with 154 and 92 published articles. At the same time, these countries have also achieved the highest dissemination of their research results, with 2,786 and 1,168 total citations, respectively. Moreover, together with China, they are the countries with the highest H index in the research area (20 and 18 respectively). Despite this, Germany is ranked in the top 3 for total citations (915), making it the country with the highest average number of citations per article (32.68).

In terms of international cooperation results, the United States and the United Kingdom have the highest number of international contributors (37 and 34 respectively). However, most of their articles are published by domestic co-authors. Only Germany has cooperation rates above 50% (CI = 53.6%), while Canada and Australia have an international cooperation rate of 50%.

Figure 6 shows the Global cooperation networks of countries working in sustainable crafts for 2001–2021. For the 108 countries identified, analysis of at least six published research articles resulted in seven Global cooperation networks consisting of 37 countries. The high number of countries, together with the high level of interaction, indicates that a stable and extensive Global cooperation network on sustainable crafts exists at the international level.

Finally, Table 6 shows the ten most productive journals in sustainable crafts and their main characteristics in 2001–2021.

Sustainability Switzerland is the most productive journal in sustainable crafts, with 35 publications, followed by Design Journal and Craft Research (15 and 14 respectively). However, the Journal of Cleaner Production, with only 12 publications, has achieved the greatest dissemination of research results, with a total of 449 citations. These numbers indicate that this journal has the highest average number of citations (37.42) and, therefore, the one with the highest H index in the research area (9), followed by the two most productive journals (Sustainability Switzerland and Design Journal).

6 CURRENT AND FUTURE RESEARCH TOPICS IN SUSTAINABLE CRAFTS

This section presents the results of the analysis of the keywords, which are representative of the content (Comerio and Strozzi, 2019) in scientific papers on sustainable crafts up to 2021. Furthermore, this analysis allows for visualising the evolution of these research works throughout time (Fang et al., 2018), creating a picture of the line of research (Ding et al., 2001). Accordingly, co-occurrence is based on records sharing the same keywords are similar (Kessler, 1963; Weinberg, 1974). For this purpose, we used the VosWiever tool, which, according to Park and Nagy (2018), develops the keyword matrix based on extraction and frequency calculation.

Accordingly, the keyword analysis is organised according to the three time periods shown in Figure 2.

6.1 Introduction of the Concept of Sustainable Crafts (2001–2007)

For a total of 71 research articles published in this period, only 17 keywords were identified, among which there is no co-occurrence. This finding indicates that in these 7 years, in addition to the few articles published, these works are
unconnected. Consequently, there are no research topics that have been studied in depth.

### 6.2 Sustainable Crafts in the Aftermath of the International Financial Crisis (2008–2014)

For 221 research articles published in this period, 1,424 keywords were identified. Following the analysis of at least three co-occurrences, 78 keywords were obtained. After a filtering process that eliminated keywords incorporated in the search and others unrelated to the research (thus avoiding erroneous conclusion), the final number of keywords represented in Figure 8 is 42, divided into five clusters (Figure 7).

#### 6.2.1 Ecotourism and Sustainable Fishing

Significant contributions have been made to the issue of ecotourism during this period. Thus, Mbaiwa (2011) studied the potential of using sustainable tourism as a tool for the economic sustainability of disadvantaged populations, while García-Rosell and Mäkinen (2013) proposed a stakeholder-based ecotourism evaluation model. In addition, Godratollah et al. (2011) put forward a methodological proposal that includes social, ecological, cultural, economic, and institutional indicators for ensuring tourism sustainability.
In terms of sustainable fisheries, the main contributions were those of Ross et al. (2008), who developed a technology transfer programme to implement small-scale farming to ensure the sustainability of the Mexican silverside Menidia estor and protect the livelihood of farmers. In addition, Cillari et al. (2012) proposed the use of bottom longlining to ensure the sustainability and recovery of artisanal fisheries in the Strait of Sicily.

### 6.2.2 Resource Management
Zhang et al. (2010) were the first to propose a waste exchange model to improve energy efficiency and reduce the fossil fuel dependence of the craft sector, while Kabongo and Boiral (2011) created a model for the management of waste materials, proposing up to five types of waste recovery. da Silva Viera et al. (2010) focused on reincorporation into the production cycle, proposing the reuse of sawmill waste as raw material for the design of small wood products, thus ensuring the economic and social sustainability of disadvantaged populations.

Important contributions have also been made to the management of forest resources. For example, Bruschi et al. (2014) analysed the negative externalities of the production model and called for caution regarding the overexploitation and destructive harvesting of woody species to ensure their sustainability. Pieroni (2008) discussed how botanical taxa contribute to the development of sustainable trade activities based on food, medicine, and handicraft products. Moreover, Dovie et al. (2008) found that groups with greater botanical knowledge implement resource selection and apply habits oriented towards prioritisation, planning, and conservation monitoring.

### 6.2.3 Environmental Performance: Water Management
Important contributions have emerged in the governance of water management. For example, Kuzdas and Wiek (2014) studied various governance styles in water management in response to the impact of climate change, while Jaglin et al. (2011) argue that these measures should be based on workable co-production arrangements between local governments and other actors, underpinned by coherent coordination and regulatory mechanisms.

Moreover, contributions from the management of the cultural heritage of water emerged in this period. For example, Rugani et al. (2011) found that, in the Italian city of Siena, aside from achieving better environmental outcomes than other contemporary management systems, conservation of its network of underground galleries was essential to the cultural heritage of the city. In addition, Stuuds and Miller (2010) proposed solutions for the reuse of dredged sediment materials to ensure the future viability of the waterway.

### 6.2.4 Forest Sustainability Management
In this cluster, the contributions are concerned with the management of forest resources. Thus, da Silva Viera et al. (2010) found that the reuse of forest residues contributed to the generation of new products, whose commercialisation also had important social and economic implications for the community. In addition, Bruschi et al. (2014) suggested a model that includes the participation of local communities in the forest management of woody species to avoid deforestation and overexploitation. Furthermore, Glover and Elsiddig (2012) suggested the design of integrated policies for sustainable forest management based on partnerships with local communities and the promotion of property rights, while for Camacho et al. (2012), the experiences derived from the management of natural forest resource systems vary according to local cultures, beliefs, and traditions. Finally, in this period, Barzekar et al. (2011) proposed a set of multidisciplinary indicators for monitoring ecotourism in forests.

### 6.2.5 Knowledge Management for Sustainability
Finally, the smallest cluster includes some contributions toward knowledge management to achieve sustainability in the artisanal sector. The main works are those of Gavronski et al. (2012), who established the relationship between knowledge management and the social climate of the plant to ensure sustainability in operations. In addition, Kabongo and Boiral (2011) proposed an analytical framework for managing waste material recovery practices, while Griffiths (2012) concluded that environmental quality standards contribute to developing new, more sustainable manufacturing technologies.

### 6.3 Sustainable Crafts in the Framework of the 2030 Agenda and the 17 SDGs (2015–2021)
From 602 research articles published in this period, 2,622 keywords were identified. After analysing at least five co-occurrences, 80 keywords were obtained. After further filtering, the final number of keywords represented in Figure 8 is 43, grouped around 4 clusters.

#### 6.3.1 Local Sustainability
An important part of the search for sustainability in the craft sector has been based on local impact. The latter constitutes the main axis of the sustainable development of traditional crafts, as their end products have dual artistic and economic characteristics (Fan and Feng, 2019). Chen et al. (2015) established different manufacturing paradigms ranging from handicrafting to mass production with the industrial revolution, finding that artisans often produced various products. Still, the products shared similarities in their production methods, although sometimes their marketability was limited to the local community Chen et al. (2015).

Along these lines, some authors have analysed how craft brewers are clear indicators of urban renewal and economic development of territories (Gatrell et al., 2018), while souvenir shops selling artisanal products tell local and ‘real’ stories and are therefore more accepted by tourists than mass-produced souvenirs, even if the latter are often cheaper (Anastasiadou and Vettese, 2019). Consequently, in the face of increasing tourism, the craft sector contributes to the economic sustainability of local regions more than the industrial sector (Olya et al., 2018). Therefore, the conservation and sustainable
management of natural resources require the involvement of all stakeholders, including local communities (Gosling et al., 2017). Additionally, the artisanal sector must be oriented towards green innovation, defined by Feng and Chen (2018) as the application of production technology and equipment in the artisanal production process, while highlighting the need to incorporate aspects of environmental regulation to transition towards a green artisanal economy.

6.3.2 Cultural Heritage Management
Chi et al. (2020) conclude that rural crafts and local cultures are the main attractions for visitors to rural destinations. Therefore, these authors emphasize the importance of protecting and promoting local culture and heritage to maintain and develop tourism in such areas. Furthermore, the handicraft sector is one of the key factors for sustainable tourism development (Olya et al., 2018). In this sense, proper heritage management of the sector contributes to people learning, protecting, and enhancing traditional crafts while achieving sustainable management and efficient use of resources (Li et al., 2019). In this context, Pallarès-Blanch et al. (2015) point out that craft activities with high added value are more closely aligned with sustainable principles.

From the perspective of ecotourism, guided itineraries allow for a better understanding of the community and its potential, favouring its conservation and the community’s economic development (Gosling et al., 2017). Two major sectors contribute to ecotourism from the standpoint of heritage management: craft breweries, which help to conserve and restore cultural heritage buildings (Feeney, 2017); and craft food shops, which carry the nostalgia of a rural past, satisfying the imagination and needs of visitors, contributing to the sustainability of the tourist destination (Guan et al., 2019).

6.3.3 Resource Management
In terms of resource management in this period, Huang (2015) was the first to propose applying circular economy models to the craft sector, while Bozkurt and Lara-Cohen (2019) highlighted the importance of repair work in developing environmentally sustainable societies. In addition, Pao et al. (2015) emphasized the need to encourage renewable energy development, and Mustafa et al. (2015) drew on natural resource management to enhance ecotourism and local artisan products.

The management of natural plant resources provides people with food, fuel, medicines, and materials for construction and manufacturing handicrafts and many other products. For example, for Schösler and de Boer (2018), food has become a key aspect of achieving sustainability goals. Accordingly, Sperandio et al. (2017) have provided technical solutions for the valorisation and reuse of brewery waste, while Hannibal and Kauppi (2019) assess the social sustainability of supply chains, considering that information asymmetries can lead to uncertainty about the production and marketing of goods.

Resource management provides the artisanal sector with social, environmental, and economic benefits, and it also contributes to preserving cultural identity and the livelihoods of local communities (Maroyi, 2017).

6.3.4 Social Sustainability
A thorough understanding of livelihoods is necessary to ensure that development policies are compatible with resource conservation and social and economic development goals, i.e., sustainability (Simard et al., 2019).

In the search for social sustainability, authors have mainly paid attention to sustainable agriculture. For example, according to Schösler and de Boer (2018), food is a central focus for achieving sustainability objectives, and these authors consider the need to adopt more reflective practices that can incorporate the sustainability dimension. For Maroyi (2017), knowledge about plant species, particularly in developing countries, provides people with food, fuel, medicines, and materials for construction and the manufacture of handicrafts. Similarly,
Schnitzer et al. (2016) developed and tested a sustainable livelihood model consistent with environmental protection in handicraft villages in rural areas, based on different techniques and integrated components, including handicraft production. However, some authors have paid attention to other issues. For example, the supply chain is of particular importance in labour-intensive industries such as handicrafts (Hannibal and Kauppi, 2019). In addition, Laitala et al. (2018) focused on fashion to show how repair, redesign, and modification are real alternatives for prolonging the usage life of clothing, correlating positively with the environmental and social benefits perceived by consumers.

Finally, the keywords from this period are ordered from darkest to lightest colour, thus showing future research trends in the craft sector (Figure 9).

Future research trends in sustainable crafts mainly focus on the potential of heritage management, knowledge, and promotion of the craft sector’s values, traditions, and fundamentals for achieving social, economic, and environmental sustainability.

7 DISCUSSION AND CONCLUSION

This article employed scientometric methodology to address the conceptual development of sustainable crafts in the period 2001–2021. To achieve this objective, we conducted a bibliometric review of 894 research articles available in the Scopus database for the selected period, generating four main conclusions:

C1. The main characteristics of the research area indicate strong growth in the concept of sustainable craftsmanship in the 21st century and, consequently, an increased level of interest from the research community. The large number and weighting of thematic areas presented in Figure 3 suggest a high degree of multidisciplinarity in this area of knowledge. In addition, three distinct periods have been detected, with the period following the declaration of the 2030 Agenda leading to exponential quantitative and qualitative growth in this research area.

C2. The most prolific authors in sustainable crafts have been the Colombian authors Bernal, R. and Galeano, G., while Arizona State University is the most productive institution. The United States is the most prolific country, while the most productive journal is Sustainability Switzerland.

C3. A low degree of international cooperation has been detected, particularly at author and institution levels. However, countries—although showing particularly low output—have significantly larger and more consistent Global cooperation networks.

C4. Multiple research themes have been identified. While in the period 2001–2007, relatively few research articles were published, and these had low interrelation and no particular topic of interest, after the international financial crisis, the following topics were identified: ecotourism and sustainable fisheries; resource management; environmental performance: water management; forest sustainability management; and knowledge management to achieve sustainability. However, the period 2015–2021 saw exponential growth, with four major emerging research themes: local sustainability, cultural heritage management; resource management; and social sustainability. Consequently, we detected a gradual increase in the keywords resulting from the research articles published in each of the three periods analysed and a quantitative and qualitative increase in the research topics, particularly after the United Nations published the 2030 Agenda and the Sustainable Development Goals in 2015. From this perspective, the main research trends in the foreseeable future will focus on the potential of heritage management, knowledge, and the promotion of the sustainable craft sector’s values, traditions, and foundations.

Thus, the present work makes a novel and innovative contribution to this research area. Specifically, we have...
provided a holistic view of crafts through the lens of sustainability, following the recommendations of Väänänen et al. (2017), finding a great growth in scientific production in this research field after the 17 SDGs. This increase has caused new concerns to arise in the artisan sector, which is adopting a comprehensive vision of sustainability. Consequently, our conclusion extend the considerations of Fröcklin et al. (2018) and Oyekunle and Sirayi (2018), finding social, environmental, economic and cultural applications in the concept of sustainable crafts. However, we have not found any research work that addresses the influence of sustainable crafts on the Sustainable Development Goals, so we propose that future research addresses the impact of the sustainable actions of the crafts sector on the various SDGs.

As a result, we conclude that the craft sector has responded to the challenges posed by sustainability. A very relevant aspect of the artisan sector has traditionally been its contribution to local development. While Yang et al. (2018), Oyekunle and Sirayi (2018) and Zhan and Walker (2019) detected the productive and recovery value and asset management of the sector, our findings extend to the consideration of sustainable craftsmanship that has been the engine of the development of productive sectors auxiliary, such as tourism, thus causing strong professional development and employment growth, especially in rural areas. At the same time, this concern for management has contributed to a greater awareness of environmental issues, giving rise to a more sustainable social and environmental management model. Thus, traditional crafts have adapted to the challenges posed by the major international financial crisis, proposing sustainable solutions and alternatives to the unbridled consumption habits characteristic of industrial production. However, it is consumers who, through their purchasing decisions, ultimately determine the preservation of the sector. Therefore, we propose research studies that analyse the meaning of sustainability for consumers and how this can be incorporated into the brand image of artisan products.

A very relevant theme of sustainable crafts is concern for the environment. Our findings extend the considerations of Zhan and Walker (2019), finding that sustainable crafts is, at least in its concept, a clean production model that already has instruments to apply the operating bases of the circular economy. Consequently, we have verified that solutions have been proposed for the correct management of natural resources, as well as for recycling, the recovery of waste and its reincorporation into the supply chain. However, there are still margins for improvement in sustainable crafts in the environmental dimension, especially linked to the development of indicators to measure the circularity of the craft production process, for which we propose the development of lines of research that contribute to the development of indicators that help the craft sector to continue moving towards a cleaner production model.

For all these reasons, we conclude that after the Sustainable Development Goals, sustainable crafts have experienced strong growth in their concern for social, economic and environmental sustainability, becoming a productive model that respects the environment, generating growth and economic development.

local, which coincides with the findings of Väänänen and Pöllänen (2020).

Consequently, our findings could be useful for policymakers since we provide a scientific basis for the impact of the craft sector on environmental, social, and economic sustainability. As a result, policymakers could implement mechanisms to ensure and promote the values and survival of traditional crafts. In addition, our findings could be valuable for the artisans themselves and their representative institutions by demonstrating examples of good sustainable development practices to enhance sustainability at the local level. Finally, our results could also help researchers, as we provide data that could underpin their future hypotheses concerning the trajectory of the existing discussion on sustainable crafts.

Finally, we should note that this study has certain limitations that should be considered for future research. The database used was Scopus, so we propose considering other repositories such as Google Scholar or Web of Science. In addition, we have only considered research articles in this review. Thus, in future work, we consider it worthwhile to incorporate a greater diversity of research documents, such as book chapters or conference papers, which could complement the information obtained. Moreover, the computer tool used for data visualisation and clustering was VosWievier, and so using other software could also provide slightly different or complementary results. Finally, the bibliometric analysis methodology does not consider that citations require time to be analysed. Thus, content analysis could provide a complementary method for evaluating research in the future (Hughes, 2011).

**DATA AVAILABILITY STATEMENT**

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

**AUTHOR CONTRIBUTIONS**

Conceptualization, MP-P, FG-S, and AG-L; methodology, MP-P, and FG-S; formal analysis, MP-P, and FG-S; writing—preparation of the original draft, MP-P, FG-S, and VM-M; Writing—Proofreading, and Editing, MP-P, FG-S, AG-L, and VM-M; supervision, AG-L, and VM-M; acquisition of funds, AG-L, and VM-M. All authors have read and accepted the published version of the manuscript.

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