


MAPPING URBAN DESIGN LITERATURE: A NETWORK-BASED APPROACH

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The aim of this paper was to analyze and connect the existing literature on urban design. The use of mapping methodologies from a network-based approach made it possible to chronologically identify the most relevant authors from a literature review on urban design and their contributions, establishing points of theoretical connection. The main result of this analysis was the construction of three proposed approaches: i) an environmental and ecological approach, including for example research about the third landscape, the healthy city or ecosystemic urbanism; ii) a technological approach with Industry 4.0 and iii) a participatory and gender perspective approach.

Key words: urban design, network analysis, ecology, gender, industry 4.0.

INTRODUCTION

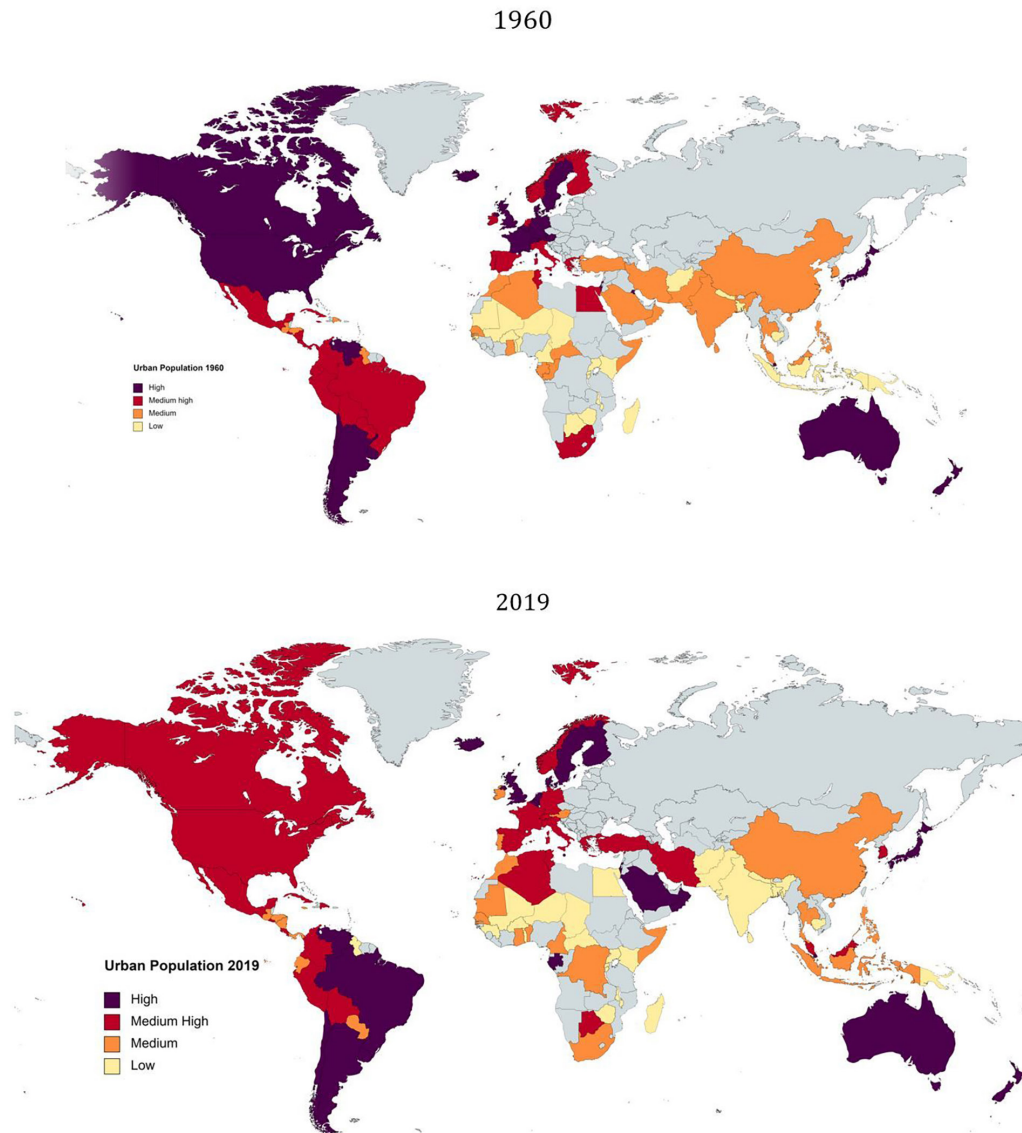
The importance of urban design can be seen in the continuous contributions that have been made to it in recent decades. Social, ecological, and technological evolutions and environmental problems are related to the factors that define the design of the built environment, involving both new interventions and the rehabilitation and regeneration of the existing built environment. Analyses related to previous theories on urban design enable the transmission of ideas and exchange of knowledge that advances the design of cities.

The main theoretical and urban design assumptions of the 20th century include the principles of the garden city and the industrial city as examples of the “top down approach” to planning, the Athens charter, “progressive urbanism” and “modernist planning” (Choay, 1965) and a participatory and advocacy planning approach from the 1960s. Theories and practices framed between the tuberculosis pandemic in the early twentieth-century and the two world wars led to the search for alternatives through the principles of rationalism or the Modern Movement in architecture and urban design developed around the world (Colomina, 2019). These principles were adopted by urban planners for the reconstruction of Europe after the Second World War.

This movement also fostered the advance of theory and the development of associated congresses for debate through the “Congrès International d'Architecture Moderne” (1928-1959) and the subsequent split and spontaneous creation of Team X (1961-1981) with “The Doorn Manifesto”.

Urban population movements in the last fifty years frame urban design approaches. As seen in Figure 1, there have been transitions from lower population levels in urban settings in 1960 to higher levels in 2019, such as in Gabon, Oman and Saudi Arabia. Other countries have made a reverse transition from high levels in 1960 to low levels in 2019, e.g., in Austria and Egypt. Still other countries that had high population levels in 1960 remained constant in 2019, e.g., Australia, Argentina, Belgium, Denmark, and others. According to UN Goal 11 (UN, 2015), which refers to “making cities more inclusive, safe, resilient and sustainable”, and considering the gradual shift in residence of the human population from rural to urban areas, since 2007, more than half of the world's population lives in cities, and this is expected to increase to 68% by 2050. Urban design is pertinent in relationship with migration but it also includes agriculture robotization and the climate crisis, bearing in mind how rural, remote, desert and wilderness territories make up 98% of the earth's surface (Koolhaas and AMO, 2020). However, cities and metropolitan areas also account for about 70% of global carbon emissions, and they use more than 60% of resources. Moreover, rapid urbanization is most devastating in informal settlements and slums

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*Figure 1. Percentage of urban populations in 1960 and 2019
(Source: World Bank data 1960-2019 and authors' own elaboration)*

globally. Furthermore, in many cities, air pollution has become an unavoidable health hazard for both human and natural ecosystems (Figure 1).

Additionally, UN goal 5 (UN, 2015) to “achieve gender equality and empower all women and girls” is crucial in urban design. Women and girls continue to be subjected to harmful practices that profoundly affect their lives. They are too often denied decision-making power and participation. There are also insufficient laws and policies in the frameworks and spheres of public life that protect their rights. These objectives drive the need to cooperate in the collaborative, multidisciplinary and multicultural design of both rural and urban built environments from a gender-based perspective.

The aim of this paper is to analyze and connect existing literature on urban design and to make new contributions to the field. Attention is paid to making associations between authors, years and concepts, in order to shed some light on the complexity of this discipline. The methodological

proposal to achieve the objective is based on network analysis or mapping methodology. This proposal has been used in different disciplines such as biology, economics, urban planning and architecture. The research carried out in this paper could be oriented as a pedagogical tool for students and researchers in the fields of architecture and urban planning and for people with an interest in these disciplines.

The paper is organized as follows: the methodology is presented in the next section. After that, the section deals with the review of the literature on urban design, in particular proposals by Ellin (1999), Cuthbert (2007b) and Foroughmand Araabi (2014, 2016, 2017). In the case of the latter two authors, theoretical connections are made between both. Then, a new contribution is made, based on three approaches to theories associated with the literature. In doing so, special attention is paid to multidisciplinary in this field, which is an important requirement for different knowledge and key concepts that need to be considered.

Finally, the penultimate section enounces the results and discussion and final section presents the main conclusions.

METHODOLOGY

According to Fortunato and Hric (2016) the science of network analysis is a modern discipline that has a wide range of uses, for example, in natural, social, computer and engineering sciences, as well as in the built environment (Hillier and Hanson, 1984) and politics. Basically, networks are made up of edges that connect vertices or nodes. The formation of communities (network clustering) and their structure within the network, as well as the representativeness and importance of the actors (unit of analysis) are usually the objectives pursued. The centrality measures used are based on the researchers’ decisions and the literature, and they allow the connections to be interpreted. Network analysis is a powerful visual tool, which provides information about relationships in complex systems. Its basic interpretation is as follows: starting from a subgraph C of a graph G, the number of nodes and edges are “n” and “m” for G, and “nc” and “mc” for C. The adjacency matrix of G is A, and its elements “A_{ij}” are equal to 1 if nodes i and j are neighbours, otherwise they have the value 0. The type of structure is assumed; for more detail, see Fortunato and Hric (2016).

Returning to the chosen centrality measures, the following measures were chosen: degree centrality, betweenness centrality, and modularity class. The degree *d* measure reported on the connection and representativeness of a node with respect to other nodes. The calculation of the degree value is shown in equation 1

$$d_i = \sum_{j \neq i} A_{ij} \tag{1}$$

where *d_i* is the degree node *i* and *A_{ij}* is the adjacency matrix. The betweenness centrality measure is the number of times a node acts as a bridge on the shortest path between two other nodes. The calculation of the Betweenness B(v) is shown in equation 2

$$B(v) = \sum_{s \neq v \neq t \in V} \frac{\sigma_{st}(v)}{\sigma_{st}} \tag{2}$$

where σ_{st} is the total amount of shortest paths from node *s* to node *t* and $\sigma_{st}(v)$ is the quantity of those paths that pass through *v*.

According to Newman (2006) there are different ways of defining the concept of modularity. In this sense, modularity Mc is defined as the section of edges that fall within two groups (e.g., group 1 or 2), minus the probable sum of edges within groups 1 and 2 for a random graph with the same node degree dispersal as the given network. The calculation of the modularity class is shown in equation 3

$$Mc = \frac{1}{2m} \sum_{vw} [A_{vw} - \frac{k_v k_w}{2m}] \frac{s_v s_w + 1}{2} \tag{3}$$

where *v* and *w* are the nodes with node degrees *k_v*, *k_w* and membership *s_v* and *s_w* respectively from a random network. *A_{vw}* is the adjacency matrix of nodes *v* and *w*. Finally, *m* is the total number of stubs in the network.

The free software Gephi was used because of its visual power (Force Atlas visualization algorithms were used for network definition and Louvain for modularity optimization). In relation to the concept of modularity, community is considered to be the empirically discovered relationships between the different elements of the network, according to Scott (1991). The structure of the databases was carried out by forming columns relating authors to years, authors to each other, and authors to the chosen topic. Subsequently, the choice of adjacency matrix format and the adjustment parameters in Gephi allowed the visualization and interpretation of each analysis network.

LITERATURE REVIEW

The information gathering process follows the phases mentioned by Larrán and Andrades (2017):

- search for relevant studies in urban design using urban design, urban development, social space, and spatial representations as some of the key words;
- screening of studies by analyzing their titles, abstracts and full texts;
- extracting information, by means of in-depth analysis of the papers, in order to control the quality; and
- forming different databases (authors, years, concepts), according to the selection of works identified.

Two analyses of previous literature reviews of great depth and temporal breadth were considered. The first is by Ellin (1999), perhaps one of the most extensive existing reviews, together with those of the urban design reader (Larice and Macdonald, 2012) and the city reader (LeGates and Stout, 2020) included in Figure 4. Attention was paid to the list of authors and their chronology, then those by Cuthbert (2007b) and Foroughmand Araabi (2016). In this case, the typologies proposed by these authors were compared.

Ellin (1999)

As a preliminary step, Figure 2 shows the word cloud that identifies the importance of the authors (left-hand side) and years (right-hand side) in the review carried out by Ellin (1999). In relation to the authors, Alexander, Lefebvre,



Figure 2. Word cloud authors and years Ellin (1999) review (Source: Ellin (1999) and authors’ own elaboration)

and Jencks are the most represented, with six contributions followed by Lynch with five and Rossi with four. The years, 1969, 1965 or 1964 are the most represented (Figure 2).

Table 1 and Figure 3 show a network analysis which, firstly, confirms what has already been presented in Figure 2, and secondly, allows the nodes (authors and years) to be connected. In terms of the degree measure, which provides information about the importance of the nodes in the network, the brown and green nodes show the authors and years respectively. In relation to the authors, Alexander and Lefebvre have been present in the literature on urban design for many years. In particular, Alexander’s research is related to 1964, 1965, 1975, 1977, 1979 and 1987 and Lefebvre’s philosophy is shown in 1967, 1968, 1970, 1972, 1974 and 1991, which implies that they have a relevant representativeness, as the edge connections show.

In addition to Figure 3, Table 1 provides information on the values of the metrics used by the Gephi software, which enables further analysis (Table 1).

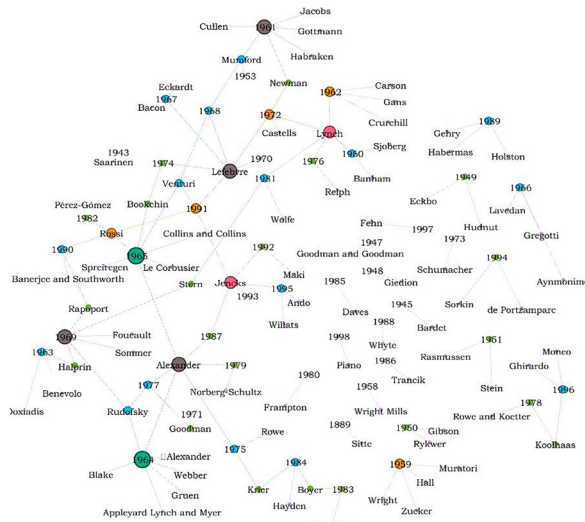


Figure 3. Network from Ellin’s (1999) literature review (Source: Ellin (1999) and own elaboration)

Table 1. Values of network centrality measures from Ellin’s (1999) literature review (Source: own elaboration based on Ellin 1999)

Authors	Degree	Betweenness	Closeness
Alexander	6	1162.91	0.247
Lefebvre	6	856.99	0.238
Jencks	5	526.19	0.235
Lynch	5	821.01	0.213
Rossi	4	450.21	0.252
Mumford	3	285.59	0.194
Rudofsky	3	447.80	0.218
Venturi and Scott Brown	3	426.81	0.244
Bookchin	2	99.04	0.223
Boyer	2	152.00	0.133
Goodman	2	77.00	0.186
Halprin	2	225.00	0.182
Koolhaas and AMO	2	6.00	0.625
Krier	2	365.00	0.175
Newman	2	168.17	0.189
Rapoport	2	143.17	0.206
Stern	2	383.13	0.207

The degree value (Table 1) corroborates the representativeness mentioned above. The measure betweenness centrality (Table 1) refers to the importance of the extent to which a link node between other nodes in the network is relevant. This allows the connection/disconnection of other nodes in the network. Lefebvre, Lynch and especially Alexander have the highest values.

The closeness centrality measure is based on the idea that nodes with a short distance can propagate information quickly through the network. The highest values relate to Rossi, Alexander Ishikawa and Silverstein, Venturi and Scott Brown.

Proposals by Cuthbert (2007b) and Foroughmand Araabi (2014, 2016, 2017)

Figure 4 shows the network analysis, authors, year and research topic collected jointly by Cuthbert (2007b) and Foroughmand Araabi (2014, 2016, 2017). Cuthbert’s (2007b) review and analysis are based on 40 selected contributions over the last 50 years of urban design. Foroughmand Araabi (2016) mentions the main contributions addressed by some universities in the USA, United Kingdom and Australia, and also, by those that these universities use in common. The metric called “modularity class” is used in this network to provide information about the structure of the network in modules or groups/clusters. These clusters with high modularity imply that they have dense connections between nodes of different modules. The limits of modularity are compromised when detecting small communities or clusters.

There are 27 communities or clusters. Cluster#1 with magenta nodes is the one with the highest modularity, as shown in Table 2, referring only to the authors’ nodes. It is followed by cluster#2 in green, cluster#3 in blue, and cluster#4 in brown. Figure 5 is a detail of the mentioned clusters. As can be seen, cluster #1 is made up of Gehl’s contributions with the research “Life between Buildings” and “Cities for People” published in 2010 and 1971, whose thematic denomination would be “social”. Cluster #2 can be framed within “vernacular and critical regionalism” studies. Cluster #3 can be identified with “mathematical and compositional analysis”. Finally, cluster #4 can be outlined with “perception of the urban environment”. Clusters #1 and #4 can be grouped within “humanising urban space”, while clusters #2 and #3 are framed within “searching and generation of patterns” (Figure 5).

In addition, Table 2 reports the measures of Degree, Betweenness and Closeness in relation to the overall network in Figure 4. Gehl, Alexander and Lynch’s highest BC or Kostof, Halprin and Rudofsky’s highest CC are analogous to how the network was previously analyzed in Ellin’s 1999

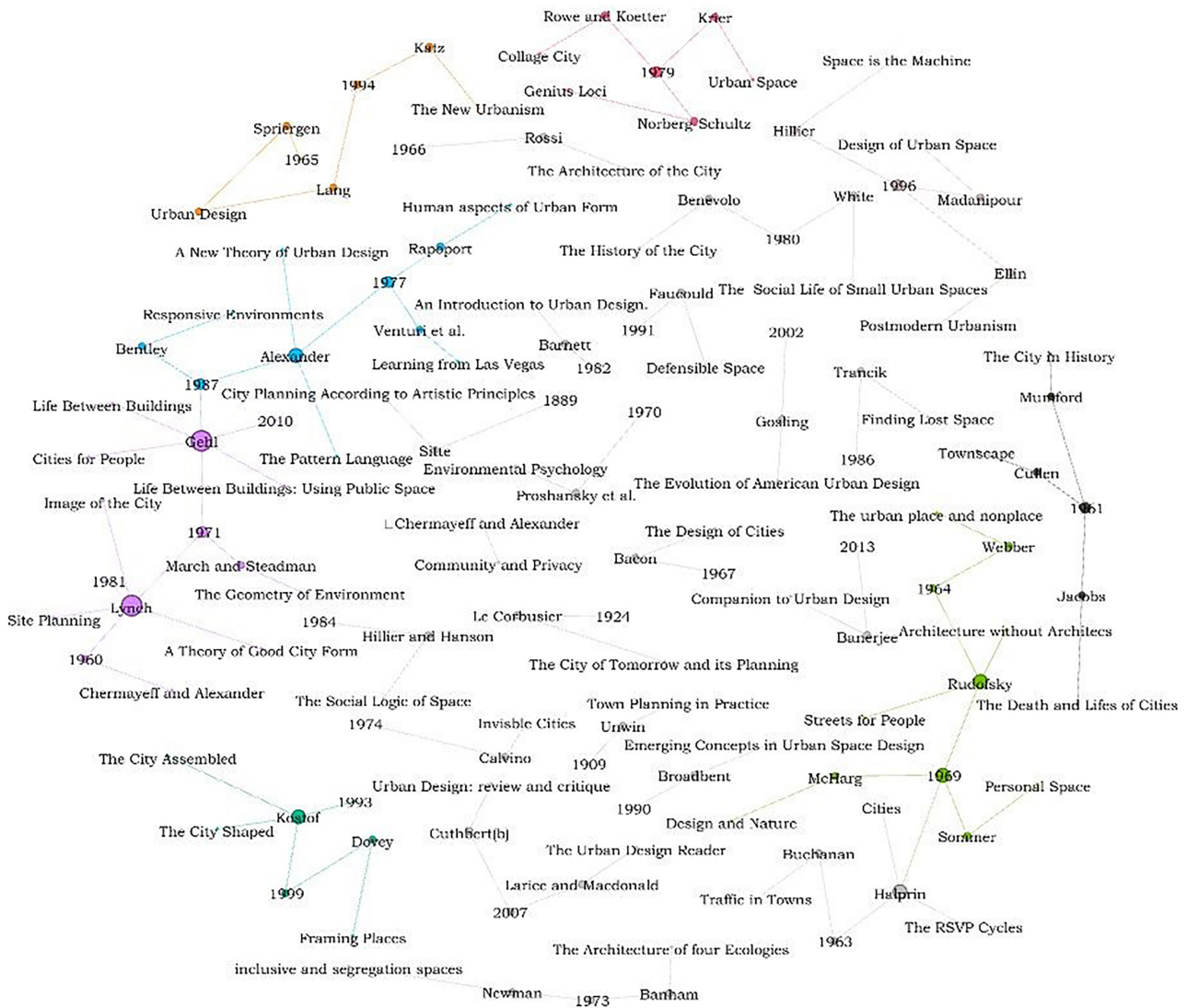


Figure 4. Network, of authors, year and research topic collected jointly by Cuthbert (2007b) and Foroughmand Araabi (2014, 2016, 2017) (Source: adapted from Cuthbert (2007), Foroughmand Araabi (2016) and the authors' own elaboration)

Table 2. Values of the network centrality measures from Cuthbert (2007), Foroughmand Araabi (2016) literature review (Source: adapted from Cuthbert (2007), Foroughmand Araabi (2016) and own elaboration)

Authors	Degree	Betweenness	Closeness	Modularity Class
Lynch	6	128.0	0.297	16
Gehl	6	200.0	0.378	16
Halprin	4	62.0	0.410	5
Rudofsky	4	62.0	0.312	4
Alexander	4	137.0	0.666	12
Kostof	4	12.0	0.5	14
Mumford	2	5.0	0.5	1
Jacobs	2	5.0	0.5	1
Cullen	2	5.0	0.5	1
Buchanan	2	15.0	0.253	5
Weber	2	15.0	0.253	4
Spriergen	2	5.0	0.375	2
Bacon	2	8.0	0.461	2
Sommer	2	1.0	1.0	3
Prohansky et al.	2	15.0	0.571	4

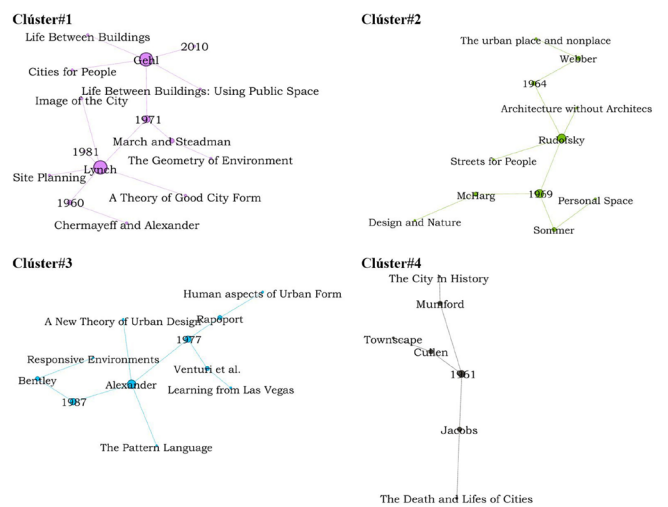


Figure 5. Example of four clusters of authors, year and research topic collected jointly by Cuthbert (2007b) and Foroughmand Araabi (2014, 2016, 2017) (Source: adapted from Cuthbert (2007), Foroughmand Araabi (2016) and authors' own elaboration)

analysis, thus informing us on the representativeness and information propagation in the network (Table 2).

Cuthbert (2007b) and Foroughmand Araabi (2016) conducted qualitative analyses, to classify the contributions made by the authors in their respective reviews. Cuthbert (2007b) made three distinctions:

- “Collage City”, Rowe and Koetter (1979); “Concepts of Urban Design”, Gosling and Maitland (1984); “Finding Lost Space-Theories of Urban Design”, Trancik (1986); and “Emerging Concepts in Urban Space Design”, Broadbent (1990);
- “A Theory of Good City Form”, Lynch (1981); “Urban Space”, Krier (1979); “The Social Logic of Space”, Hillier and Hanson (1984); “A New Theory of Urban Design”, Alexander (1987); and
- the influence of practice on urban design theories, in two blocks, Sustainability and New Urbanism with a certain paradigm tendency that seems to overshadow other approaches.

Foroughmand Araabi (2016, pp. 13-14) classifies literature into three types:

- Type I: Theories of composition of mass and space: “Artistic Principles”, Sitte (2013); “Space Syntax”, Hillier and Hanson (1984); “Theories about visual aspects of public spaces”, Trancik (1986); “Townscape”, Cullen (2012); “Theories of the image of the city”, Lynch (1960); “The Death and Life of Great American Cities”, Jacobs (1984); “Theories to evoke social interaction”, White (1980); “The Social Life Of Small Urban Spaces”, “Life Between Buildings”, Gehl (2011); “Theories to enhance identity, studying history and the meaning of cities”, Krier (1993); “The City Shaped”, Kostof (1999); and “Collage City”, Rowe and Koetter (1978);
- Type II: Theories about the object of urban design with a comprehensive view of what urban design objects are about (descriptive emphasis): “Good City Form”, Lynch (1981); “Public Places and urban Spaces”, Carmona *et al.*, (2003); and theories about how to improve the object of urban design (prescriptive emphasis): “Responsive Environments”, Bentley *et al.* (1987); and
- Type III: Theories about the knowledge of urban design. Theorising urban design knowledge from the perspective of other disciplines: “Design of Urban Space”, Madanipour (1996) and “Place-shaping Continuum”, Carmona (2014).

The classification made by these two authors has points in common. Figure 6 illustrates the methodology proposed in this paper.

For example, Lynch (1981); Hillier and Hanson (1984), Trancik (1986), Krier (1993) and Rowe and Koetter (1978) are part of the common theoretical framework of both literature reviews, while the unconnected external nodes are the individualized theoretical contributions of each author.

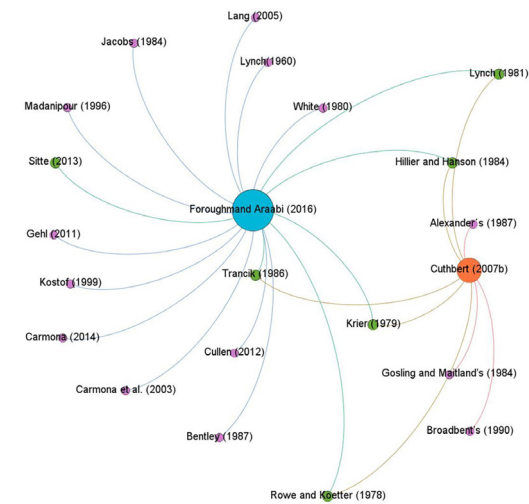


Figure 6. Conceptual (Dis)connections of Cuthbert (2007), Foroughmand Araabi (2016). (Source: adapted from Cuthbert (2007), Foroughmand Araabi (2016) and own elaboration)

SOME ANALYTICAL CONTRIBUTIONS TO URBAN DESIGN

The literature review carried out in the preceding sections allows us to continue with new developments and to analyze the contributions in the field of urban design. To this end, three approaches were established with regard to the Sustainable Development Goals (UN, 2015) in order to outline guidelines for urban design in the future. These goals relate directly to architectural and urban design in an integral way and consider all its facets, starting from the available resources and energies, and including the actors involved in the interdisciplinary design process. Figure 7 shows the connections between Cuthbert (2007), Foroughmand Araabi (2016), and De Jorge-Huertas and De Jorge-Moreno (2021). The connections with the reviews analyzed were established based on the authors that connect them (green and blue nodes). The authors represented by the external

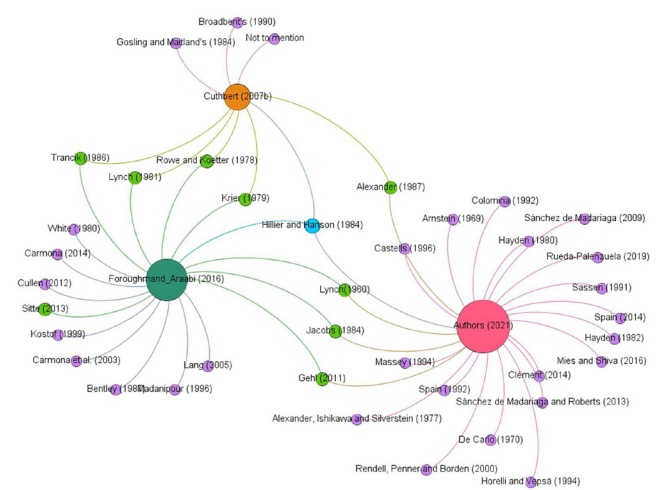


Figure 7. Conceptual (Dis)connections from Cuthbert (2007), Foroughmand Araabi (2016) and De Jorge-Huertas and De Jorge-Moreno (2021) (Source: adapted from Cuthbert (2007), Foroughmand Araabi (2016) and authors' own elaboration)

radio centric mauve nodes refer to the individual theoretical contributions (Figure 7).

The following theoretical approaches are explained: (i) environmental and ecological approach, (ii) technological approach and Industry 4.0, and (iii) participatory and gender-based approach. The three of them are shown in Figure 8.

Environmental and ecological approach

This approach is centered on theories around the natural and anthropized environment, and it focuses on the relation with the environment and its ecosystems or the relationship with animals, plants and landscape ecology in urban design. In this regard, we can consider several visions and utopias: from ancient Babylon with its hanging gardens, Ebenezer Howard’s garden cities, Arturo Soria y Mata’s linear landscaped city or Frederick Law Olmsted’s urban parks, Frank Lloyd Wright’s Broadacre City of 1934, agrarian urbanism and ecological urbanism, the “agropolis” or “agrarianism”, the agricultural city in the context of Japanese metabolism with Kisho Kurokawa in the 1960s and “Agronica” by Andrea Branzi’s group in 1995. These previous case studies and other works already built have resulted in some guidelines in relation to urban and architectural design in synergy with nature. Additionally, recent research on “the third landscape” (Clément, 2014) advocates taking care of the environment without pesticides. It is relevant to take the landscape into account in the design of the built environment and to do so through “ecosystemic” urbanism (Rueda-Palenzuela, 2019), e.g. the “superilles” in Barcelona. In addition, this approach should make visible ecofeminist theories, valuing the role that women play in putting forward ideas related to ecological destruction and industrial catastrophes (Mies and Shiva, 2016). One of these ecofeminist ideas could be enabling teleworking to reconcile work and family life, and reclaiming abandoned villages and rural places. Furthermore, this approach also focuses on promoting organic materials with lower emissions, such as wood, and the future transparent wood, or materials and construction systems with lower energy and economic expenditure, by reducing the time and type of transport required for the materialization of urban designs.

Technological approach and Industry 4.0

Alternatively, in other layers of urban design, there is a new technology-based approach based on artificial intelligence, digitalization and virtual and biological worlds superimposed on the built environment (Industry 4.0). Authors such as Hillier and Hanson (1984) could be considered pioneers in the application of graph theory to the discipline of architecture, an approach focused on dialogue with systems through “Space Syntax”. Consideration should also be given to the link between urban design and new intangible information and communication networks (Castells, 1996) or the technologies of global cities (Sassen, 1991). “Global cities” need networks that required large refrigerated servers for their subsistence. In fact, in the last two decades entire “cities” have been designed for machines with the advent of the worldwide computer network that uses the telephone line to transmit information. Complete cities have been designed with cooling towers and data

centres located in Prineville, Iowa, Douglas and Lenoir (USA), in Saint-Ghislain (Belgium), in the former Stora Enso paper mill in Hamina (Finland) converted into a data centre and in Luleå (Sweden). Entirely new typologies of architecture and urban design have been brought about by a 21st century phenomenon. The “Internet-network” as a decentralized set of interconnected communication networks, with its pros and cons, is already a planning and design tool for the built environment in the digital age. Moreover, it has been assimilated as a “path” by society, from its designers to the users themselves. The map, now virtual, is on a micro-device connected to the internet through the Global Positioning System (GPS). In this sense, entire cities have also been developed linked to large technology companies such as Google in California. These new phenomena could be understood as a Fordist reinterpretation of the industrial cities designed ad hoc to control workers in the 20th century. In today’s information age this model tends to be repeated with intangible and delocalized industry.

Participatory and gender-based approach

The participation-based urban design approach began in the late 1960s. However, it has been a re-emerging and recurring interdisciplinary theme since 1980, including its gender-based perspective, as Daphne Spain (1992) points out. On the one hand, authors such as Lynch (1960), Alexander *et al.* (1977) and Alexander (1987) provide a generative design through a system of patterns for the production of the urban form in what could be considered a “pro-participatory” approach influenced by the systems and hierarchies of mathematics and biology.

On the other hand, authors such as Hayden (1980, 1982), Jacobs (1984), Colomina (1992), Massey (1994), Horelli and Vepsä (1994), Rendell *et al.* (2000), Gehl (2011),

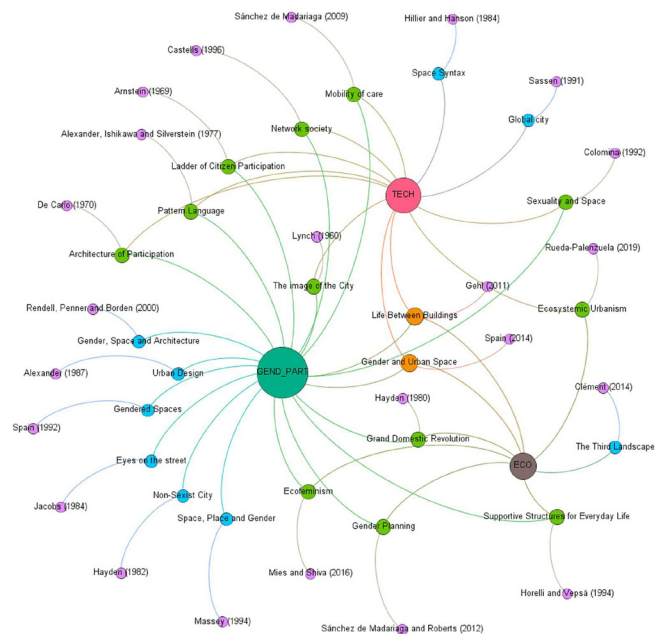


Figure 8. Approaches i) environmental and ecological (brown node), ii) technological and Industry 4.0 (magenta node) and iii) participatory and from a gender perspective (green node). (Source: Authors, 2021)

Sánchez de Madariaga and Roberts (2013), and Spain (2014) have created a solid research framework in relation to urban design and participatory planning from a gender perspective, studying the safety and humanization of spaces at any scale from architecture, landscape to urban planning, and, proposing the deconstruction of patriarchal distribution of space. These studies analyze factors and agents of change for urban design such as the critique of the “man-made” environment, the “chain of tasks” and the “mobility of care” (Sánchez de Madariaga, 2009), spaces and their different needs associated with gender, the relationship between LGBT communities and creative cities, the creation of health and self-help clinics, queer sites, feminist bookshops and domestic violence shelters, the development of public facilities with free choice participation of citizens (Arnstein, 1969) and “the public of architecture” (De Carlo, 1970), also promoting the need for pedestrianised urban spaces, reducing the need for car use and promoting the triangle “services - work and home” with proximity (Figure 8).

RESULTS AND DISCUSSION

This work has analyzed and connected the existing literature on urban design. Special attention has been paid to previous studies by Ellin (1999), Cuthbert (2007b), Foroughmand Araabi (2016) and others. Points of theoretical connection between themes and their references were established, and then some contributions to urban design analysis were proposed. In this sense, if urban design is getting close the 2030 Sustainable Development Goals, perhaps the approaches previously addressed in this paper can be considered. Regarding the first approach, related to the environment and ecology, urban design should decarbonize the energy system of the built environment completely by 2050. This entails taking into account the design of landscape ecology in urban planning, increasing shared public and alternative transport, promoting a circular economy through self-sufficiency and non-energy dependence, creating urban farms with Km.0 products and seedbeds in the city, recycling and reusing materials, energy and waste, and improving acoustic and air quality. In relation to the second approach, urban design could tend towards becoming interdependent with new technologies and digitalization from applications, in order to calculate and forecast pollution or waiting times and provide thermo-atmospheric sensors personalized to each individual's health. It could provide the possibility for citizens to go beyond being consumers or passive recipients. Citizens could be creators with virtual realities and wearable devices or through connected 3D printing. Regarding the third approach, both safety in urban space, a sense of local and global belonging and identity in urban places, as well as the deconstruction of the “tyranny of gendered spaces” are increasingly inescapable factors, and urban design can help to foster more equitable spaces through urban design for the work-life balance and care, compactness, livability and accessibility of the city by prioritizing the different users in the city.

CONCLUSIONS


The aim of this work has been to map and investigate the existing literature on urban design. The use of mapping

methodologies from a network-based approach has allowed us to chronologically identify the most relevant authors from a literature review on urban design and their contributions, establishing points of theoretical connection between them. The main result of this study is the construction of three possible approaches: i) environmental and ecological, including for example research about the third landscape, the healthy city or “ecosystemic” urbanism; ii) technological and Industry 4.0 and iii) participatory and from a gender perspective.

Possible extensions could be related to specific case studies or pivotal cases based on the approaches and theories analyzed by mapping. Another extension could involve the simultaneity of approaches creating new contributions, e.g., an urban design approach oriented towards and specializing in ecological dialogue from a gender perspective could be a new approach to research, which could generate contemporary theories, policies and practices.

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Received August 2021; accepted in revised form October 2021.