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Original Research Article

A Systematic Assessment of Architectural Studies in Iranian Scientific and Elsevier (q1) Journals

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Abstract

Problem statement: Considering the progress of societies in recent years and the development of scientific studies in various fields of architecture, comparing approaches in the global research movement of scholars with Iranian studies can be proof of future research needs in the field of architecture. Iranian studies have less generalizability compared to international studies. To increase their competitiveness with international studies, they need an optimal change considering domestic issues and problems.

Research objectives: The purpose of the current study is to review the scientific articles published in reputable architectural journals at the global and local levels concerning thematic focus and their research methods.

Research method: By reviewing all architectural q 1 journals of Elsevier (646 articles) and scientific research (Persian and English) journals (802 articles), published from April 2017 to March 2020, the current paper aims to study their thematic focus and research methods.

Conclusion: The statistical evaluation of the results indicates that among the 11 identified topics (sustainability, building technologies, design process, architectural layout, historical studies, semantics, environmental psychology, passive defense, management, tourism, and landscape), the focus of studies in Iranian scientific journals is mostly on “historical” and “environmental psychology” and often qualitative method (descriptive-analytical); while in architectural studies of Elsevier (q1) journals, the main concentration is on the fields of “building technology” and “design process” with quantitative method (experimental).

Keywords: *Research Methods; Iranian scientific journals; Elsevier (q1) journals; Architectural studies.*

Introduction

Making progress in any field requires regular and logical study, efforts to respond to current issues, development of theoretical and practical concepts (Taheri, 2012), and continuous study of patterns and trends followed by scholars in order to be effective in completing future knowledge and development (Dwivedi, Venkitachalam, Sharif, Al-Karaghouli & Weerakkody, 2011). The scope of science in today’s world encompasses various

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areas of human life, and science- and technology-based planning, shapes global changes and the transformations of today's life. Since modern society increasingly needs knowledge and a purposeful scientific system, amendments in the current system can be seen not only in quantitative terms but also in structure and performance (Krohn, Layton Jr. & Weingart, 2012). Creating the ability to use new scientific knowledge has made it necessary to combine and integrate sciences from different disciplines and has led to scientific progress and promotion in various fields. Therefore, paying attention to the commonalities of these sciences through research can represent the scientific situation in different temporal and spatial areas and pave the way for future scientific developments.

Architecture, as a process resulting from science, art, and skill (Sameh & Akrami, 2014), encompasses a wide range of fields and can be defined as a branch of multidisciplinary sciences. With the development of related studies in this field and changes in architectural patterns and trends, we are witnessing the emergence of innovative models of interdisciplinary techniques in this field (Alhadidi & Mitcheltree, 2016; Bayhan & Karaca, 2020). Paying attention to the role of these sciences in completing a coherent body of architectural knowledge, and also expanding its course towards new methods of combining various sciences with a functional focus, can be considered an effective approach for determining architectural research's current and future status (Chaszar & Joyce, 2016).

One of the important matters in any field of study is the common method of its research. Considering the wide range of interrelated disciplines, researchers inspect their study purpose from different perspectives. Moreover, to answer the research questions, they take different approaches (Zarei & Mahmoudi Pachal, 2019) that follow certain principles and logic (Groat & Wang, 2013). Since science has always been the companion of the method, research in any field will be conceivable by examining the scientific method and its mechanisms. Recently, several studies have been conducted to examine research developments and identify current gaps in various fields in order to eliminate them (Firdaus, Zulfadilla, & Caniago, 2021), including medical tourism (de la Hoz-Correa, Muñoz-Leiva & Bakucz, 2018), science education (Lin, Lin, Potvin & Tsai, 2019), sustainable development (Salvia, Leal Filho, Brandli & Griebeler, 2019) and augmented reality (Diao & Shih, 2019).

In this regard, considering that Iranian scientific journals and Elsevier (q1) journals are among the most reliable publications in the world, the current study intends to examine the thematic focus and research method of articles published in its journals from April 2017 to March 2020. By studying the differences in their subjects and research methods, a suitable approach can be presented to researchers in the architectural field and related journals to improve this field's future scientific planning and eliminate its shortcomings.

Research Question

Comparing the frequency of repetition, what is the statistical difference between the thematic focus and research methods of architectural studies published in Iranian scientific journals and Elsevier (q1) journals from April 2017 to March 2020?

Research Method

This study used a qualitative and descriptive-analytical method. For this purpose, published papers were reviewed to identify the direction of architectural studies in Iran and at the global level. The statistical population includes all articles published in Elsevier (q1) and Iran's scientific research journals from April 2017 to March 2020.

To identify Iranian architectural journals, the keywords "architecture", "building", and "environment" was searched in Iran's scientific journals ranking system (https://irisweb.ir/index.php?slc_lang=fa&sid=3) with scientific research

ranking obtained from Iran's Ministry of Science. Additionally, to identify Elsevier journals with the q 1 rating on the Journal Citation Reports - Clarivate site, the keywords "Architecture", "Building", and "Environment" were used in the ScienceDirect Academic Search Engines database (https://www.sciencedirect.com/browse/journals-and-books?contentType=JL). Also, the content and objectives of all selected journals include architectural studies and interdisciplinary topics related to architecture.

The articles in the two mentioned groups have been examined and compared based on statistical information and the frequency of thematic focus of the articles (in the main groups and relevant subgroups of the architecture field), and their research methods. To investigate the thematic centrality and research method of articles, the coding method, which is the identification of keywords and their classification, was used (Vaughn & Turner, 2016). To review the articles in terms of thematic focus, the keywords were coded from the abstract and the introduction sections of the articles, and after identifying the depth of the topic, the main focus of the articles was classified into 11 groups (Table 1). Also, by reviewing and coding each article's abstract and research method sections, the type of method used in each study was categorized.

A systematic review study is a type of review study that collects information by searching for keywords in databases (Popay, Rogers & Williams, 1998). Researchers that systematically review articles have conducted studies in the fields of data technology (Chen, 2017), environment (Owen, 2020), and sustainability (Yigitcanlar, Kamruzzaman, Foth, Sabatini-Marques, da Costa & Ioppolo, 2019).

In addition, comparative studies have been conducted as part of a systematic study in various fields of architecture such as architectural learning (Gawlak, Pruszewicz-Sipińska, & Bonenberg, 2021), architectural layout (Junara, Triyadi & Budi,

Table 1. Definitions of thematic focus in the field of architectural studies. Source: Authors.

Thematic focus	Objective of Studies	Reference
Sustainability	Minimizing the buildings' negative environmental impact by improving efficiency and moderation in the use of materials, energy, and ecosystem	(Salama, 2002)
Building Technology	Investigation of structural systems, lighting, piping and ducts, hot and cold-water distribution network, sewage piping, electrical and mechanical wiring, acoustics, control and management of facilities	(Eilouti, 2018)
Design Process	Studies on how to design a building, each space, and furniture, examining the practical aspects of the building's construction, planning, procurement, and management	(Demirbaş & Demirkan, 2003)
Architectural layout	Evaluation of the shapes, dimensions, and positions of the building's interior spaces	(Michalek, Choudhary, & Papalambros, 2002)
Historical studies	Studying the history of buildings, architectural features, and styles over time	(Leach, 2013)
Semantics	Investigating the building beyond its form and aesthetics and paying more attention to understanding the meaning and concept of the building	(Kaul, 2019)
Environmental psychology	Investigating all external factors and conditions affecting human life, behavior, and growth	(Steg, Van Den Berg, & De Groot, 2013)
Passive defense	Evaluating methods to meet vital needs during natural and unnatural hazards, such as decentralized design and creating escape routes	(Amirhajloo & Saghae, 2021)
Management	Studying the development of design from the initial concept to final plans, management of time, and construction process	(Emmitt, 2014)
Tourism	Investigating the impact of architecture on tourism (travel to see historical and architectural monuments)	(Specht, 2014)
Landscape	Evaluation of outdoor and green space design to achieve environmental, socio-behavioral, and aesthetic goals	(Jansson, Vicenzotti & Diedrich, 2019)

2019) and sustainability (Farhan, Hashim, & Naji, 2019). This shows the importance of this method.

One of the criteria for evaluating scientific studies is their generalizability at the international level. Lack of recognition of the difference between the structure of studies in Iran and the world leads to lower rankings and generalizability of Iranian research (Razzaqi Asl & Farhadian, 2017). Therefore, in this article, the differences between Iranian and world architectural studies are examined to suggest a solution to improve the quality of Iranian scientific papers and increase their competitiveness with global studies. It should be noted that in this field, extensive research has been conducted, such as examining the structure of the educational program with research outputs (Razzaqi Asl & Farhadian, 2017), architectural requirements in children's educational spaces (Azad Armaki, 2019), Persian and English architectural research (Ariannejad, Osam & Yigitoglu, 2019), the role of foreign architects in the developments of contemporary architecture in Iran and Turkey (Hassanpour, Soltanzadeh & Bazrafkan, 2017), English and Persian articles on the urban poverty challenge in marginalized areas (Khanmoradi, Hassani & Mohammadlou, 2016) and a comparative study of research in Iran with China, India, Germany, and Japan (Shafiee, 2005).

Theoretical Foundations

Architecture, as a knowledge originating from natural and human phenomena, is a unique combination of art and science (Sameh & Akrami, 2014) that covers a wide range of sciences, as evidenced by the variety of available studies and the types of research methods.

Based on the conducted study, articles in the architectural field are thematically divided into 11 groups, each of which has different sub-categories based on a more detailed classification (Fig. 1). In the following, descriptions of these groups are discussed.

- **Architectural layout**

This group of studies includes principles of regulating visual measures, which, both philosophically and emotionally, makes the participation of various forms and spaces of a building possible (Fath Baqali & Sanieipour, 2018). Most layout studies are in the field of morphology, which investigates the building's form, plan, function, and structure of the building (Mousavi & Afzalian, 2019), and the surrounding environment (Liu et al., 2018). The typological field includes the classification of buildings based on differences in the formal, physical, organizational, and functional characteristics of spaces (Rahrouei Poodeh, Vali Beig, Dehghan & Massoud, 2018). Buildings can

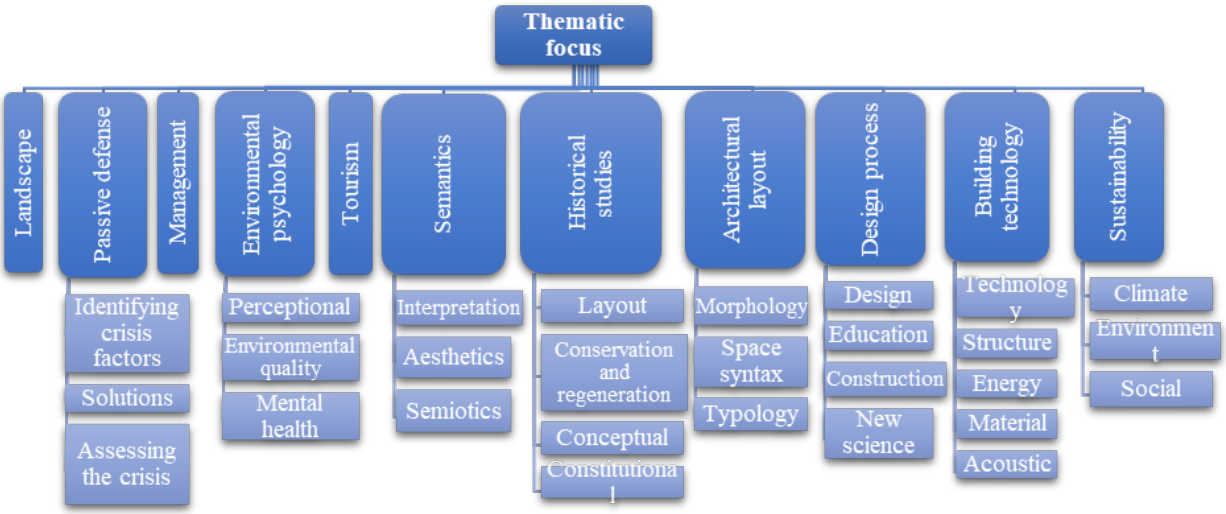

Fig. 1. Thematic classification of architectural studies. Source: Authors.

also be analyzed and evaluated based on the spatial system and using space spatial measurement tools (Depthmap software) (Kiani, Soltanzadeh & Heidari, 2019) in the form of space syntax studies (Dawes, Ostwald & Lee, 2021).

- **Design process studies**

Due to their importance, studies of building design and construction are known as the most important sub-branch of design process studies. Most studies in this field focus on the process of design formation and architectural design methods (Labibzadeh, Hamzehnejad & Mohammadi, 2019), which is provided by education for architecture novices. Therefore, education as one of the subgroups of this branch is a factor in the formation of comprehensive thinking in the mind of an architect (Hosseini, Falamaki & Hojjat, 2019). The construction phase is also considered a part of the architectural process of a building. It includes matters in the field of industrial construction (Akmam Syed Zakaria, Gajendran, Rose & Brewer, 2018), manufacturing technologies (Osei-Kyei & Chan, 2019), economic issues (Zarian & Tehsildoost, 2019), environmental (Ziaei & Abbasi Harfteh, 2018) and other related topics that examine problems (Lin, Lin, Potvin & Tsai, 2019) or offer practical solutions in the field of architecture (Gao, Low & Nair, 2018). In order to eliminate the disadvantages and limitations of traditional methods (Donato, Zemella, Rapone, Hussain & Black, 2017), and to create innovative components in research, development (Loonen, de Klijn-Chevalerias, & Hensen, 2019), building design, and construction (Wortmann & Tunçer, 2017), each of these studies has evolved through new sciences, both in theory and in practice, that leads to facilitating and accelerating the architectural process (Brisco, Whitfield & Grierson, 2020).

- **Building technology studies**

Building technology studies include all technical studies in the field of construction and its subgroups, presenting topics in the field of structural design (Gholami, Garivani, Askariani, & Hajirasouliha, 2022; Krishnan & Li, 2019) or the evaluation of the behavior and strength of the structure in new (Arto, Gallego, Cifuentes, Puertas, & Gutiérrez-Carrillo, 2021; Avci & Al Nouss, 2018) and historical buildings (Sadegh & Toloo Del, 2018) that introduces applicable methods to optimize the structural performance of the building (Sabetgadam, Alemi, Sadeghpour & Pachnari, 2018). Topics in the technology area (Li, Cheng, & Chen, 2020) are a prelude to the emergence of various methods in the fields of building production from design (Madi & Imani, 2018) to construction, & have led to the creation of branches in this field, including; Intelligent architecture (Maghsoudi, Seyedian, Mahnam & Shahroudi, 2017) and building information modeling (BIM) (Mallasi, 2018). By evaluating the amount of energy consumption (Bui, Nguyen, Ghazlan, & Ngo, 2021; Chung, Liu, & Seong, 2019) and proposing plans (Tehsildoost, 2019) or introducing alternative systems for natural energy consumption (Cao, Hamidvand, Bezaatpour, Ebadollahi & Ghaebi, 2022; Hussain & Kim, 2019; Lyu, Li, Shi, Wang & Huang, 2021), building technology studies suggest effective methods to increase energy efficiency (Kazemi, 2017) in the form of energy studies. On the other hand, by including acoustics issues and analyzing the problems in the field of sound in indoor spaces (Rajagopalan, Nguyen & Carre, 2017) and defining responsive methods, building technology studies try to increase efficiency and reduce noise pollution in buildings (Sokhandan Sorkhabi, Nasrollahi & Ghaffari, 2019).

In the materials group, most of the topics are dedicated to the introduction of new materials (Mosalam & Casquero-Modrego, 2018), quality and performance evaluation of materials (Rodríguez, Blanco, Pujadas & Aguado, 2017), appropriate methods for production (Bemanian, Arabalizadeh Mahabadi & Ulfat, 2017), optimization of construction materials (Razani & Faraji, 2018) and try to promote this field in the architecture and construction industry.

- **Historical studies**

Some of the articles with historical themes include

studies that deal with historical and ritual analysis and investigate issues that are related to the cultural, social (Eskandarnejad & Khaki, 2015), and artistic aspects of vernacular architecture (Asadi Karam, 2021; Ali Asadi, Amini & Tajeri, 2021). In the field of layout, by focusing on the physical form and structure of the building, historical research has provided a context for studying past architecture and the similarity between them and existing buildings to determine the building's identity (Vahdatpour, Valibeigh & Rahimi Ariayi, 2019). This field also studies the morphological, semantic, and functional layers of buildings (Eilouti, 2017). By studying the rituals in the past as a meaningful element in architecture and through the direct relationship of these rituals with the function and body of the building, the immaterial and semantic features of an old building can be identified, and the indigenous culture and traditions of the people of that region will be revealed (Kazemi Shishvan & Baybordi, 2019). The value system that governs society in the traditional era can be defined in the form of conceptual studies that are rooted in beliefs, and the construction patterns and lifestyles of people in each region can be analyzed as well (Heidari & Ghasemian, 2019).

In addition to the above studies, which are conducted to achieve the principles and traditions regulating the past architecture, another part of the historical studies introduces methods to reduce and compensate for the quantitative and qualitative physical deficiencies of the old buildings to protect, rebuilt, and prevent the destruction of identity and physical integrity of them over time (Shah Mohammadpour Salmani, Bakhshandeh Fard & Mohammad Moradi, 2019).

- **Environmental psychology studies**

Through the study of architecture's physical aspects, we enter the field of conceptual and perceptual research in which the field of environmental psychology is a common field of architecture and behavioral sciences. By studying human behaviors in relation to the surrounding habitat or physical environment (Emamgholi, Ayvazian, Zadeh Mohammadi & Eslamy, 2012) and the changes humans make in architecture, the purpose of perceptual studies as a sub-category, is to study sensory and mental processes (Eijkelenboom, Verbeek, Felix & Van Hoof, 2017). By obtaining information from the environment and its impact on human life in the form of architecture, environmental psychology creates various sub-categories (Paykan & Rafieian, 2019).

Also, the study of human behavior and lifestyle in different environments (Madahi, Esfandiani Moghadam, Abbasi & Bemani Naeini, 2018) influenced by culture and society can lead to the definition of place (Cash, Hartlev & Durazo, 2017; Choi, 2018). In the field of environmental quality, the research is focused on three components of layout, meaning, and activity (Delshad Siahkeli, Bemanian & Mahdavi Nejad, 2018) which aims to provide user comfort in various dimensions, including space quality, visual (Farboud & Shahhoseini; Mousavi Samimi & Sadraei Tabatabaei, 2022; Mousavi Samimi & Shahhosseini, 2021), and non-visual perceptions and preferences (olfactory, heat, acoustic, tactile) (Ramprasad & Subbaiyan, 2017; Shahhosseini, 2014; Shahhosseini, Kamal & Maulan, 2014). Mental health is also included in environmental psychology studies as a combination of subjective and objective conditions of human life that is related to the feeling of satisfaction and life realities (Taheri & Taheri, 2019).

- **Semantic studies**

The meaning, value, concept, and message dimension (whether intellectual or emotional) includes a part of any phenomenon and is also the result of human interaction with the architecture, both in the form of layout and context (Raisi, 2016). In this field, studies have been conducted to identify a society's cultural identity and values (Shafieian Dariani, Pourjafar & Ghobadi, 2014) and led to the definition of an approach called semantics in the field of architecture. Interpretive semantics deal with the nature of architecture and its context (environment) based on the four main

components of the architect, audience, layout, context, and also a number of sub-components such as different human influences, preconceptions, and pre-experiences (Raisi & Noghrehkar, 2018). Semantic studies divide the existing theories based on how to explain the meaning of works in three general perspectives: "audience-oriented", "author-oriented" and "context-oriented" (Raisi, 2016). The field of aesthetics with the aim of recognizing and understanding the environment and the position of the person in the environment has examined issues such as the relationship with the structure, building details, audience, and environment (Sadeghi, Ekhlasi & Kamelnia, 2018), and tries to define aesthetics according to existing views. Semantic studies, with the objective of comprehending the conventions and functions of the sign systems that shape the human world, define a subgroup called semiotics, which leads to the achievement of laws and contracts that have been consciously or unconsciously made by members of local culture and create the meaning of phenomena (Hameh Jani, Bayazdi & Sahabi, 2017), which, along with other sub-disciplines, form a set of semantic studies.

- **Sustainability studies**

Sustainability includes various aspects, from the layout to social and cultural concepts and patterns (Azam Kasiri & Aghazadeh, 2022). Its purpose is to meet the current needs of the present generation without destroying the capabilities of future generations in meeting their needs (Zameni & Vali Beig, 2017). The most basic meaning on which sustainability was first proposed is environmental sustainability (Hami, Suhardi, Manohar, & Shahhosseini, 2011; Razmjoo, Kaigutha, Rad, Marzband, Davarpanah & Denai, 2021), which is known as the foundation of sustainable development and its objective is to protect the environment for the survival of all communities in a just system (Firoozi, Mohammadi Dehcheshmeh & Saeedi, 2017). Achieving environmental sustainability depends on issues such as a healthy indoor environment, energy efficiency and productivity, and ecologically safe materials (Vallas & Courard, 2017), which confirms the breadth of this field of study.

In addition, sustainability issues in the field of climate have received attention. Due to the contribution of climate to achieving sustainability goals, studying the climatic and natural conditions of each region and analyzing the principles for the design, location and physical condition of the building are necessary (Attarian & Safar Ali Najjar, 2018). Paying attention to this issue has been considered one of the most important matters in housing design in the past (Akbari & Teshnehdel, 2018). Alongside environmental and climatic issues, achieving sustainability is due to social sustainability, which has been considered a link between different dimensions of sustainable development, and in its definition, the four elements of social justice, social solidarity, participation, and security have a decisive role (Karimi, 2018). Sustainable social development, like the sustainable development of human society, has environmental, material, social, economic, legal, cultural, political, and psychological aspects that must be considered (Barzegar, Divsalar, Ghorbani & Sedaghat, 2017).

- **Passive defense studies**

Given the extent of architectural studies, this area also includes guidelines for specific and critical situations. In this regard, a group of studies in the form of passive defense in the fields of architecture and urban planning aims to reduce vulnerability and damage related to man-made threats such as war and also the risk of natural disasters, which includes all the necessary studies and measures to identify the causes of the crisis (Adelizadeh & Shabiri, 2019) and assess the crisis and lead to the presentation of strategies for evaluation, analysis and finally protective measures (Hosseini & Kameli, 2015). Therefore, studies and analyses in this field can be divided into three sub-categories: recognizing crisis factors and assessing crisis conditions and measurements.

- **Management studies**

Management discussion includes all management policies and methods that are defined for evaluation (Abad, Eshtehardian, & Taghizade, 2019), conservation (Rezaei & Faraji, 2018), development (Yaran & Mohammadi Khoshbin, 2019), performance improvement, and efficiency increase (Liu, Anumba, Jallow & Carrillo, 2020) in the field of design and production in architecture.

- **Tourism studies**

Tourism studies are another field that has been developed due to its importance as one of the principal economic sectors of cities and has an effective role in architecture (Tayebi & Zekavat, 2017). Some of its most important types include local tourism, medical tourism, religious, commercial, and historical tourism (Akbari, Esmailpour, Razavi & Hatami Nejad, 2021; Pishbahar, Parcham & Yadavar, 2017).

- **Landscape studies**

Landscape studies with complex objectives and subjective concepts, and wide physical and non-physical dimensions (Einifar & Aghalatifi, 2011), have always been discussed by experts and scholars of the environment, geography, urban design, landscape architecture, and other relevant fields (Allahyar & Kazemi, 2021; Ha, Kim & With, 2022). Landscape is a phenomenon that is simultaneously obtained through human perception of the environment and interpretation of the mind, which includes layout, quality, and meaning (Mahan & Mansouri, 2017).

Research Method Types

In a general classification according to the type of data, research methods are divided into two groups: quantitative (survey, experimental) (Sukamolson, 2007) and qualitative (case study, ethnography, demography, futures studies, descriptive-analytical, review) (Crabtree & Miller, 1992) (Fig. 2). Quantitative data has at least one numerical property, and qualitative data has the characteristics of a research topic. Quantitative research methods use deductive logic of analogy and test hypotheses through data. On the other hand, in qualitative methods based on inductive logic, concepts embedded in data, hypotheses, and theories are created. It is necessary to pay attention to the fact that the choice of research method is often not optional and is determined by the nature of the research subject (Ali Ahmadi & Ghaffarian, 2003). In order to identify the research method of articles, by referring to the abstract and research method section of each paper, reviewing and coding the text, the type of research method used in each article was categorized.

Results

The total number of articles published in architecture journals during the mentioned period is 1448, of which 802 articles (55.39%) are published by 19 Iranian scientific journals and 646 articles (44.61%) by 9 Elsevier (q1) journals. Notably, some articles published in these journals are related to urban planning and art, which were removed from the extracted articles (Table 2).

Thematic Focus Comparison

The sum of the studied subjects in the form of categories and sub-categories proposed in the theoretical foundations define the scope of studies in the field of architecture. Given the importance

Fig. 2. Classification of research methods.

of each of these topics and the number of articles published in each, it is possible to understand the direction of architecture in different contexts and evaluate the strengths and weaknesses of these studies. Based on the results of reviewing articles, selected topics in Iranian and Elsevier (q1) scientific research journals are different. The number of articles published in the field of historical studies with 26.81%, environmental psychology studies with 17.33% are the highest, and tourism studies with 0.62% are the lowest number of studies in Iranian scientific journals. However, most studies in Elsevier (q1) journals were devoted to the field of building technology with 36.38%, the design process with 28.33%, and the least studies in the field of landscape with 0.15% (Fig. 3). The

Table 2. Titles of journals and number of Iranian scientific articles and Elsevier (q1) during April 2017 to March 2020. Source: Authors.

Row	Study area	Elsevier (q1) Journals' title	Number	Row	Study area	Iranian scientific journals' title	Number
1	Management and use of information technology in design and engineering	Automation in Construction	24	1	Architecture, art, urban planning, environmental design	Bagh-e Nazar	85
2	Science and technology of materials related to solar energy conversion	Solar Energy Materials & Solar Cells	70	2	Architecture, urban planning, architectural challenges	Sustainable Architecture and Urban Design	23
3	Science of building, city, and human interaction with indoor and outdoor environments	Building and Environment	79	3	Architectural methodology, habitats, description of architectural works and schools	Architectural Thought	42
4	Landscape design, planning, sustainability	Landscape and Urban Planning	87	4	The theoretical and practical wisdom of Islam in architecture and urban planning	Researches in Islamic Architecture	50
5	Design, construction, operation, maintenance and deterioration of the building	Journal of Building Engineering	103	5	A study of the past and present of architecture and urban planning	Soffeh	57
6	Renewable energy components and systems	Renewable Energy	100	6	Localization of theoretical knowledge of urban planning	Urban Planning Knowledge	9
7	Building materials, construction and technology	Construction and Building Materials	60	7	Theoretical studies and new technologies in architecture and urban planning	Naqshejahan	56
8	Reduce energy consumption and improve the quality of the indoor environment	Energy and Buildings	115	8	Localization and helping to develop global knowledge of urban planning and architecture	Architecture and Urban Planning	17
9	Using, planning, designing and management of greenspace	Urban Forestry & Urban Greening	8	9	Architecture, urban planning and environmental studies	Hoviat shahr	59
	-	-		10	The historical architecture of Iran, knowledge and related arts	Iranian Architecture Studies	44
	-	-		11	Exchange of science and knowledge in the fields of architecture and urban planning	Iranian Architecture & Urbanism	50
	-	-		12	Promotion and development of Islamic art and architecture	Islamic Art Studies	23
	-	-		13	Comparative studies of visual arts, applied arts, architecture	Motaleate-e Tatbighi-e Honar	3
	-	-		14	Rural architecture, urban planning and settlements	Housing and Rural Environment	70
	-	-		15	Contemporary, traditional and indigenous architecture in hot and dry climates	Architecture in Hot and Dry Climate	29
	-	-		16	Urban design, urban planning, landscape architecture, architecture	Armanshahr Architecture & Urban Development	95
	-	-		17	Urban and regional research, evaluation of the country's urban plans	Studies On Iranian - Islamic City	20
	-	-		18	Research and scientific experiences in the fields of architecture and urban planning	Honar–ha–ye–Ziba-Memari-Va-Shahrsazi	42
	-	-		19	Architecture and Urbanism	Resilient City	28
Total	646 articles (44.61%)				802 articles (55.38%)		

number and percentage of 11 groups and their sub-categories in Iranian scientific journals and Elsevier (q1) are shown separately in Table 3.

Research Methods Comparison

According to studies, the most common research method in Iranian scientific journals, accounting for 56. 47 percent of all articles is the "descriptive-analytical (qualitative) ", which is used in 502 articles and is in line with the methods required for historical studies. The lowest rate was allocated to the research method "demography (qualitative)" with 0.11% and "ethnography (qualitative)" with 0.34%. While in Elsevier (q1) journals, the most used research methods include "experimental (quantitative)" and "survey (quantitative)" research methods with 52.05%, and are in accordance with thematic trends to achieve new methods in the field of construction technology, which requires experimental research and systems. The research methods of "ethnography (qualitative)" and "demography (qualitative)" include the lowest number of articles in these journals. Fig. 4 shows the analogy of the selected research methods in the Iranian scientific journals and Elsevier (q1), and Table 4 shows their number and percentage separately.

Conclusion

By identifying the dominant approach in Iranian scientific articles and the shortcomings in this area in comparison with Elsevier q 1 articles, the obtained results provide a solution to improve the quality of studies conducted by researchers and increase the competitiveness and generalizability of the output of studies published in Iranian publications. Architectural research in the world is more in line with "building technology " and "design process" studies and is more oriented toward creating new technologies, systems, and types of design. However, scientific papers in Iran are often in the field of "historical" issues to analyze the past architecture of Iran and "environmental psychology" and its impact on people interacting with the environment. Also, in global studies in the field of architecture, both quantitative and qualitative research methods have been used almost equally and in balance. However, in the smaller category, it is clear that the tendency is to use the survey research method. In Iranian journals, qualitative and descriptive-analytical research methods were generally used.

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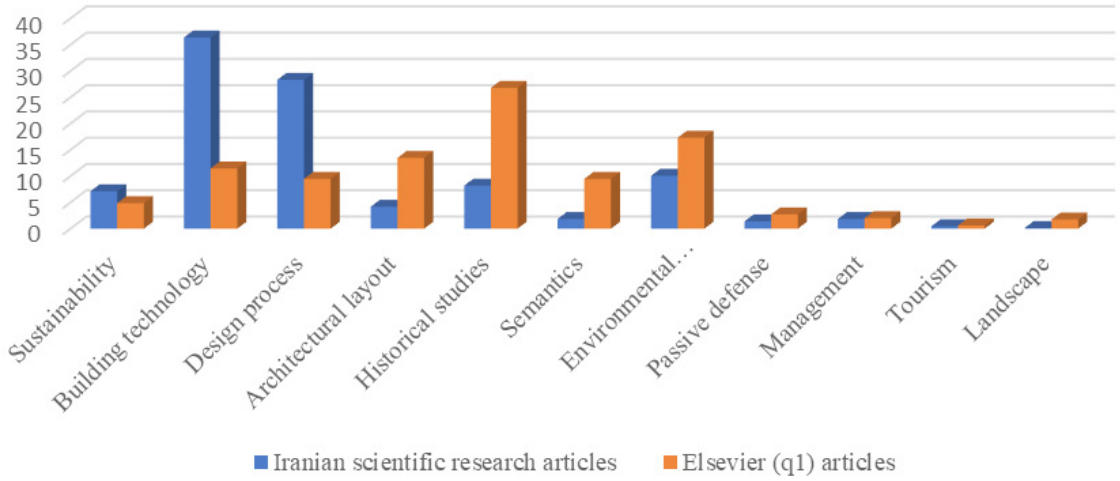

Fig. 3. Thematic focus of Iranian scientific articles and Elsevier (q1) during April 2017 to March 2020. Source: Authors.

Table 3. Number and percent of studied topics in Iranian scientific articles and Elsevier (q1) during April 2017 to March 2020. Source: Authors.

Row	Classification	Sub-categories	Iranian scientific articles			Elsevier (q1)		
			Percentage	Number		Percentage	Number	
1	Sustainability	Climate	4.86%	39	13	7.12%	46	6
		Environment			12			30
		Social			14			10
2	Building Technology	Technology	11.47%	92	9	36.38%	235	49
		Structure			22			71
		Energy			47			54
		Material			13			56
		Acoustic			1			5
3	Design Process	Design	9.48%	76	33	28.33%	183	119
		Education			38			25
		Construction			4			8
		New science			1			21
4	Architectural layout	Morphology	13.47%	108	68	4.18%	27	21
		Space syntax			14			6
		Typology			26			0
5	Historical Studies	Layout	26.81%	215	146	8.20%	53	37
		Conservation and regeneration			20			14
		Conceptual			26			2
		Constitutional			23			0
6	Semantics	Interpretation	9.48%	76	36	1.86%	12	10
		Aesthetics			9			2
		Semiotics			4			0
7	Environmental Psychology	Behavioral	17.33%	139	17	10.06%	65	28
		Perceptional			76			26
		Environmental Quality			37			7
		Mental health			9			4
8	Passive Defense	Assessing the crisis	2.74%	22	6	1.39%	9	4
		Solutions			13			5
		Identifying crisis factors			3			0
9	Management	-	2%	16	16	1.86%	12	12
10	Tourism	-	0.62%	5	5	0.45%	3	3
11	Landscape	-	1.75%	14	14	0.15%	1	1
	Total		100%	802		100%	646	

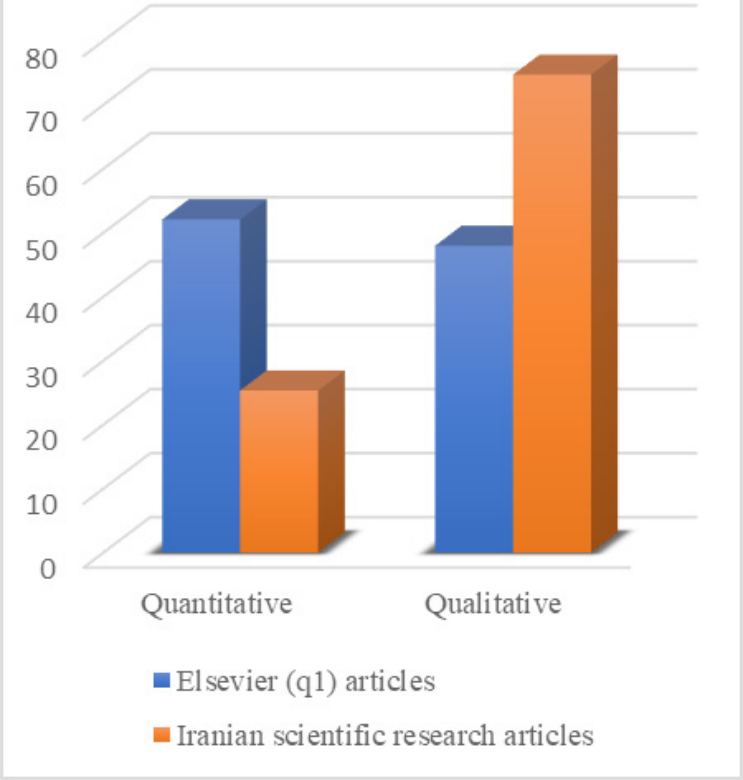

Fig 4. Research methods used in Iranian scientific articles and Elsevier (q1) during April 2017 to March 2020. Source: Authors.

Table 4. Number and percent of used research methods in Iranian scientific articles and Elsevier (q1) during April 2017 to March 2020. Source: Authors.

Row	Classification	Sub-categories	Iranian scientific articles			Elsevier (q1) articles		
			Percentage		Number	Percentage		Number
1	Quantitative	Survey	25.31%	18.11%	225	52.05%	23%	344
		Experimental		7.20%	64		29.05%	192
2	Qualitative	Case study	74.69%	9.56%	664	47.95%	16.79%	317
		Ethnography		0.34%	3		0.15%	1
		Demography		0.11%	1		0.45%	3
		Futures studies		3.15%	28		2.12%	14
		Review		5.06%	45		9.23%	61
		Descriptive-analytical		56.47%	502		19.21%	127
Total				100%	889	100%		661

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