Creative city design / Vol. 5, No. 3, 2022, 14-27

Perceptiveness at the Position of Approach, Strategy, Method and Technique in Design Process (A Case Study: Kari Jormakka)

Sama Modirrousta[1], Vida Norouz Borazjani[2*], Mahmud Rezaei [3]

1. Department of Architecture, Central Tehran Branch, Islamic Azad University, Tehran, Iran.
2. Department of Architecture, Central Tehran Branch, Islamic Azad University, Tehran, Iran.
3. Department of Architecture, Central Tehran Branch, Islamic Azad University, Tehran, Iran.

Submit Date: 10 July 2022, Accepted Date: 18 Sep 2022

Abstract

The design process includes the steps that the designer walks through to reach a solution for the design problem. In addition to finding ideas and concepts in the design process, designers take other steps encompassing choosing the approach, the strategy, the method and the technique. The objective of this study was to examine the position of approach, strategy, method and technique in the design process. As a case study, Kari Jormakka's classifications were chosen for analysis. The reason why these classifications were selected was that the terms were not employed properly by Jormakka in his book. The nature of this study was qualitative. In the present study, comparative research method was used for comparing experts' ideas regarding the technical terms and logical reasoning method wass applied for data analysis. The main research question of this study was: What is the correct position of the terms approach, strategy, method, and technique in design process? The findings highlighted that the steps of design process can be categorized from macro to micro from approach to technique. On this basis, *approach* could be defined as people's belief on an issue while *strategy* was recognized as part of *approach*. *Method* was defined as the way of achieving the goal that can be implemented through different *techniques*. It seems that, in Jormakka's classification, the term *method* was used instead of strategy and approach on multiple occasions, and none of the seven main sets presented by Jormakka fell under the term method; rather, they were more distinct on the basis of strategies and approaches.

Keywords: *Design approach, Design method, Design process, Design strategy*

1. Introduction

The issue of design process was raised in the early 1960s [1]. Ever since then, a number of experts have provided models and have attempted at presenting certain classifications to aid designers. They acknowledged that if there is a design, a method must have been used to create it: A method that has found a solution to the design problem [2]. Design procedure is full of repeated actions, which lie between a problem definition and finding a solution for this problem. It is the decision-making process that defines the problem to be solved by design [3]. Hence, design process includes the steps that the designer walks through to reach the solution to the design problem [4]. Architectural design can be deemed as a problem-solving activity in which the designer is required to generate a solution in the form of a building that outlines a specific program for specific users to perform specific functions on site, using a process [5]. The main challenge for designers, here, is the act of balancing multiple requirements and needs [6]. Meanwhile, although the idea generation has always been considered to be one of the important

*Corresponding author: Vid.Norouz_Borazjani@iauctb.ac.ir

This paper is extracted from Sama Modirrousta's PhD dissertation entitled "Epistemology of Recognition in Architectural Design Process (A Study on the Works of Contemporary Iranian Architects Based on Grounded Theory)", supervised by Dr. Vida Norouz Borazjani and advised by Dr. Mahmud Rezaei, conducted at Islamic Azad University, Central Tehran Branch.

steps in the design process [7], there certainly are other steps that are equally significant. They include selecting an approach, presenting a strategy, and finding methods and techniques. Some researchers in the field have incorporated these terms in their classification. John Chris Jones, for example, stated that once the problem has been fully understood, the presentation of the method is the next stage in the design process. After analyzing the problem, the choice of strategy remained the main focus for Souza [8]. Vida Norouz [8] believed in choosing a strategy after the formation of an idea and choosing methods after finding a concept. Bert Bielefeld and Sebastian El Khouli, in a book named "Basics Design Ideas" emphasized the importance of approach, strategy, and method in the design process [9]. Also, some researchers have noted that designers often rely on subjective approaches, such as their own intuition, to anticipate what users require from a design [10]. The goal of this study was to examine the position of approach, strategy, method and technique in the design process, which authors believed can help designers use these technical terms in the architectural design process. The present study aimed at investigating this main question: What is the correct position of the terms approach, strategy, method and technique in the design process? Arranging mentioned terms is important because it can lead to a more accurate and precise definition, and designers can have a common language and expression. Although the position of these terms can be probed in the works of different architects and experts, this study merely focused on Jormakka's ideas. The sub-question is: How are the terms approach, strategy, method, and technique employed in the classification provided by Jormakka as a case study?

The findings of this study can be beneficial for students, architects, and architectural firms in the process of design.

2. Research Background

An extensive review of the related literature signified different categories in the field of design process are based on cases such as objective-subjective, direct-indirect, rationalism-empiricism, process-product, and paradigm and tools [11], [12]. a large number of experts such as Broadbent & Ward (1962), Bryan Lawson (2012), McGinty (1979), Charles Jencks (2002), and Kari Jormakka (2014) presented their own classifications. The analysis of these experts' views highlighted that Broadbent's classification was more general; McGinty's classification fell at the solution level; Jencks's classification was based on new trends; the classification offered by Jormakka was largely broad; and Faludi and Alexander's categorization was based on the degree of subjectivity or objectivity [2] (Fig 1). The literature review also outlined that research has scantly explicated the position of the terms approach, strategy, method and technique in the design process, nor has it provided a clear hierarchy in the case of architectural case studies. The reason to focus on this topic is that although many designers draw diagrams to think about architectural concerns [13], but many of architects and also architecture students in process of design cannot distinguish appropriate approach and strategy. They may also be confused for finding the main idea of their design. In reviewing reseach background, it can be seen that an in-depth study of the design methods proposed by Jormakka has never been detected in the previous studies, demonstrating the novelty of this research (Table 1).

Table 1: Review of research in the field of design process in architecture (source: authors)

Foreign Researchers	Research name	Authors' emphasis on research
(Alexander, 1964)	Notes on the synthesis of form	-The key role of diagram and pattern in design [14]
(Broadbent & Ward, 1969)	Design methods in architecture	-Pragmatic method, iconic method, typical method, canonic method [15]
(McGinty, 1979)	Design and the design process	-Essence, programmatic, ideal [16]
(Alexander & Faludi, 1989)	Planning and plan implementation: notes on evaluation criteria	-Policy, planning, design, project, programming [17]
(Jones, 1992)	Design methods	-Systematic method, analysis, synthesis, evaluation [4]
(Jencks, 2002)	The new paradigm in architecture	-Organi-tech, fractal, blobmeisters, enigmatic signifier, data-scape, landform, cosmogenesis [18]
(Lawson, 2012)	What designers knows	-Narrative method [19]

(Bielefeld & El Khouli, 2017)	Basics design ideas	-Ideas, approaches and strategies in the design process [9]
Iranian Researchers	**Research name**	**Authors' emphasis on research**
(Norouz Borazjani, 2019a)	The design of design; How do you design? A compendium of design models from 1939 to 2008	-Emphasis on the position of approach, strategy, method and technique in the Conductive-based architectural design process [8]
(Bastani & Mahmoodi., 2018)	Conceptualization methods in the design process of architecture	-Analogy methods, patterns, rationalist methods, theoretical methods [20]
(Niknam et al., 2018)	Presentation analytical framework of manufacturing production process in architecture, objectification to subjective idea	-Digital design methods [21]
(Akbari et al., 2017)	Explaining the methods of contextualism and regionalism design in Iranian architecture	-Methods of contextualism and regionalism in design [22]
(Rezaei, 2014)	Design Analytica: reviewing theories and concepts in contemporary design process of form and space	-Critique of modern contemporary design methods in the West [2]
(Masoud et al., 2011)	Role of analogy in architectural design process	-Emphasis on the role of exemplify in the architectural design process [23]
(Mahmoodi, 2005)	Design thinking the interactive model of thinking and design	-Design process steps [24]

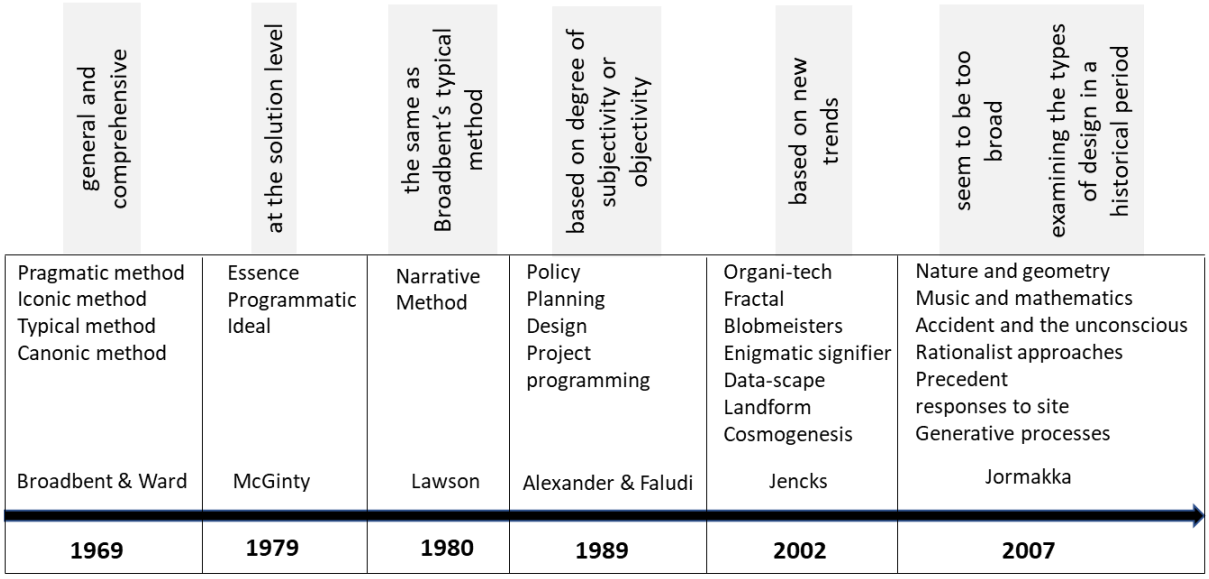

Fig.1: The differences in various paradigms in field of design methods (source: authors).

3. Research Methodology

According to Creswell, research methods can be divided into three groups: quantitative, qualitative and combined [25]. Among these, "qualitative researchers seek a deep understanding from the perspective of a group or individual." [26] and since one of the goals of this research is to have a deeper understanding of the terms approach, strategy, method, and technique in design process, the nature of this research is qualitative. In this study, comparative research method is used for comparing data and logical reasoning method is used for data analysis. In comparative research, relationships that have already been discovered can be omitted or replaced by other explanations. In comparative research, researchers distinguish between the "most similar system design' (MSSD) and the 'most different system design' (MDSD).

The MSSD and the MDSD can be used in a number of ways, depending on how the research task is designed. In the present work, MSSD is used, because when examining the theories, MSSD can be helpful with a deductive approach [27]. In this research, a theory named "conductive-based architectural design process" is tested by MSSD method and compared with the opinions of experts in different fields about approach, strategy, method and technique to find similarities between them. Finally, the mentioned terms in Jormakka's classification as a case study have been analyzed and revised accordingly (Fig 2). For evaluating the quality of the research results Guba and Lincoln credibility is used. Most qualitative methodologists use the term credibility to refer to the evaluation of the results quality, instead of using the term validity in quantitative research.

Credibility is the degree to which research findings can be relied upon. Guba and Lincoln believed that the credibility includes four separate but interrelated criteria: Prolonged engagement, Reliability, Qualitative objectivity, Applicability.

• Prolonged engagement is the reasoning and processes required to trust research results.
• Reliability is the ability to identify the source from which the particular data has been collected.
• For qualitative objectivity, the researcher must show that the findings are really based on data.
• Applicability is the degree to which the results of a qualitative study can be transferred to other different environments and applied to a different population. Some questions should be answered to know the credibility for qualitative research (Table 4).

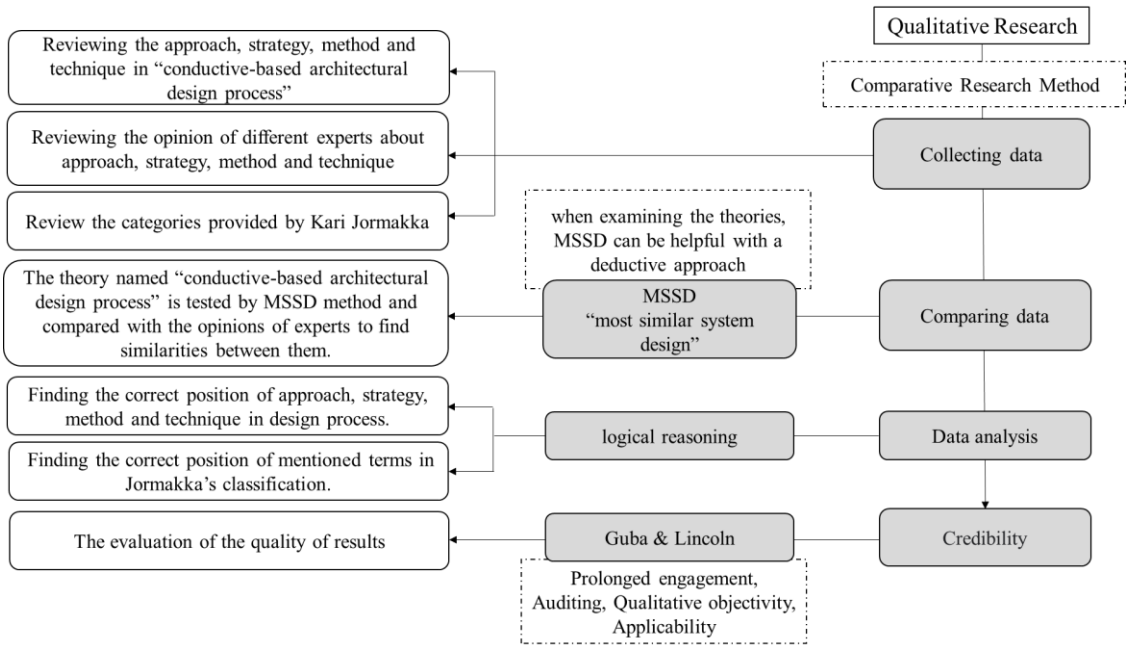

Fig. 2: The general structure of the research method (source: authors).

4.Theoretical Framework

In reviewing research background, it can be seen that in the book named "The design of design" author has emphasized to the position and relation between the terms approach, strategy, method and technique in design process cycle in a model named "conductive-based architectural design process" and among different design models, this model has been selected to examine in this research. The reason for choosing this model as theoretical framework is that the position of the terms approach, strategy, method and technique in the design process and their role in the formation of ideas and concepts has been shown in this model. Also, this model has been formed as a result of two decades of educational experience in practical design workshops in various educational levels in the field of architecture. In the second section of theoretical framework to examine the conductive-based architectural design process and to find the correct position of the terms "approach, strategy, method and technique" in the design cycle, view of different experts in various fields have been analyzed and compared about these terms (Table 2). For this purpose, the attitudes of many experts who have studied these terms in

different fields such as research methods, design process, and design methods have been studied. Then, based on the comparative research method the commonalities between the views have been extracted with MSSD method (Table 3), and the definition for each term has been expressed by authors of this research.

4.1. Conductive-based architectural design process

In the conductive-based architectural design process there are four steps and each step has inputs and outputs. In this process, the idea is formed according to designer's "approach" and concept can be achieved with the help of "strategy", and finally, various "methods" and "techniques" can be used to implement the concept. The process concsists of four steps including the presenting the overall intent of the design, identifying the approach, determining the strategy, and presenting the methods. The elements of this process act reciprocally (Fig 3). A: In the first step called cognition, the main goal of the designer is to know the expected task of the final product by understanding the three issues including: project nature, site and users. The data collected at this stage passes through the filter of the designer's "paradigm" and his/her perception of the world which makes it possible to clearly define the "mission" of the design. B: The second step is to identify the design idea, by clarifying the "approach". In this step, the designer express design idea according to the project mission, and present his/her approach as a special purpose reflecting the ideals of the architect. C: The third step is to discover the concept by determining the "strategy". In this step, the architect expresses the design concept in the form of a temporary answer to the question based on the requirements of the strategy, and determine the design goals. D: The last step is to present the design by clarifying "methods and techniques". The main task of the designer in this step is to provide methods and techniques that allow to the concept to be converted to the final design. At this stage, special techniques can be considered in the presented methods. At the end of this step, both the review and the evaluation of the final design is carried out in accordance with the mission of the project [8].

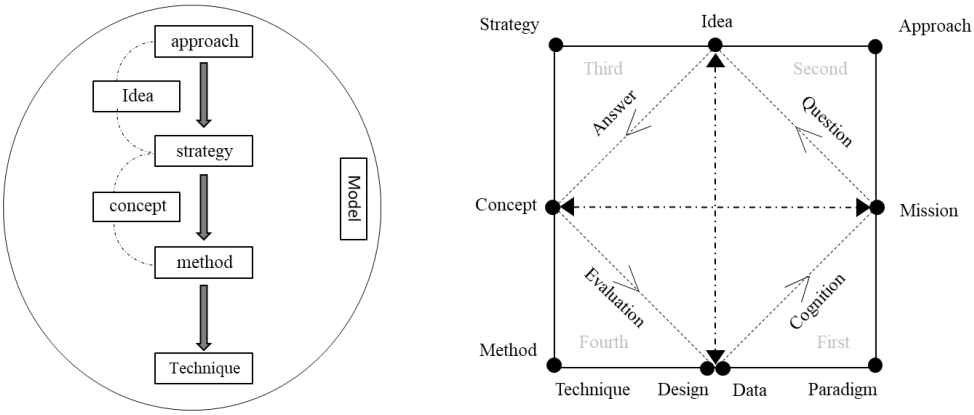

Fig. 3: The conductive-based architectural design process [8].

4.2. Opinions of experts about the approach, strategy, method and technique

The opinion of different experts in various fields about the terms model, approach, strategy, method and technique can be seen in table 2 and the similar ideas have been shown in a radar chart (Fig 4). Following are the most similar ideas expressed by experts:

- **Approach:** The architectural approach emphasizes the ideas expressed in a particular situation [28]. A conscious understanding of the path can be possible with an approach [29]. Some experts describe the term approach in different sentences but same notions: Approach is belief of people about an issue [30], what we believe in, and the sum of our belief [31]. The approach helps understand the issue [32], and choosing the right approach depends on each person's skills. It helps to search for an idea at the beginning of the design process [9], and it includes strategies and methods [32].
- **Strategy:** As discussed, architectural design can be considered as a problem-solving activity [5].

By strategy, the problem can be overcome. The strategy is chosen based on the approach [33], and it is a policy to achieve goals [34]. The strategy is to identify the resources needed to achieve project goal (Best, 2011) [35], and different strategies can be used to achieve different goals [9]. It can be said that a strategy can be applied in the project by using various methods [36].

• **Method**: The right approach is the key to choosing the right method [33]. Method is a way of achieving something and it is chosen based on the approach [31]. Methods can be applied through different tools and techniques [36].

• **Technique:** By selecting a method, the technique is also specified [37]. Techniques are a set of activities that are in line with the method and therefore in line with the approach [31]. Techniques can be considered as tools to implement the methods [30]. No technique could meet all design problems' needs, and those needs might change during the process itself. A design system needs to be flexible and provide agency to its users to select techniques used both initially but also progressively during a generative design process [38] (Table 2).

Table 2: The opinion of experts in various fields about model, approach, strategy, method and technique (Source: authors)

Terms	Authors	View of the author
Model	(Cohen, 2002)	Models are usually used to graphically represent a particular phenomenon [39]
	(Clarke, 2005)	The model is a general framework that is formed based on a philosophical view and can be implemented through a method. The method is placed in a model [37]
	(Ford, 2009)	It is a structure that helps to understand the system and has inputs, processors and outputs [40]
	(Bellinger, 2004)	It is a representation of a system that helps to understand the system [41]
	(Dori, 2011)	An abstraction of the system that explains the various aspects of it [42]
	(Kumar et al., 2014)	An abstraction of a system to represent system properties [43]
Approach	(Hofler, 1983)	An approach is the belief of people about an issue [30]
	(Anthony, 1963)	An approach is a set of principles and rules. What we believe in, the sum of our beliefs [31]
	(Spens, 2006)	The research approach is a conscious understanding of the path [29]
	(Nawi, 2014)	The approach includes strategies and methods. The approach helps to understand the issue [32]
	(Bielefeld and El Khouli, 2017)	The approach helps to search for an idea at the beginning of the design process. Choosing the right approach depends on each person's skills [9]
Strategy	(Best, 2011)	The strategy is to identify the resources needed to achieve the goal [35]
	(Evered, 1983)	The strategy is the policy to achieve goals [34]
	(Grover, 2015)	By strategy, the problem can be overcome. It is chosen based on the approach [33]
	(Cavaye, 1996)	The strategy is a way to do something. It can be done by using various methods [36]
	(Bielefeld, 2017)	Different strategies can be used to achieve project goals [9]
Method	(Hofler, 1983)	The method is formed based on the approach [30]
	(Anthony, 1963)	It is a way of achieving something and it is chosen based on the approach [31]
	(Cohen, 2002)	The method is chosen according to the approach [39]
	(Grover, 2015)	The right approach is the key to choosing the right method [33]
Technique	(Hofler, 1983)	Technique can be considered as a tool to implement the method [30]
	(Anthony, 1963)	A set of activities that are in line with the method and in line with the approach [31]
	(Clarke, 2005)	By selecting a method, the technique is also specified [37]
	(Cavaye, 1996)	Method can be applied through tools and techniques [36]

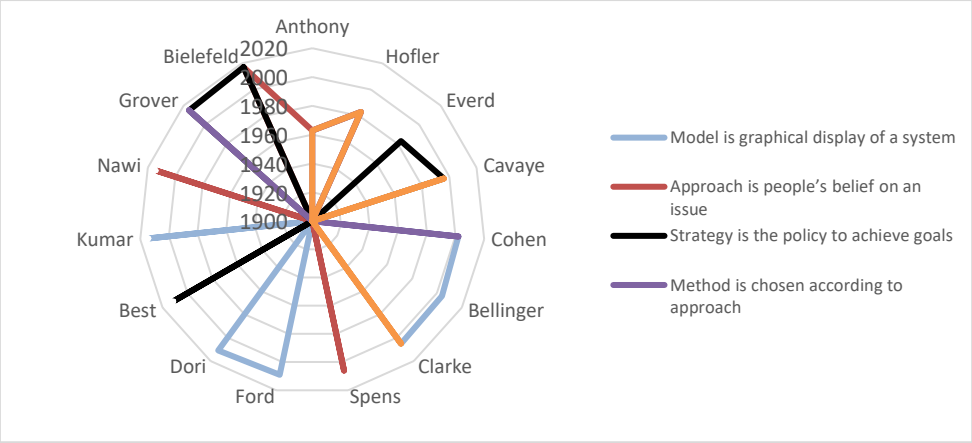

Fig. 4: Similar ideas about model, approach, strategy, method, and technique by different experts over the years (source: authors).

5. Results and Discussion

After analyzing the table 2 and finding the similarities between descriptions, researchers claim that the terms approach, strategy, method and technique can be classified from general and macro to partial and micro in the design literature from approach to technique. The following is the result of the comparative comparison that tables 2 & 3 supports.

• A model is a representation of a system that explains various aspects of the system to better understand it.

• The approach is people's belief and perspective on an issue. It should be noted that strategy and method are parts of the approach.

• The strategy is a plan to achieve goals and is chosen based on the approach.

• The method is the way of achieving the goal, the choice of which is influenced by the approach and can be implemented through various techniques.

• A technique is a tool to implement the method (source: authors).

It can be seen that the definitions expressed by most of experts are the same as the ideas mentioned in the conductive-based architectural design process. In the next step, the quality of results and credibility in qualitative research is evaluated (Table 4)

Table 3: MSSD to compare the terms approach, strategy, method and technique (source: authors)

Terms	MSSD Most Similar System Design	Anthony	Cohen	Ford	Clarke	Cavaye	Hofler	Best	Kumar	Dori	Grover	Bielefeld-El Khouli	Spens	Evered	Nawi	Bellinger
Model	Model is a representation of a system		yes	yes	yes				yes	yes						yes
Approach	Approach Includes strategy and method														yes	
	Approach helps to understand the path											yes	yes		yes	
	Approach is belief of people	yes					yes					yes				
Strategy	A plan to achieve goal							yes				yes		yes		
	Strategy chooses based on approach. It includes methods					yes					yes					

Method	Method is a way of achieving something based on approach	yes	yes				yes				yes					
Technique	Technique is a tool to run method	yes			yes	yes	yes									

Table 4: Guba & Lincoln and Krathwohl: The evaluation of the quality of results [44]

Credibility in qualitative research	General questions	answer
1-Prolonged engagement	Are the research constructs credible for the subjects?	yes
	Were the results what was expected?	yes
	Were the results consistent with previous findings in the literature?	yes
	Were there other valid inferences based on the results or were there other explanations for the relationship?	no
2-Reliability	The extent to which the review process is reliable. The ability of human tools to achieve consistent and logical results.	
3-Qualitative objectivity	The extent to which the product review is verifiable. Including whether the results are rooted in the data?	yes
	Are the results logical?	yes
	Is there a researcher bias?	no
	Has the researcher provided enough details to be able to evaluate the data collection and analysis?	yes
4-Applicability	Does the result of a qualitative study can be transferred to other different environments and applied to a different population?	yes

As table 4 supports, four important criteria for credibility in qualitative research had been investigated. In the next step of the research, Jormakka's idea about these technical terms will be analyzed. It should be noted that although the position of these terms can be considered in the works of other architects and researchers as case studies, this study investigates the Jormakka's ideas.

6. Case Study: The position of approach, strategy, method and technique in Kari Jormakka's thought

Kari Jormakka, an architect, critic and lecturer who is a professor of architectural theory in Austria published a book named "Basics Design Methods" with Oliver Schurer and Dorte Kuhlmann. From the point of view of Jormakka and his colleagues, designers used seven different sources to solve design problems in the late 20th and early 21st centuries. Jormakka has divided each of these sources into subsets and has included examples in each collection in his book. He has presented seven sources that can help the designers in the architectural design process.

There are seven different sources in basic design methods book: 1-nature and geometry as authorities 2-music and mathematics as models 3-accident and the unconscious as sources 4-rationalist approaches 5-precedent 6-responses to site 7-generative processes [45].

The reason for choosing Jormakka's book is that this book has been translated into various languages, this shows the importance of the issues raised by Jormakka in the field of design process. Also, in different sections, he has referred to the terms approach, strategy, method and technique, but it seems that the term method has been used numerously instead of strategy and approach and he had not used any of these technical terms in their proper position in design cycle. In this section, Jormakka's ideas and the way he used these meaningful terms have been analyzed. Then, the categories proposed by Jormakka have been modified based on the results of this research.

6.1 Nature and geometry as a reference

In the first group proposed by Jormakka, the use of nature and geometry by designers is mentioned. 6.1.1 Jormakka has introduced the use of nature or

biomorphic architecture as a “model”. According to his point of view, paying attention to nature makes it possible to achieve models in design process. For example, in designing the TWA Flight Center, Eero Saarinen used a bird-like form to illustrate the idea of motion. Also, Jorn Utzon was inspired by seashells in the design of the Sydney Opera House.

6.1.2 According to Jormakka, using geometry in design is a “method”. Jormakka has mentioned two “methods” of quadrature and triangulation. For instance, Louis Sullivan used a simple square to design a flower, by connecting the diameters together reached the final design. Also, Alvar Aalto applied the method of triangulation in the design of the church façade in Italy and designed the façade with angles of 30 and 60 degrees [45].

It can be said that the use of nature which was considered as the “model” by Jormakka is a “strategy” by which the designers can highlight the concepts of their work such as using the animal skeleton form or natural plant form or the shape of sea creatures (Boiler House, Johnson Wax factory, Sydney Opera House). Also, geometry which was named a “method” by Jormakka is a design “strategy” that can apply to implement the concept through methods such as quadrature and triangulation. In other words, neither of these two items in this section are design methods and both refer to “design strategies” from the authors’ point of view.

6.2 Music and mathematics as models

Jormakka believes that musibutc and mathematics are “models”. Musical analogies, higher dimensions and proportions are included in this section.

6.2.1 For some architects, the question arose as to how music might be used in design. Steven Holl used the composition of Béla Bartók music for designing the Stretto House. In this music, percussion instruments are placed in the middle and stringed instruments are placed on the sides, creating a light and heavy spatial arrangement. Holl used this arrangement and designed four heavy concrete blocks and considered the roofs to be quite light.

6.2.2 Jormakka has referred to display of the fourth dimension in design. Peter Eisenman used intersecting cubes for designing the American Science Center in 1991, which showed his efforts to represent the fourth dimension.

6.2.3 Proportion is another way to use mathematics in design. In the past, Pythagoras found that basic distances in music could be converted into numerical ratios. Le Corbusier also believed that golden proportion was a way to achieve beauty, and based on this belief, he used golden proportion in designing the façade of Ozen Fant in Paris [45].

From Jormakka's point of view, music and mathematics are considered as “models”. The authors believe that the use of music and mathematics in design process are “design strategies”. Musical analogies are in fact design strategies that can be used in architectural design process to convert sound into form with various methods such as phonology or recognizing the musical components. The higher dimension is also a “design strategy” that helps to show the fourth dimension with methods such as converting music into color combinations or displaying the light on the screen. The use of proportion is another “design strategy” that can be exploited with methods such as using intervals of notes in music and golden proportions. In other words, the use of music and mathematics, which are considered as models by Jormakka, are “strategies” in the design process.

6.3 Accident and the unconscious as sources

Jormakka has introduced the accident and the unconscious as sources of inspiration and has considered heterotopia and surrealist devices in this collection.

6.3.1 The design of Alvar Aalto has a special reproductive order called heterotopia. Jormakka has stated that heterotopia is a “design method” in which there is no organizing principle that would collect different forms together. Aalto's design for the Wolfsburg Cultural Center has demonstrated the use of heterotopia.

6.3.2 Jormakka also has mentioned the use of surrealist devices in the set of the accident and the unconscious. Aristotle stated the image appearing in the clouds is like a random painting. Based on this view, a method was proposed for the accidental formation of ink spots on the paper in 1785. In the twentieth century, surrealists introduced a variety of techniques such as grattage, fumage, graphomania, and collage. According to Jormakka, in the field of architecture, the Coop Himmelb(l)au applied surrealist methods for designing the open house in Malibu in 1990. They carried out the design process with a sketch drawn with their eyes closed and converted it to a 3D volume while playing music [45].

Analyzing of this section, it can be said that the accident and the unconscious are some approaches

in design based on inspiration and intuition. Heterotopia which was named a method in Jormakka's book can be one of the strategies in the design process which helps to reach the final design through using method such as combining volumes in the sensory space according to authors. Jormakka sometimes referred surrealist devices as methods and sometimes mentioned them as techniques, while the use of surrealist devices is a method that can apply through various techniques such as collage.

6.4 Rationalist Approaches

When Hannes Meyer declared in 1928 that architecture does not fall into the subset of fine arts and that an architect should not design on the basis of inspiration and intuition, some at the Bauhaus school tried to expand the use of rationalist approaches such as performance form and design research.

6.4.1 The first subset called performance form refers to the use of information related to the program and the site. Before setting out the design, Meyer had emphasized drawing diagrams of solar angles and believed that once these factors are identified, the final design could answer the problem. In the designing of Association Building, Meyer used two performance diagrams and the angle of the sun to start the design assuming that each function requires a certain amount of light.

6.4.2 Design research is the second title in this series. In the 1960s, with the development of computer applications, design research developed and Bill Hillier and Julienne Hanson proposed a space syntax method and tried to model the behavior of residents and visitors [45].

According to the authors, as the title of this group named “rationalist approaches”, a designer can take a rationalist approach in design process and choose the appropriate strategy based on this approach. The two titles named performance form and design research have both been considered as methods in Jormakka's thought, but to the authors, the performance form which is based on the relationship between form and function is a strategy. Design research is also another strategy that can be used in the design process with various methods such as space syntax.

6.5 Precedent

Jormakka has put typology and transformation of a specific model in this category.

6.5.1 Jormakka has introduced typology as a design method. Rossi believed that models can be extracted from similar forms in the past [45].

6.5.2 Regarding the transformation of a specific model, Jormakka has stated that architects can make use of historical building as starting point for design, but it is better to change it instead of imitating its aspects. The design of Ludwig Mies van der Rohe for the German Pavilion in the Barcelona International Exhibition is an example of applying the past works in design [45].

For analyzing this section, it can be said that precedent that has been mentioned as a method in the Jormakka’s classification, is a strategy. Jormakka believes that typology is a method, but from the authors' point of view, it is a strategy in the design process. About transformation of a specific model, firstly, it is better to use the term transformation of a specific type (not a specific model) and secondly transformation of a specific type can be a strategy in the design process.

6.6 Responses to site

From Jormakka's point of view, regionalism and contextualism fall into the subset of response to site.

6.6.1 In regionalism, the architect tries to use the features of the region in the design which is not necessarily taken directly from project site. In regionalism, the designer pays attention to local materials and the local construction. According to Jormakka, Hassan Fathi used a regionalist method in designing buildings in Egypt, using central courtyards and clay materials in 1948 which were the prominent features of Gorna’s architecture.

6.6.2 In contextualism, designers often draw diagrams related to the project environment. Their design is influenced by the lines drawn from the buildings and streets around the project. The diagonal lines in the plan of the Jewish Museum, by Daniel Libeskind, are the reaction to the Baroque Museum [45].

Based on the results of this research and authors’ views, response to site is a strategy. Regionalism is also a strategy that can advance the design process with a variety of methods such as using indigenous materials. Contextualism is another strategy that directs the design process with methods such as the reaction to the surrounding buildings.

6.7 Generative processes

In last classification, Jormakka has mentioned five items named superposition and scaling, morphing-folding and animate form, datascape, diagrams and parametric design, in all of which, design is performed based on a change in a basic variable.

6.7.1 According to Jormakka, Eisenman tried to use Jacques Derrida's idea that 'meanings are never fixed' in design by using the scaling procedure. Moreover, scaling is derived from fractal geometry. In a fractal, similar shapes are repeated at different scales and for this reason fractal for Eisenman, was a way of expressing Derrida's ideas in architecture. Superposition and scaling were used in the design of the Wexner Center in 1983. The city and university networks were analyzed and diagrams were drawn for both networks in four scales. The networks were placed on each other and finally the design emerged from within the networks [45].

6.7.2 Morphing, folding, and animate form mentioned as techniques by Jormakka in this collection. Morphing is formed on the idea that organic forms arise from the transformation of Euclidean geometric forms. In the morphing technique, two or more images are selected and then the hotspots in each image are identified and the first image slowly converts to the second image. Folding also had been mentioned as a "technique" in Jormakka's book. Robeshtack Park designed by Eisenman is an example of folding. Animate form is based on the processing of information outside of architecture which was proposed by Greg Lynn in the 1990s. Lynn Hydrogen House is an example of animate form.

6.7.3 Jormakka has introduced datascape as an "approach". The idea is derived from the work of MVRD group and the design is performed based on a main parameter in it. A good example for datascape is the project Monuments Act 2 by MVRDV in Amsterdam. According to a Dutch law, new buildings should not be seen from the street due to the preservation of the historical context. As a result, the formation of the building based on this data led to the form followed only by the parameter not being seen from the street.

6.7.4 Jormakka also has mentioned the use of diagrams in design. In Mobius House designed by UN Studio in 1997, the design began with a diagram of a Mobius strip. Since the end of the Mobius strip connects to the beginning of the strip with a rotation, the walls and ceilings were intertwined in the design of this house.

6.7.5 Jormakka has referred to parametric design as a "method". In parametric method, a set of parameters are selected to make changes to them, thus the architect allows the form to be created from computer algorithms [45].

Based on the results obtained, the generative processes that Jormakka has introduced as design methods can be considered as "design strategy" in the design process. Jormakka has mentioned superposition and scaling, morphing, folding, and animate form as techniques in the design process, but the authors believe that these items can be design methods. Jormakka has introduced the datascape as "approach", but in the author's view, datascape is a "method" that can be used to implement the concept after finding a solution to the problem. Using diagrams and parametric design are also some "methods". To summarize, it can be said that all five items mentioned in the subset of generative processes can be considered as methods in design process.

As a result, based on the studies performed, the revised classification of Jormakka is done (Table 5). The position of the approach, strategy and method in the Jormakka's categories had been revised based on result of this research (Table 6) (Fig 5).

Table 5: The hierarchy of approach, strategy, and method in Jormakka's categories (source: authors)

Approach	**Rationalist approaches, Accident and the unconscious**
Strategy	Nature and geometry, Music and mathematic, Precedent, Responses to site, Generative processes, Biomorphic, Transformation of a specific model, Typology, Regionalism, Contextualism, Musical analogies, Higher dimensions, Proportions, Performance form, Design research, Heterotopia.
Method	Quadrature and triangulation, Surrealist devices, Superposition and scaling, Morphing and folding and animate form, Data-scape, Diagrams and parametric design.

Table 6: The approach, strategy, method, and technique in Jormakka's thought and authors' view on each collection (source: authors)

Author's View	Jormakka's thought about model, approach, strategy, method, and technique				Author's View
Strategy	**Model**	Biomorphic architecture	Model	Nature and geometry	Strategy
Method	**Method**	Quadrature and triangulation			
Strategy	**Method**	Musical analogies	Model	Music and mathematic	Strategy
Strategy	**Technique**	Higher dimensions			
Strategy	**Method**	Proportions			
Strategy	**Method**	Heterotopia	Method	Accident and the unconscious	Approach
Method	**Technique**	Surrealist devices			
Strategy	**Method**	Performance form	Approach	Rationalist approaches	Approach
Strategy	**Method**	Design research			
Strategy	**Method**	Typology	Method	Precedent	Strategy
Strategy	**Model**	Transformation of a specific model			
Strategy	**Method**	Regionalism	Method	Responses to site	Strategy
Strategy	**Method**	Contextualism			
Method	**Technique**	Superposition and scaling	Method	Generative processes	Strategy
Method	**Technique**	Morphing, folding, animate form			
Method	**Approach**	Dataspace			
Method	**Technique**	Diagrams			
Method	**Method**	Parametric design			

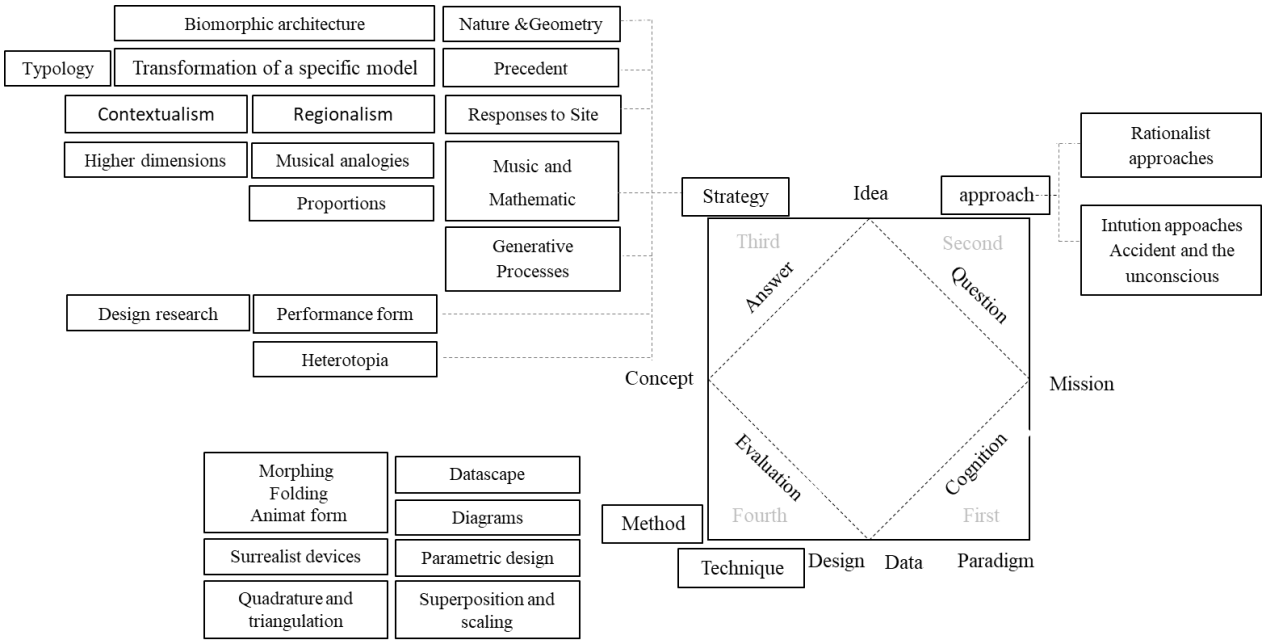

Fig. 5: The correct position of the approach, strategy, method and technique in the classification provided by Jormakka based on the Conductive-based Architectural Design Process (source: authors).

7. Conclusion

To answer first and main question of research, the results show that the terms approach, strategy, method and technique can be classified from general and macro to partial and micro in the design literature from approach to technique. On this basis, the approach is people's belief on an issue and the strategy and method are parts of the approach and the method is the way of achieving the goal that can be implemented through different techniques. The definitions of these important terms in design process based on result of the research have been mentioned:

• The approach is people's belief on an issue. The strategy and method are parts of the approach.

• The strategy is a plan to achieve a goal and is chosen based on the approach.

• The method is the way of achieving the goal that can be implemented through techniques.
• A technique is a tool to implement the method.

In a book entitled "The design of design", Norouz Borazjani (2019) stated that technique is part of method, and method is part of strategy and strategy is part of approach which was in line with the findings of this study. Moreover, Nawi (2014) mentioned that the approach includes strategies that is the same as Grover's idea (2015) which stated strategy is chosen based on the approach. Cavaye (1996) asserted that strategy can be done by using various methods. Cohen (2002) highlighted that the method is chosen according to the approach that is the same idea as Gover (2015) which mentioned that the right approach is the key to choosing the right method.

Clarke (2005) asserted that by selecting a method, the technique is also specified that is the same as Cavaye's idea (1996) which asserted that method can be applied through different tools and techniques. Anthony (1963) stated that techniques are a set of activities that are in line with the method and therefore in line with the approach. The findings of all these studies confirmed and were in line with the findings of the present study.

To answer second question of the research, it can be said that in the classification provided by Jormakka in the field of design process, it seems that Jormakka has examined the types of design in a historical period, then he has chosen a name for each group, and he has used the terms approach, strategy, method and technique, interchangeably and incorrectly in his book. However, it should be noted that according to the results of this research each of these important terms can represent a stage of the design process and has a degree and special position relative to each other.

It can be said that out of seven major collections presented by Jormakka, five are considered as design strategies including nature and geometry, music and mathematics, precedent, responses to site, and generative processes. Accident and the unconscious are the intuition-based approaches. Rationalism is also an approach that one could choose in the process of architectural design to find an idea. Out of the eighteen subsets described as design methods, only six subsets can be considered as methods: quadrature and triangulation, surrealist devices, superposition and scaling, morphing and folding and animate form, data-scape, diagrams and parametric design. The others are design strategies that can be used to achieve a concept. Totally, results show that out of the eighteen subsets mentioned as design methods by Jormakka only six subsets can be considered as methods and the rest can be design strategies.

References

1. Chandrasekaran, B.: 1989, A framework for design problem-solving, Research in Engineering Design, 1(2), 75-86.
2. Rezaei, M.: 2014, Design analytica: reviewing theories and concepts in contemporary design process of form and space, Islamic Azad University, Central Tehran Branch, Tehran, Iran.
3. Priya, R. S., Shabitha, P., & Radhakrishnan, S.: 2020, Collaborative and participatory design approach in architectural design studios, Social Sciences & Humanities Open, 2(1), 100033. https://doi.org/10.1016/j.ssaho.2020.100033
4. Jones, J.C.: 1992, Design methods, John Wiley & Sons.
5. Abdelhamid, T.G.: 2020, A 10-Step Design Process for Architectural Design Studios, In Sustainable Development and Social Responsibility, Springer, Cham, (1), 1-11. https://doi.org/10.1007/978-3-030-32922-8_1
6. Diaz, H., Alarcón, L. F., Mourgues, C., & García, S.: 2017, Multidisciplinary Design Optimization through process integration in the AEC industry: Strategies and challenges, Automation in Construction, 73, 102-119. https://doi.org/10.1016/j.autcon.2016.09.007
7. Shariatrad, F., Pourabrishami, P.: 2021, Sources of Architectural Ideation and the Contribution of Each in the Design Process of Architects and Architecture Students (Case study: Architecture students of Shahid Beheshti University), Honar-Ha-Ye-Ziba: Memary Va Shahrsazi, 26(1), 69-77. https://doi.org/10.22059/jfaup.2022.310743.672533
8. Norouz Borazjani, V., Dubberly, H.: 2019a, The Design of design; How do you design? A compendium of design models from 1939 to 2008, Mehraz, Tehran.
9. Bielefeld, B., El Khouli, S.: 2017, Basics Design Ideas, Birkhäuser, 16-17.
10. Mavros, P., Conroy Dalton, R., Kuliga, S., Gath Morad, M., Robson, S., & Hölscher, C.: 2021, Architectural cognition cards: a card-based method for introducing spatial cognition research and user-centred thinking into the design process, Architectural Science Review, 1-18. https://doi.org/10.1080/00038628.2021.2008299
11. Rezaei, M.: 2020a, Common People: Internal Meta-Criterion for Successful Plans (Review of Tehran's Urban Design Projects Implemented in Three and a Half Decades since the 1980s). Armanshahr. 13(31), 241-252. https://www.sid.ir/en/Journal/ViewPaper.aspx?ID=828119
12. Rezaei, M.: 2020b, Reviewing Design Process Theories: Discourses in Architecture, Urban Design and Planning Theories, Springer Nature.
13. Faizi, M., & Khakzand, M.: 2009, Drawing diagrams as an aid to architectural design process, IJIEPM, 19(6), 1-11.
14. Alexander, C.: 1964, Notes on the Synthesis of Form (Vol. 5), Harvard University Press.
15. Broadbent, G., Ward, A.: 1969, Design methods in architecture, New York: George Wittenborn.
16. McGinty, T.: 1979, Design and the design process: Introduction to Architecture, McGraw-Hill Company. New York. USA.

17. Alexander, E. R., & Faludi, A.: 1989, Planning and plan implementation: notes on evaluation criteria, Environment and planning B: Planning and Design, 16(2), 127-140. https://doi.org/10.1068%2Fb160127.
18. Jencks, C.: 2002, The new paradigm in architecture: the language of post-modernism, Yale University Press.
19. Lawson, B.: 2012, What designers know, Routledge.
20. Bastani, M., & Mahmoodi, A.S.: 2018, Conceptualization methods in the design process of architecture. Honar-Ha-Ye-Ziba: Memary Va Shahrsazi, 23(1), 5-18. https://jfaup.ut.ac.ir/article_67904_4ed8d37f5d7c4827557373b7634536db.pdf
21. Niknam, A.S.A., Bazrafkan, K., Ali, M.P.: 2018, Presentation Analytical Framework of Manufacturing Production Process in Architecture: Objectification to Subjective Idea, Urban management, 51, 21-37. (In Persian)
22. Akbari, A.A., Bazrafkan, K., Tehrani, F., Sultanzadeh, H.: 2017, Explaining the methods of contextualism and regionalism design in Iranian architecture (study sample: significant works with different time periods from the architecture of Tehran), Urban Management, 16(3), 327-342. (In Persian)
23. Masoud, M., Valid, M.S., Hosseini, Y.S.S.: 2011, Role of Analogy in Architectural design process, Soffeh, 21(2), 33-42. (In Persian)
24. Mahmoodi, A.S.: 2005, Design Thinking the Interactive Model of Thinking and Design, Honarhaye Ziba, 20, 20-36. (In Persian)
25. Mirmoghtadaee, M., Ganjizadeh, N., Hosseinabadi, S.: 2018, The nature of research methods in architecture and urban design, Journal of Architectural & Environmntal Research, 1(1), 1-12. https://dx.doi.org/10.30470/jaer.2018.32724
26. Norouz Borazjani, V.: 2019b, Qualitative research methodology, Yadavaran international research and publishing company, Tehran, 159. (In Persian)
27. Anckar, C.: 2008, On the applicability of the most similar systems design and the most different systems design in comparative research, International Journal of Social Research Methodology, 11(5), 389-401. https://doi.org/10.1080/13645570701401552
28. Bajçinovci, Q. B., Bajçinovci, B., & Bajçinovci, U.: 2020, Architectural Design Process: Consulting with Nature, Journal of Science, Humanities and Arts, 7. http://dx.doi.org/10.17160/josha.7.2.643
29. Spens, K. M., & Kovács, G.: 2006, A content analysis of research approaches in logistics research, international journal of physical distribution & logistics management. https://doi.org/10.1108/09600030610676259
30. Hofler, D. B.: 1983, Approach, method, technique a clarification. https://doi.org/10.1080/19388078309557742
31. Anthony, E. M.: 1963, Approach, method and technique, English language teaching, 17(2), 63-67.
32. Nawi, M. N. M., Osman, W. N., & Che-Ani, A. I.: 2014, Key factors for integrated project team delivery: A proposed study in IBS Malaysian construction projects, Advances in Environmental Biology, 8(5),1868-1873. https://www.semanticscholar.org/paper/Key-factors-for-integrated-project-team-delivery%3A-A-Nawi-Osman/6fc5e82040153d6cc98d18a86eb549fa4b8f4053
33. Grover, V.K.: 2015, Research Approach: an overview, International Multidisciplinary Research Journal, 4(8). https://www.researchgate.net/profile/Vijay_Grover/publication/273352276_RESEARCH_APPROACH_AN_OVERVIEW/links/54ff0d500cf2eaf210b4a3eb/RESEARCH-APPROACH-AN-OVERVIEW.pdf
34. Evered, R.: 1983, So what is strategy? Long range planning, 16(3), 57-72. https://doi.org/10.1016/0024-6301(83)90032-8
35. Best, K.: 2011, What can design bring to strategy? Designing thinking as a tool for innovation and change, In Holland University of Applied Sciences.
36. Cavaye, A. L.: 1996, Case study research: a multi-faceted research approach for IS, Information systems journal, 6(3), 227-242. https://doi.org/10.1111/j.1365-2575.1996.tb00015.x
37. Clarke, R.J.: 2005, Research Models and Methodologies, HDR Seminar Series. Faculty of Commerce, Spring Session.
38. Mukkavaara, J., & Sandberg, M.: 2020, Architectural design exploration using generative design: framework development and case study of a residential block, Buildings, 10(11), 2. http://dx.doi.org/10.3390/buildings10110201
39. Cohen, L., Manion, L., & Morrison, K.: 2002, Research methods in education, Routledge.
40. Ford, A.: 2009, Modeling the Environment, 2nd ed, Island Press, Washington D.C.
41. Bellinger, G.: 2004, Modeling & Simulation, An Introduction [Online].
42. Dori, D.: 2011, Object-process methodology, Encyclopedia of Knowledge Management, Second Edition, 1208-1220. IGI Global. https://doi.org/10.4018/978-1-59904-931-1
43. Kumar, A., Nori, K. V., Natarajan, S., & Lokku, D. S.: 2014, Value matrix: From value to quality and architecture, In Economics-Driven Software Architecture, 205-240, Morgan Kaufmann. https://doi.org/10.1016/B978-0-12-410464-8.00010-6
44. Mohammad Pour, A.: 2010, Anti-Method: Logic and design in qualitative methodology, Publications of Sociologists, Tehran, 496-501. (In Persian)
45. Jormakka, K.: 2014, Basics design methods, Birkhäuser.