Research Paper: Assessing the Globalization Model of Traditional Architecture through Industrialization (Case Study: Rural Areas of Iran)

Seyed Mahmoud Taghavi Sangdehi[1], Mohsen Vafamehr[2*]

1. PhD Student, Department of Architecture, Faculty of Art and Architecture, South Tehran Branch, Islamic Azad University, Tehran, Iran.
2. Professor, Department of Architecture, Art and Architecture College, Mashhad branch, Islamic Azad University, Mashhad, Iran.

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ABSTRACT

Purpose: This study has been carried out with the aim of Assessing the globalization model of traditional architecture through industrialization with an approach to sustainable development.

Methods: This studyis practical and analytical in terms of purpose, and is quantitative research. A questionnaire was used to collect data and data analyzed using SPSS software as well as (FARAS & BMW) models. To mentionThe validity of the questionnaire was confirmed by experts and their reliability was also confirmed using Cronbach's alpha of 0.89. The statistical population consists of expert professors and elites in the fields of civil and urban engineering, architecture, and rural planning; 30 people were selected as a size based on targeted sampling.

Results: the results showed that economic, social, cultural, political, technological, and environmental dimensions are adaptable to rural areas in Iran. Based on the obtained results of the FARAS model, the cultural dimension with a weight of 0.462 has the highest adaptation, while the political dimension with a weight of 0.280 has the least adaptation. Finally, the results of the BMW model showed that the highest degree of adaptation in the economic dimension belongs to the economic policy variable with a weight of 0.110in the social dimension belongs to the education variable with a weight of 0.107 in the cultural dimension belongs to lifestyle variable with a weight of 0.118, in the political dimension belongs to the government support with a weight of 0.057, in the technological dimension belongs to the technical equipment variable with a weight of 0.079, in the environmental dimension belongs to the sustainable development with a weight of 0.082.

Conclusion: the findings showed that the implementation of an industrialization strategy in the traditional architecture in rural areas of Iran requires access to government support, government policies, political trust, lifestyle, consumption patterns, informing, identity formation, production and distribution, investment, economic policies, economic stability, advertisement and awareness, social marketing, education, social cohesion, technical requirements, upgrading equipment, environmental preservation, ISO compliance, and sustainable development.

Keywords:
Globalization, Traditional architecture, Industrialization, Sustainable development, Iran's rural areas

*** Corresponding Author:**
Mohsen Vafamehr, PhD
Address: *Department of Architecture, Art and Architecture College, Mashhad branch, Islamic Azad University, Mashhad, Iran.*
Tel: *+98 (936) 3423195*
E-mail: *Dr.vafamehr@gmail.com*

1. Introduction

Systematic investigation of the spatial nature of geographical phenomena is considered one of the most efficient approaches among today's geographers (Saeidi et al., 2013:7-23). Housing as one of the essential elements in the rural spaces is the result of the interaction between humans and the environment (Seydaiy & Ghasemian, 2012: 87-106). Housing has undergone various changes along with the changes in rural life, so that, the shape, pattern, and function of housing as the vanishing point of various factors is represented as environmental-ecological factors, socio-economic relations, sets of decisions and policies, and spatial-local processes (Saidi & Amini, 2010: 30-31). Ritter, at his first attempt, considers the type of rural houses as the result of the complex relationship between humans and the environment which is formed by cultural characteristics, welfare status, and social-economic facilities of the rural residents (Seydayi & Ghasemian, 2012: 87-106). Bromberger relates natural and human factors in the establishment of rural housing (Behfrouz, 2007: 227). Similarly, Cohen highlighted the changes in the shape and rule of villages as well as their building accessories from the view of rural geographical study (Seydaiy & Ghasemian, 2012: 87-106). In this regard, it seems that under the influence of the determining factors of the village life flow, rural housing explains its architectural structure to meet the needs of its various functional, cultural, aesthetic, and social functions (Askari Rabbory et al., 2016: 37). Therefore, vernacular and traditional rural architecture has gradually evolved and now has basis, variables and theoretical foundation related to its structure. Thus, the cognition of vernacular architecture of rural areas determines the simple and direct relationship between the life structure of its residents and their needs, in addition to the way of transformation from the needs to housing and creation of other living spaces (Rezaee & Molavi, 2014: 175).

In the meantime, early advances in technology and modern building materials have triggered a widespread revolution in industrialization construction that leads to the necessary change in the traditional methods of building construction due to the demand and needs of the current era (Bani Masoud, 2009: 40). This approach improve the quality, construction time, and production circulation, and as result, will have a great impact on the cost-effectiveness of housing and building production. Industry can be seen as the application of complex and at the same time reasonable methods in the production of economic goods and services. In other words, the application of complex methods is defined as using machines that improve the quantity and quality of building production (Foyouzat & Mobaraki, 2012: 21). The construction and housing sector can be identified as one of the most important sectors of development in the society. In general terms, this sector with its vast economic, social, cultural, environmental, and physical dimensions has a widespread impact on demonstrating the characteristics and image of the society (Khezriyan & Saghafi, 2017: 186). In most developing countries, construction industrialization plays an important role in building production. Since 1951 Iran has attempted building construction several times by industrial methods but has failed to utilize and develop the industrialization of buildings (Falah, 2011: 2). It is important to point out that the process of mass production in Iran varies from the developed countries. Since our country is a developing country and housing in rural areas is considered one of the essential indicators of development, it is necessary to pay attention to the rapid and substantive issue of construction. Many studies have been proposed about the necessity of taking an approach to industrial methods of building construction regarding the ever-growing need for housing in the aftermath of the ever-increasing population as well as the inefficiency of common and traditional systems in mass production of housing (Yousefpour & Nasiri, 2017: 1). On the other hand, Iran faces an enormous challenge in construction areas due to the massive shortage of dwellings, low bargaining power of buyers, in addition to low speed and quality of construction in urban areas. The current challenge is so essential that place the importance of design quality in the next category. So apparently, all the existing conditions in Iran's housing and architecture market in rural areas are leading to industrialization in rural areas. As some of these trends can be seen in the objectives of the development plan following Iran's 20-year vision document (Majedi, 2009: 13).

The implementation of the globalization model of traditional architecture through industrialization in rural areas of Iran, besides industrializing the design of buildings can also perfectly meet the needs of its users including functional requirements, relief conditions, climatic issues, aesthetics, flexibility, diversity, social and cultural issues, elegant urban landscape, identity formation, etc. in this respect, the industrialization category in rural areas of Iran, needs implementation of traditional architecture principles through industrialization in rural areas. Meanwhile, it is necessary to study the implementation of the globalization model of traditional architecture through industrialization. The present study aimed at investigating the following question:

- To what extent are rural areas of Iran compatible with the globalization model of traditional architecture through industrialization?

2. Literature Review

Concerns regarding the background and time interval of the formation of the concept of globalization have led to various approaches and opinions. Ronald Robertson illustrates that major religions and empires were forms of globalization in the earliest period of history. However, he argues that the scientific debate on the term "globalization" has been used since the mid-1980 (Robertson, 2006: 17-19). Lyotard explores the idea of the main roots of globalization in the thoughts of philosophers of the enlightenment which led to the formulation of the first declaration of human rights (Hosseinzade, 2006: 61-69). Additionally, one of the debating issues regarding globalization can be vernacular and traditional architecture. The debate over the vernacular and traditional architecture does not have many records, and perhaps it is no more than half a century that we have access to significant written materials.Moreover, we can rely on the findings of others, to explore the complexity and characteristics of them (Falamaki, 2005: 10). Experts have analyzed vernacular and traditional architecture upon different perspectives. Paul Oliver (1987), in the encyclopedia of vernacular architecture, has divided the methods of studying vernacular architecture into three categories: single-disciplinary and interdisciplinary approaches to vernacular architecture, study on typology, and eventually, in 1988 Brenskill mentioned in the picture guidebook of architecture about the study of the vernacular architecture which can be done through five stages, each can be utilized regarding the requirements. The first stage is the study of the entire vernacular architecture, which can be done by studying a certain sector or topic (fieldwork, etc.). The second stage is registration and documentation. The third stage is centralized registration and documentation during documenting the progress of monument buildings for study through maps. The fourth stage takes a careful examination of the documents of buildings and their owners to investigate hidden issues. And the fifth stage is document destruction (Oliver, 1987:12-14). From the modernist perspective, vernacular and traditional architecture, logical and rational responses to (human activity) function, regional, natural and aesthetic characteristics, vernacular materials, and construction methods are discussed. This perspective is a response to human needs. On the other hand, most of the sensory and experimental qualities are taken into consideration, and the mere aspect of modern architects' rationalism is criticized. This perspective was supported by the presentation of the 1964 Rudofsky exhibition of architecture, which led to the breakdown of the conception of architecture and expanded the scope of architectural study. Following this, interest in documenting, classifying, and naming became the main endeavour of the study of vernacular architecture. These studies demonstrate extreme cultural diversity embodied in the vernacular architectural expression (Li, 2013: 40). As such, vernacular architecture speaks of a distinct local culture; the culture that is formed and grows by the people in the same place and and is affected by difficult events. But it will be adaptable to the same people with their native culture (Memarian, 2007: 182). In the same way, rural architecture is another name referred to as vernacular architecture and even in some sources they are used interchangeably (Alpago-Novello, 2005: 25). At first glance, the architecture of rural dwellings looks simple and basic, but it is built by highly intelligent and skilled people (Zargar, 2011: 9). In recent years vernacular architecture in villages has undergone changes across the globe as well as developing countries. In the meantime, early advances in technology and modern building materials have triggered a wide spearing revolution in the field of building industrialization that leads to the necessary changes in the traditional methods of building construction due to the demands and needs of the current situation (Bani Masoud, 2009: 54). In a comprehensive definition, industrialization is a production paradigm that includes systematic planning and methods that enhance the resource consumption and labor by optimizing the application of equipment and technology in the process of construction (Khezriyan & Saghafi, 2017: 189).

As explained, the industrial construction method is usually based on non-traditional methods and includes a combination of materials and methods for design and construction (Douglas, 2016: 31). The industrialization of construction which encompasses new building materials, structures, services, and use of new knowledge, the mechanization, prefabrication, and automation of construction are defined as an investment in equipment, facilities, and technology to increase the output, saving manual labor, and improving the equality (Sebestyen, 2003: 54). Construction method includes design rules and methods of production. In a sense, its part is compatible with each other, and take advantage of various construction and assembly components. The compatibility of components and various assembly methods of construction have been brought about by the dimensional method, permissible error, as well as joint connection. To put it in other words, the construction method is de-

fined as establishing a method of building construction or a set of construction components that are assembled in different ways to create various facades (Sarja, 1998: 37). The necessary conditions for the success of this procedure includes the concentration of production, standardization, specialization, organization, suitable mass production, and convergence (Waszawski, 1999: 28). Nowadays, the industrialized construction of buildings suggests applying modern methods and organized designs, production planning and controlling, as well as automation and mechanization process of production (Khezriyan & Saghafi, 2017: 189). According to the "literature of industrialization", the following can be regarded as the advantages and disadvantages of this method:

Rapid manufacturing and mass production: mass production, new technology, prefabrication, etc., are among the strategies for speeding up the process of building construction and housing supply to solve the issue of Iran's housing (Daneshpour & Hosseini, 2012: 68). Mass production: another industrialization basis is the necessity of high-volume of manufacturing. Hence, the expected benefits of industrialization can often be achieved through high-volume manufacturing (Asefi et al., 2017: 23). Quality control-process capability: industrialization methods are considered as one of the appropriate methods with maximum monitoring and quality control-process capability. In general, the exploitation of building industrialization can be explored by a better monitoring capability (Vafamehr, 2013: 34). Reducing construction waste at the end of the span-life of buildings: many industrialization strategies produce less construction waste as a result of recyclability of materials and extending the service life of buildings that seems to be an important parameter in terms of companionship and harmony with nature. The impossibility of optimal implementation and design limitations: designs of industrialization buildings are facing many challenges regarding the necessity of complying with the modular size and dimensions and complying with the requirements of each industrialization strategies. The strategy of industrialization of building construction should undergo the design and production process with a pre-determined plan. The impact is a restriction in making changes during design execution, also facing problems with local and indigenous labor forces in the implementation process, due to the strong correlation with fixed executives (Vafamehr, 2013: 39; Durmisevic & Linthorst, 2000: 88). Low-volume manufacturing: relative, uniformity, and similarity of building patterns: one of the most important principles of industrial production is mass production that used to be interpreted as serialization that is due to the superficial similarity between the products of a production line as a result of a common design pattern. With the emergence of the open system, products can be distinctive by scarce flexibility and free movement of goods. Nevertheless, there is still a low volume of industrial products that leads to uniformity and similarity of industrialized buildings. One of the major theories regarding industrialization and globalization of traditional architecture is sustainable development. The central framework of sustainable development meets the needs of the present generation. The major principle of sustainable design is Human Design which illustrates the entire component's ability to live on the earth. Human survival is dependent on the need to preserve the concatenation of the life components on the earth. The most essential role of architecture is to improve the security, health, and comfort of occupants in a building (Armaghan & Gorji Mehlabani, 2009: 27).

Therefore, this study uses sustainable development approach for implementing the globalization model of traditional architecture through industrialization in technological, economic, cultural-social, and political dimensions in rural areas of Iran.

Until now, no research at the domestic or global level has been observed. Moreover, the studies in the field of traditional and industrialized architecture were conducted separately. No study has been conducted regarding the implementation of the globalization model of traditional architecture through industrialization in rural areas of Iran. However, the studies related to the title and content of this research will be discussed in the following part:

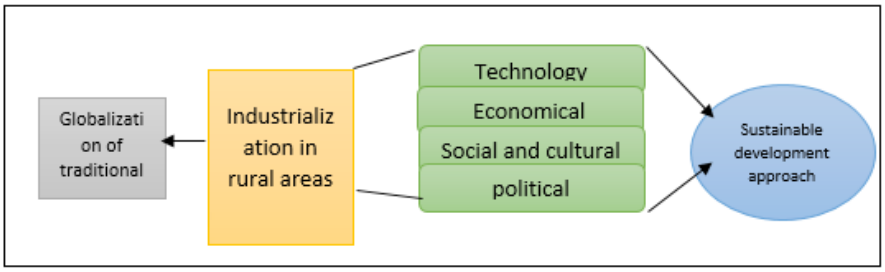

Figure 1. Conceptual model of the research

Javani (2016) in a study titled "analyzing the traditional architecture of rural areas and its function regarding the materials and design of buildings (case study: Karangan village in Varzaqan city)" found that the architecture of Kargan village, as the function of dwelling units was satisfying and have provided a suitable condition for the residents. Bayat and Taherkhani (2016) in a study titled "investigation on comparing conventional and industrial construction method with the perspective of time and cost" found that because of the parallel production completion date in industrial construction it does not take as long as traditional construction does. Furthermore, the initial investment cost is much higher compared to the traditional method and since a significant part of operating cost is dedicated to purchasing materials and equipment for an industrialized building system through allocating the operational credit at the start of the operational process, the operating costs concerning the construction as well as the effect of inflation on it could be controlled. Altogether the total building cost can be reduced. In short, the industrialized construction system increases direct costs, while reducing indirect costs. Asefi et al. (2017) in a study titled "assessing the strengths and weaknesses of industrialized construction in housing" found that the set of industrialization components agrees with jurisprudential and physical principles of Islamic housing by 63%, which indicates an acceptable consistency. The set is compatible with semantic principles of Islamic housing by 17%, which indicates a contradiction between industrialization and semantic principles of Islamic housing. Thus, it can be concluded that the relationship between industrialization and Islamic housing is a consistent and positive relationship with contradictions just in "design constraints". Atayean and Asadi Malek Jahan (2019) in a study titled "comparing the comparative method of industrial construction with the traditional method with the perspective of time, cost, and quality" found that according to the unsatisfactory results in the construction industry, the conventional construction systems cannot meet the needs of the country. Thus there will be the economic justification of mass production by utilization of industry in construction with the mentioned criteria, and by affording LSF (lightweight steel framing) building. Keyvanijad et al. (2019) in a study titled "Adaptation of Pattern Language with Iranian rural Vernacular Architecture along with environmental sustainability (case study: lafoor village) found that the major advantage of villages is identified as the ecological beauty of rural architecture, utilization of local materials, coordination between environmental exposure condition in an urban settlement and building construction, settlement of the villages in the natural bed and integration of natural landscape in architecture. Rezaei et al. (2020) in a study titled "analysis evolution of contemporary commercial space in Tabriz with the emphasis on Tabriz grand Bazaar" found that this bazaar has played an international and national role. It can create and form value-added activity clusters, but with the advent of modernity, the introduction of new goods and services, and the emergence of new spaces have stagnated. Behbahani et al. (2020) in a study titled " rereading the features of vernacular architecture in the housing of coastal villages of Bushehr" found that the architecture of these areas despite simplicity follows principles that have its roots in culture as well as the native cognition of his residence because traditional architecture is built by the villagers themselves who share collective intelligence. The architecture of the coastal villages of Bushehr has its architectural language and demonstrates certain principles. Hence, the characteristics of the vernacular architecture of Bushehr villages include: providing climate comfort, utilizing technology and local materials, and partnership with natives in the construction design. Ermolli and Galluccio (2019) in a study titled "investigating the possibilities offered by the design and production paradigms of Industry 4.0 in the Architecture, Engineering & Construction industry is hereby proposed an interpretation of the meaning that an industrial transformation of the AEC industry takes over for the Architectural design, simulating a methodology in a BIM environment for the design of residential buildings in Cold-Formed Steel with drywall envelopes, exploiting the potential of digital manufacturing and computational design advanced tools. Wu et al. (2019) in a study found that greening integration and science are the evolution path building technology in the new era. Not only building technology is a necessary means of building realization, but also its influence on the regionalization of architecture should be supplemented and promoted.

3. Methodology

The research method in terms of purpose is practical and analytical, and in terms of method, is quantitative research. The data collection tool was questionnaire and SPSS software as well as FARAS & BMW models were used for data analysis. The validity of the questionnaire was confirmed by experts and their reliability was also confirmed using Cronbach's alpha of 0.89. Indicators and dimensions of research were reflected by the authors of this research in form of a questionnaire after developing the globalization model of traditional architecture through industrialization. Then the questionnaires were distributed among experts (Figure 1). The statistical

population in this study consists of expert professors and elites in the field of civil and urban engineering, architecture, and rural planning. 30 people were selected as a sample size based on targeted sampling.

4. Findings

At first, a one-sample t-test and Spearman's correlation were used to assess the compatibility of the recommended variables with rural areas. Before any assessment Kolmogorov-Smirnov test was used to ensure the normality for each dimension. This test is considered to be a matching test for quantitative data. This test is based on the difference of observed relative cumulative frequency with the expected value under the null hypothesis which means:

Null hypothesis (HO) testing is: the normality of the dimension's distribution

Alternative hypothesis (H1) is: non-normality of the distribution of the examined dimensions

If the significance level of the test is less than 0.05, the null hypothesis is rejected with a 0.95 confidence interval which means we are dealing with the non-normal distribution of data. If the significance level of the test is greater than 0.05, the null hypothesis is accepted and normal data distribution is assumed (Figure 2).

According to the results obtained from Table 2, a p-value higher than 0.05 of the examined dimensions indicates the normality of data distribution. Therefore, the parametric t-test can be used. The results are described in Table 3.

According to the results obtained from Table 3, the compatibility of recommended variables in the environmental, economic, social, cultural, political, and technological dimensions was evaluated with high values of the average (higher than average No. 3). In this regard, FARAS model was used to rank and adjust the compatibility of each recommended dimensions.

After normalizing the initial values in a Matrix, the optimal value function and degree of desirability were determined.

According to the obtained results among recommended dimensions, the cultural dimensions with a weight of 0.462, economical with a weight of 0.445, social with a weight of 0.434, environmental with a weight of 0.370, technological with a weight of 0.350, and political with a weight of 0.280 has the most and least compatibility with rural areas respectively. But this degree of compatibility among dimensions is too general and needs each variable to be ranked partially. In this regard, the BMW model was used to rank each recommended variable.

According to the obtained results of Table 6, and figure 3, economic policies with a weight of 0.110, economic stability and production and distribution with a weight of 0.103, and investment with a weight of 0.096 have the most and least compatibility with rural areas of Iran respectively.

Table 1. Recommended indicators and dimensions for the globalization of traditional architecture through industrialization

Indicators	Dimensions	Indicator	Dimensions
Advertisement and awareness	Social	Government support	Political
Social marketing		Government policies	
Education		Political trust	
Social cohesion		Lifestyle	Cultural
Technical knowledge	Technological	Consumption patterns	
Information exchange		Informing	
Technical requirements		Identity formation	
Upgrading equipment		Production and distribution	Economic
Environmental preservation	Environmental	Investment	
ISO Compliance		Economic policies	
Sustainable development		Economic stability	

Source: research finding

Table 2. The results of the Kolmogorov-Smirnov test of dimensions

result	Significant level	Kolmogorov-Smirnov Z	Dimensions of the globalization of traditional architecture through industrialization
Accepting the null hypothesis- normal distribution of data. P>0.05	0.175	1.103	Cultural
Accepting the null hypothesis- normal distribution of data. P>0.05	0.094	1.241	Economic
Accepting the null hypothesis- normal distribution of data. P>0.05	0.100	1.231	Social
Accepting the null hypothesis- normal distribution of data. P>0.05	0.113	1.213	Cultural
Accepting the null hypothesis- normal distribution of data. P>0.05	0.154	1.131	Political
Accepting the null hypothesis- normal distribution of data. P>0.05	0.167	1.125	Technological
Accepting the null hypothesis- normal distribution of data. P>0.05	0.159	1.128	Environmental

Source: research finding

Table 3. Assessing the compatibility of the recommended variables of globalization of the traditional architecture through industrialization in rural areas of Iran

95% confidence interval of the difference		Significance level (2 ranges)	T	Mean	variables		Dimensions
lower	upper						
3.87	3.98	0.000	26.334	3.76	Government support	X11	Political
3.76	3.85	0.000	26.330	3.56	Government policies	X12	
4.00	4.13	0.000	26.400	3.85	Political trust	X13	
3.90	4.05	0.000	26.456	3.87	Lifestyle	X21	Cultural
4.04	4.15	0.000	26.480	3.98	Consumption patterns	X22	
4.04	4.15	0.000	26.480	3.98	Informing	X23	
4.01	4.11	0.000	26.467	3.91	Identity formation	X24	
3.00	3.23	0.000	26.500	3.11	Production and distribution	X31	Economic
3.56	3.85	0.000	26.330	3.76	Investment	X32	
3.89	4.07	0.000	26.458	3.92	Economic policies	X33	
3.89	3.67	0.000	26.211	3.56	Economic stability	X34	
3.00	3.23	0.000	26.510	3.13	Advertisement and awareness	X41	Social
2.98	3.15	0.000	26.480	3.04	Social marketing	X42	
3.11	3.34	0.000	26.545	3.23	Education	X43	
3.22	3.45	0.000	26.554	3.33	Social cohesion	X44	
2.90	3.10	0.000	26.466	3.00	Technical knowledge	X51	Technology
2.84	3.02	0.000	26.450	2.94	Information exchange	X52	
2.90	3.10	0.000	26.466	3.00	Technical requirements	X53	
2.98	3.15	0.000	26.480	3.05	Upgrading equipment	X54	
3.32	3.54	0.000	26.675	3.43	Environmental preservation	X61	environmental
3.44	3.66	0.000	26.765	3.55	ISO Compliance	X62	
3.45	3.72	0.000	26.667	3.56	Sustainable development	X63	

Source: research finding

Table 4. Continued: integration of experts' opinions regarding the recommended variables and dimensions

	Economic			Social			Cultural			Political			Technological			Environmental		
	α	β	γ	α	β	γ	A	β	Γ	α	β	γ	α	β	γ	A	β	Γ
X11	3.11	3.21	3.12	3.21	2.33	2.11	3.67	3.77	3.90	3.11	2.10	2.10	3.11	3.21	3.22	3.66	3.70	3.86
X12	3.11	3.11	3.12	3.11	2.10	3.04	3.35	3.66	3.66	3.11	2.12	3.00	3.10	3.11	3.14	3.66	3.51	3.66
X13	3.33	3.32	3.45	2.44	2.42	2.45	4.11	4.10	4.33	2.11	2.11	2.12	3.09	3.43	3.22	4.00	4.12	4.09
X21	3.23	3.67	3.00	2.23	2.87	2.89	4.11	4.00	4.43	2.12	2.21	2.22	3.16	3.00	3.07	4.11	3.55	3.08
X22	3.13	3.42	3.44	2.34	2.42	2.45	3.33	4.11	4.45	2.11	2.09	2.13	3.03	3.21	3.11	3.66	3.68	3.77
X23	3.54	3.32	3.53	2.51	2.56	2.51	4.00	4.00	4.21	2.06	2.10	2.16	3.00	3.11	3.21	3.13	3.54	3.66
X24	3.41	3.12	3.33	2.31	2.22	2.33	3.66	4.21	4.22	2.11	2.10	2.00	3.11	3.09	3.21	3.66	3.55	3.61
X31	3.33	2.32	2.31	2.41	2.32	2.31	3.55	3.66	3.54	2.21	2.11	2.00	3.10	3.21	3.31	3.51	3.44	3.44
X32	2.21	3.11	3.43	2.21	2.21	2.21	3.78	3.80	3.78	2.00	2.07	2.09	3.00	3.05	3.11	3.55	3.61	3.22
X33	3.44	3.43	3.44	2.33	2.31	2.65	3.77	3.21	3.14	2.33	2.32	2.21	3.00	3.12	3.21	3.55	3.61	3.55
X34	3.13	3.44	3.22	2.13	2.21	2.22	3.10	3.09	3.11	2.11	2.00	2.21	3.00	3.05	3.00	3.31	3.21	3.55
X41	3.34	3.31	3.11	2.22	2.12	2.11	4.33	4.23	4.31	2.08	2.04	2.04	3.21	3.11	3.00	3.41	3.49	3.33
X42	3.55	3.31	3.31	2.55	2.31	2.31	4.23	4.41	4.11	2.22	2.13	2.41	3.08	3.03	3.11	3.31	3.44	3.21
X43	3.33	3.32	3.31	2.33	2.32	2.21	4.00	4.33	4.12	2.21	2.22	2.15	3.04	3.11	3.10	3.14	3.44	3.33
X44	3.45	3.43	3.56	2.33	2.13	2.33	3.41	3.41	3.33	2.11	2.15	2.21	3.21	3.33	3.32	3.31	3.41	3.51
X51	3.54	3.55	3.22	2.31	2.21	2.22	3.76	3.55	3.51	2.31	2.21	2.22	3.09	3.33	3.21	3.56	3.33	3.31
X52	3.31	3.11	3.21	2.31	2.22	2.21	3.66	3.31	3.44	2.31	2.22	2.21	3.11	3.21	3.08	3.31	3.21	3.44
X53	3.32	3.44	3.21	2.33	2.31	2.21	3.31	3.43	3.66	2.33	2.31	2.21	3.11	3.09	3.11	3.33	3.21	3.45
X54	3.10	3.41	3.55	2.21	2.55	2.22	3.67	3.44	3.70	2.21	2.55	2.22	3.14	3.15	3.33	3.33	3.21	3.21
X61	3.12	3.33	3.12	2.11	2.22	2.13	3.44	3.53	3.55	2.11	2.22	2.13	3.11	3.12	3.22	3.44	3.45	3.51
X62	3.33	3.55	3.55	2.21	2.98	2.34	3.31	3.44	3.41	2.11	2.55	2.21	3.11	3.21	3.22	3.54	3.56	3.44
X63	3.21	3.41	3.44	2.33	2.31	2.65	3.37	3.41	3.44	2.21	2.11	2.33	3.34	3.22	3.10	3.61	3.71	3.55

Source: research finding

Table 5. The optimal value function and degree of desirability for each recommended dimension

	Economic			Social			Cultural		
	α	β	γ	α	β	γ	A	β	Γ
⊗S	0.213	0.245	0.210	0.209	0.221	0.224	0.245	0.250	0.221
Sj		0.200			0.213			0.212	
Kj		0.445			0.434			0.462	
	Political			**Technological**			**Environmental**		
	α	**β**	**γ**	**α**	**β**	**γ**	**A**	**B**	**Γ**
⊗S	0.190	0.150	0.180	0.200	0.200	0.190	0.210	0.200	0.189
Sj		0.130			0.150			0.170	
Kj		0.280			0.350			0.370	

Source: research finding

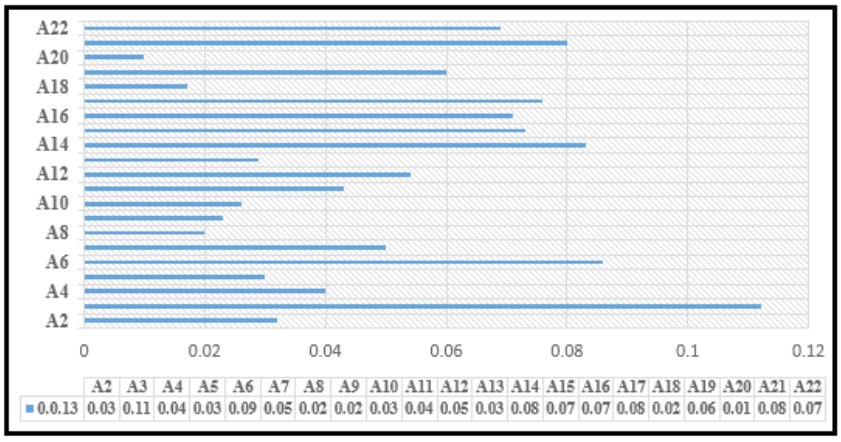

Figure 2. The compatibility degree of each globalization of traditional architecture dimensions through industrialization in rural areas of Iran. Source: research finding

JSRD

Table 6. Ranking each recommended variable in the economic dimension

Rank	final variable weights	Variable weight	Abbreviation	Final dimension weight	Dimensions
2	0.103	0.231	C1	0.445	Economic
3	0.099	0.221	C2		
1	0.110	0.245	C2		
2	0.103	0.231	C4		

Source: research finding

JSRD

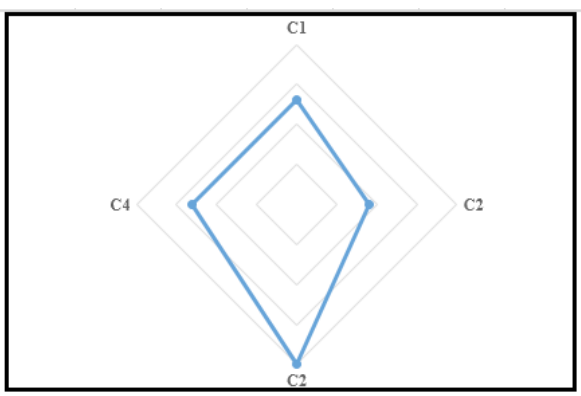

Figure 3. Degree of compatibility of each economic dimension's variable. Source: research finding

JSRD

According to the obtained results of Table 7, and Figure 4, in the social dimension, education with a weight of 0.107, social cohesion with a weight of 0.102, social marketing with a weight of 0.096, advertisement and awareness have the most and least compatibility with rural areas of Iran respectively.

According to the obtained results of Table 8, and Figure 5, in the cultural dimension, lifestyle with a weight of 0.118, informing with a weight of 0.111, identity formation with a weight of 0.110, and consumption patterns with a weight of 0.108 have the most and least compatibility with rural areas of Iran respectively.

According to Table 9, and Figure 6, in the political dimension, government support with a weight of 0.057, government policies with a weight of 0.056, and political trust with a weight of 0.054 have the most and least compatibility with rural areas of Iran respectively.

Finally, based on the results in the technological dimension, technical requirements with a weight of 0.079,

information exchange with a weight of 0.075, technological knowledge with a weight of 0.074, upgrading equipment with a weight of 0.071, and at last in the environmental dimension sustainable development with a weight of 0.082, ISO compliance with a weight of 0.080, and environmental preservation with a weight of 0.079 have the most and least compatibility with rural areas of Iran respectively.

Table 7. Ranking each recommended variable in the social dimension

Rank	final variable weights	Variable weight	Abbreviation	Final dimension weight	Dimensions
4	0.092	0.211	X1	0.434	Social
3	0.096	0.220	X2		
1	0.107	0.245	X3		
2	0.102	0.234	X4		

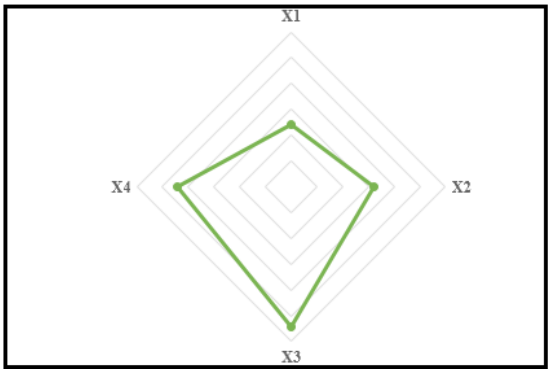

Figure 4. Degree of compatibility of each social dimension's variable. Source: research finding

Table 8. Ranking each recommended variable in the cultural dimension

Rank	final variable weights	Variable weight	Abbreviation	Final dimension weight	Dimensions
1	0.118	0.254	A1	0.462	Cultural
4	0.108	0.232	A2		
2	0.111	0.240	A3		
3	0.110	0.238	A4		

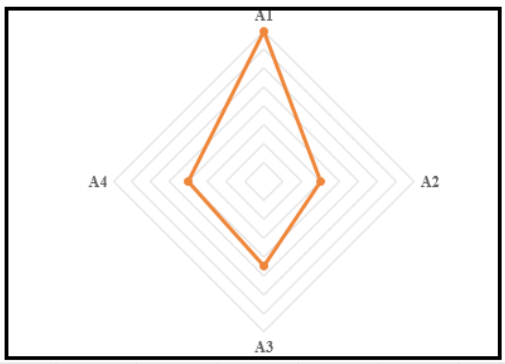

Figure 5. Degree of compatibility of each cultural dimension's variable. Source: research finding

Table 9. Ranking each recommended variable in the political dimension

Rank	final variable weights	Variable weight	Abbreviation	Final dimension weight	Dimensions
1	0.057	0.200	M1		
2	0.056	0.199	M2	0.280	Political
3	0.054	0.190	M3		

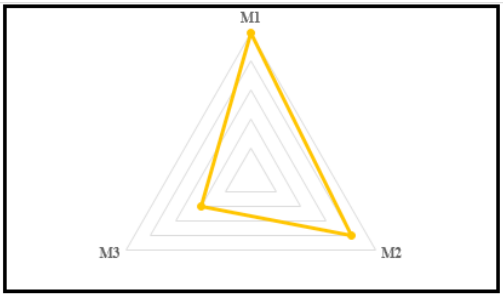

Figure 6. Degree of compatibility of each political dimension's variable. Source: research finding

Table 10. Ranking each recommended variable in the technological and environmental dimensions

Rank	final variable weights	Variable weight	Abbreviation	Final dimensions weights	Dimensions
1	0.074	0.210	T1		
4	0.075	0.211	T2	0.350	Technological
2	0.079	0.223	T3		
3	0.071	0.200	T4		
3	0.079	0.213	W1		
2	0.080	0.214	W2	0.370	Environmental
1	0.082	0.220	W3		

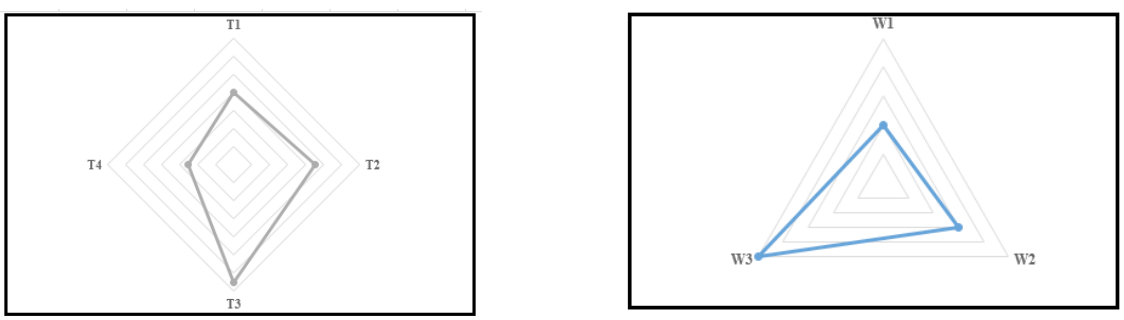

Figure 7. degree of compatibility of each political dimension's variable. Source: research finding

5. Discussion

Rural settlements as geographical phenomena are spatial manifestations of natural, social, economic, political, and cultural factors which have gradually been formed in natural contexts and human-environment relations. In another word, rural residential units,on the one hand, are built in various types following regional diversity of ecological-natural factors. On the other hand, following different influential power of political, social, and economic factors. As a result, with the industrial revolution and industrialization of buildings and architecture, Iran's rural settlements have gone under changes. Therefore, the analysis of traditional architecture's industrialization in the national development program including the architecture of rural settlements in Iran demonstrates

that the necessary strategies and principles have not been adopted and have led to a quantitative approach. Therefore, based on the study of research papers by authors, the globalization model of traditional architecture was developed; yet less attention has been paid to the planned transition of traditional architecture's construction through industrialized methods which is an internal variable of industrialization. In this study, the implementation of the globalization model of traditional architecture through industrialization in rural areas of Iran was examined. Findings showed that economic, social, political, cultural, technological, and environmental dimensions with their variables are compatible with rural areas in Iran. In a sense, among recommended variables, the lifestyle variable in the cultural dimension, the economic policies variable in the economic dimension, the government support variable in the political dimension, the education variable in the social dimension, the sustainable variable in the environmental dimension, and technical equipment variable in the technological dimension is the most and least degree of adaptability with rural areas in Iran respectively.

Based on the research findings, Iran's architecture is undergoing a rapid transition from a traditional to a modern society. Despite this, no plan regarding its application in Iran as well as rural areas, and its suitability with people's culture has been developed. Since Iran is a developing country, it follow the trending technological advancements without paying attention to the specific patterns that have introduced asymmetry and disproportionate patterns into society and raised social and cultural issues. It is necessary the architecture of rural areas of Iran show the realities of Iran's architecture instead of imitating the style of other societies. Therefore, cognition of the modern world's concept requires the calming the chaos of Iran's modern architecture, organizing today's chaos, observing all aspects of rural life including economic, social, cultural, political, etc., and finally developing a consistent construction style for rural areas. Consequently, the building's industrialization with recommended dimensions and variables of this research can meet the needs of rural residential buildings through the application of industrialized methods of construction particularly prefabrication and mass production in housing construction. Hence, regarding the comprehensive and balanced role of industrialization, sustainable development should be applied in traditional architecture as well as the industrialization of rural areas. Moreover, industrialization methods should be supported by people in charge of rural organizations to maximize compliance with sustainable development criteria. the findings of this study showed that the implementation of an industrialization strategy in the traditional architecture of rural areas in Iran require access to government support, government policies, political trust, lifestyle, consumption patterns, informing, identity formation, production and distribution, investment, economic policies, economic stability, advertisement and awareness, social marketing, education, social cohesion, technical requirements, upgrading equipment, environmental preservation, ISO compliance, and sustainable development. Finally, the findings confirm the study of Behbahani et al. (2020). Based on the research findings, the following solutions are suggested:

Research findings based on the high-altitude adaptation of each recommended dimension and variables in rural areas of Iran can be a basis for future research at the spatial level of traditional architecture through industrialization in rural and civil areas of Iran with the perspective of geographic location, climate, and consumption patterns.

It is also suggested for future research to assess factors, influencing the success and failure of the implementation of the globalization model of traditional architecture through industrialization in rural areas of Iran with a qualitative research method.

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Conflict of Interest

The authors declared no conflicts of interest.

References

Alpago Novello, A. (2005). Vernacular architecture. Tehran

Armghvan, M., & Gorji Mehlabani, Y. (2009). The values of vernacular architecture of Iran concerning sustainable architecture approach. JHRE, pp. 25-35.

Asefi, M., Hushempur, P., & Mohajeri, M. (2017). Assess the strengths and weaknesses of the construction industry in the production of Islamic housing. Journal of Research in Islamic Architecture, 17(17).

Askari Rabori, A., Abbaszadeh, Z., Abron, AA. (2016). Evaluation of rural housing structural transformations based on the

rural livelihood; case study: Riab village in Khorasan Razavi province: JHRE, 159, PP. 35-50

Ataeyan, M., & Asadi Malek Jahan, F. (2019). comparing the comparative method of industrial construction with the traditional method with the perspective of time, cost, and quality, 2(11).

Bani, M. (2009). The modern architecture of Iran: Struggling between tradition and modernity. Honar-e Memari Publication, Tehran.

Bayat, M., & Taherkhani, F. (2016). Investigation on comparing conventional and industrial construction methods with the perspective of time and cost. Journal of engineering and construction management, Vol.1 (1).

Behbahani, E., Dinarvand, A., Taban, M., & Mehrakizadeh, M. (2020). Rereading the features of vernacular architecture in the housing of coastal villages of Bushehr. 176, pp. 3-16.

Behfrooz, F. (2007). Prevailing themes in human geography (third ed), University of Tehran press.

Daneshpour, A., & Hosseini, S. (2012). The position of physical factors in housing price reduction. Arman Shahr, Vol. 5(9), pp. 61-71.

Douglas, J. (2006). Building Adaptation (2nd ed), Oxford, Elsevier Ltd.

Durmisevic, E., Linthorst, P. (2000). Industrialization of Housing (Building with Systems). In Continuous Customization in Housing, 16-18 October, Tokyo, Japan.

Ermolli, S. R., Galluccio, G. (2019). Building Industrialization and Prefabricationbetween Materiality and Immateriality. International Journal of Architecture, Art and Design. 5(2019). 93-100.

Falamaki, M. M. (2005). Vernacular Architecture, Tehran: Space Science and Culture Institute, Second Edition. [Persian].

Fallah, M. (2011). Investigating LSF (lightweight steel framing) buildings. Tehran, Housing Research Center.

Foyouzat, E., & Mobaraki, M. (2012). Industrial sociology (based on Iran's experiences). Tehran, Shahid Beheshti University of Tehran publication.

Hosseinzade, A. (2006). Global art and philosophy of the enlightenment era. Journal of art, Vol.67, pp. 61-69.

Javani, P. (2016). Analyzing the traditional architecture of rural areas and its function regarding the materials and design of buildings (case study: Karangan village in Varzaqan city) the second national conference on modern geography and planning, architecture and urban planning: Islamic research publication.

Keyvannejad, M. Taj, S., & Salehi, M. (2019). Adaptation of Pattern Language with Iranian rural Vernacular Architecture along with environmental sustainability (case study lafoor village). Quarterly of Geography and Regional Planning, 10(1), pp. 925-944.

Khezriyan, A., & Saghafi, M-j. (2017). Analysis of national development plans of Iran and reflection of its components in industrial industrialization (1989-2017), Quarterly Journal of Environmental-based Territorial Planning (JETP), Vol. 40, pp. 183-204.

Li, Z. (2013). The influence of tourism on the sustaining of vernacular architectural tradition embodied in the Bai and Naxi dwellings in Yunnan. Ph.d. thesis, (Unpublished), University of Huddersfield, England.

Majedi Ardakani, M.H. (2009). History and Planning of Industrial Construction in Buildings of Iran. Tehran: Research Center of Building and Housing.

Memarian, Gh. H. (2007). A Survey on the Theoretical Foundations of Architecture, Tehran: Soroush Danesh Publications. [Persian].

Oliver, P. (1987). Dwellings: the house across the world. Phaidon.

Rezaei, M., & Molavi, M. (2014). Sustainable Development and Vernacular Architecture in Iran: Simaye Danesh Publication.

Rezaei, N., Haghparast, F., & Mohammadzade, R. (2020). Analysis evolution of contemporary commercial space in Tabriz with an emphasis on Tabriz Grand Bazaar. Journal of Urban Ecology Research, Vol. 12(3(25)), pp. 123-143.

Robertson, R. (2006). Globalization theory and civilization analysis. (Pooladi, k. Trans). Sales publication, Tehran.

Saeidi, A., Rahmani Fazli, A.R., Azizpour, F., Mohebi, A.A. (2013). Structural-Functional of Housing and Consistency (case study: Raz villages and Jorgalan cities (North Khorasan)): Journal of Iranian Geographical Association, 11(39), pp. 7-33.

Saeidi, A., & Amini, F. (2010). Settlement instability and functional development of rural housing (case: Khafar Natanz village). Geography Quarterly, 8: 29-43.

Sarja, A. (1988). Open and Industrialised Building, London, Taylor & Francis e-Library.

Sebestyen, G. (2003).New Architecture and Technology, Oxford, Architectural Press.

Seydaei, E., & Ghasemian, Z. (2012). Evaluation of rural house changing process (case study Georgi town): Journal of Spatial Planning, 2(1(5)), pp. 87-106)

Vafamehr, M. (2013). Industrial Architecture of Building. Tehran: Ketab-e Fekr-e No

Warszawski, A. (1999). Industrialized and Automated Building Systems (2nd edn), London, E&FN Spon.

Wu J., Wei H., Peng L. (2019). Research on the Evolution of Building Technology Based on Regional Revitalization. Buildings. Sustainability. 9(165). 1-12.

Yousefpour, N., & Nasiri, A. (2017). Industrialization and Mass Production in Housing in Country. Iran's Ministry of Economic Affairs and Finance News Center, Vice President for Economic Affairs.

Zargar, A. (2011). An introduction to Iranian rural architecture: Shahid Beheshti University of Tehran.