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Original Article

Analyzing the Key Drivers of the Effect of Smart Growth Approach on Sustainable Development of Iranian Rural Settlements

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Abstract

Purpose- Nowadays, the smart growth approach plays a significant role in sustainable rural development. This approach seeks to improve the quality of human life and respond to socio-economic, environmental and physical problems and issues and can pave the way for rural management in order to make optimal use of facilities and solve rural problems. The purpose of this study is to identify and analyze the drivers of the effect of smart growth approach on sustainable development of rural settlements in Jiroft County .

Design/methodology/approach- This study is applied research and it is descriptive-analytical in terms of nature. Data has been collected through documentary and field study. To extract the key drivers of the effect of smart growth approach on sustainable development of rural settlements in Jiroft county, a questionnaire has been prepared in the form of a Micmac questionnaire and distributed and completed among the sample community. 36 questionnaires were considered for rural experts, relevant organizations. The data analysis and structural analysis of the effect of smart growth approach indicators on the sustainable development of rural settlements were conducted using Micmac software .

Finding- The results showed that among the 57 studied factors, 14 key effective drivers were identified that according to the high score of direct and indirect effect, factors such as utilizing existing infrastructure to increase villagers' employment and income, (direct (+10) indirect (+7205), improving land and housing prices in rural areas, direct (+9) indirect (+6959), villagers' satisfaction of increasing rural relations with outside (city and other villages), direct (+8) indirect (+8356) have the most effect compared to other drivers.

Keywords- Drivers, Smart growth, Sustainable development, Rural settlements, Jiroft County.

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1. Introduction

The concept of smart growth and how it works in EU policy includes knowledge, innovation, education and research policies; in which smart growth is less related to planning and more concerned with innovation, education and research policies, while in the United States it is more about planning policies to counter urban sprawl development. And this discussion is rather about urban planning and construction policy, particularly the prevention of urban sprawl (Naldi et al., 2015). The terms smart growth and smart development offer options in the fields of housing, transportation, occupations and amenities (including social, cultural, recreational, educational services) and use comprehensive planning for guidance, design, development, management, rehabilitation and building community (Barca et al., 2012; and Combes & Overman, 2004). In general, this approach considers the relationship between development and quality of life; the features and ideas of smart growth in a community vary from place to place. In a general scenario, smart growth invests time and resources and provides new life for the city center and old dilapidated textures. Smart growth takes the redevelopment of developed areas into consideration; in fact, smart growth proponents would like to optimize existing facilities rather than attempting to build new ones (Tsimpo & Wodon, 2018) which is based on three basic principles: 1- Density and compaction (limiting urban horizontal expansion); 2- Mixed uses (combined uses) with a variety of housing types and 3- Implementation of different modes of transportation with a tendency towards public transportation, pedestrian oriented and bicycle-friendly city (Chen et al., 2020). In other words, smart growth is one of the regional planning strategies that aims to create regional balance and prevent disruption in line with sustainable development goals; to put it another way, "smart growth is the planning, design and development of cities, towns, suburbs and rural areas in which seeks to create and promote social equality, a sense of spatial and social belonging and preserve of natural resources alongside cultural resources." smart growth strategies can provide significant benefits to rural communities by preserving their history and identity, making rural settlements more pleasant and livable, sustainable economic development, creating diverse and more affordable housing options and maintaining ecological sustainability (Michaud, 2013: 4; Tregear & Cooper, 2016) and it is worth noting that the challenges facing a rural area in other places, even if they are sometimes similar, can never be the same from country to country. Rural areas or villages also deserve significant growth that creates development to promotes people's lives since rural development is essential to accelerate the overall development of any country. Therefore, there is a need for studies, in terms of conceptual aspects and potential indicators and criteria of smart growth and its determining factors, in which analyze each of the effective factors on the growth potential in a diverse set of rural areas (Galli et al., 2020). Indeed, smart growth emphasizes the ability of rural communities to create and develop new opportunities from their own resources (ENRD, 2018; Zavratnik et al., 2018; Naldi et al., 2015). Accordingly, achieving the goals of sustainable development requires comprehensive planning, considering the spatial elements of the regions and its capabilities in order to guide society on the right path toward smart growth and sustainable development (Ghorbani & Noshad, 2008: 164). In fact, the concept of sustainable development has dramatically changed over the last three decades. The concept of sustainable development, nonetheless, is inherently associated with the future (Tibbs, 2011: 13-32). Indeed, smart growth and how to achieve it is not a new concept (Anabestani & Javanshiri, 2017: 188) and varies from region to region (Randhawa and Kumar, 2017). It is possible through the use of advanced technologies (Caragliu & Del Bo, 2018), information and Communication Technology (Fan Nell et al., 2018,) making all life affairs, including activity, transportation, etc. smart. It provides diverse economic, social (Randhawa & Kumar, 2017) and environmental benefits (Litman, 2005) due to its various dimensions (social, economic, physical and biological). Accordingly, one of the strategies proposed in the field of rural sustainability is the smart growth strategy, which is in the form of sustainable development theory. The smart growth approach, therefore, can provide a way out of instability and achieve sustainable development in rural areas. According to the mentioned issues in the study area, the use of futures studies approaches can provide the basis for improving smart growth in order to achieve sustainable development, especially in rural areas. Hence, the purpose of this study is to analyze the key drivers of the effect of smart growth approach on sustainable development of rural settlements with a future study approach. Therefore, the present study seeks to reply the following question: what are the key drivers of the effect of the smart growth approach on

the sustainable development of rural settlements in Jiroft County? To answer this question, using MicMac software, the key drivers of the effect of smart growth approach on sustainable development of rural settlements are identified and the results can help achieve sustainable development of rural settlements with a smart growth approach. Furthermore, reviewing studies show that no research has been carried out to identify the key drivers of the effect of the smart growth approach on the sustainable development of rural settlements in Jiroft County.

2. Research Theoretical Literature

The term smart growth was coined by Maryland Mayor, Paris Englanderning, from 1994 to 2002. It can be stated that the foundations of this theory in Canada and the United States are a reaction to the developments initiated in the early 1960s (Aaboud et al., 2019). In the mid-1990s, the term smart growth emerged in planning science and quickly became the key word. Whether the term is inherently different from growth management or is essentially just growth management under its attractive name is controversial; In fact, smart growth mentions to principles of development and operations planning in which creates land use pattern and transportation (Tregear & Cooper, 2016). Smart growth considers the redevelopment of developed areas. Indeed, proponents of smart growth would like to optimize existing facilities rather than creating new ones (ICMA, 2007; Brown et al., 2014; Ye et al. 2005). Accordingly, the term "smart growth" is widely applied to describe intensive development patterns that do not reflect the negative features of sporadic growth (Batisani, 2006). Based on this, smart growth approaches contribute to growth and development in rural areas and create a model for development in which supports multiple social goals, including public health goals.

In this regard, with the intensification of these unstable trends since the 1970s, widespread criticism and reactions were provoked against it, which resulted in the emergence and development of more sustainable approaches to physical-spatial development, including the smart growth approach. In fact, the smart growth approach has been proposed as a response to the undesirable features of sprawl (Chen et al., 2020). Accordingly, one of the most comprehensive definitions of the features of this approach is attributed to Anthony Downs, Head of the Brookings Institution Department of Economics, in which smart growth is defined with a quantitative approach including features such as: 1. Controlling peripheral and suburban development; 2. Reducing travelling by personal vehicles; 3. Endogenous development with emphasis on using abandoned spaces and recreating historical textures; 4. Planning mixed uses and activities in a various way; 5. Encouraging condensation and compact city; 6. Controlling green and open urban space (Naldi et al, 2015: 93). This institute emphasizes that the focus of development, relying on existing infrastructure reduces not only the need to use cars and, consequently, the consumption of fossil fuels, but also the cost of public services such as street construction, disposal system, sewage, water, electricity, gas and telephone supply. The consequences will be the revitalization of urban centers, higher productivity of employees and businesses, diversity of housing types, reduction of poverty, increased social security and improved sense of place (Coşciug et al., 2017). Thus, it should be noted that one of the important preconditions for achieving smart development is to taking the principles of regional planning and the features of the study place into consideration; which means that all regions (developed as well as underdeveloped), can move towards achieving smart development according to their potential and diverse capabilities (in terms of economic conditions, knowledge and innovation capacity) (McCann & Ortega -Argilés, 2015: 1291).

In this regard, the smart growth model introduces the components with which the corresponding developments can be identified. Most of these components are adapted from previous theories and solutions in this field. Indeed, the smart growth model is a package that consists of the following: intensive settlement (city and village) (sustainable development), tendency to public transportation (transportation planning), suitable design for walking and cycling (new urbanism and ruralism), protection of valuable natural and agricultural lands (environment), historical monuments, etc. (SGN, 2012: 9). In this framework, the smart growth model provides the basis for balancing the needs of individuals and sustainable development (Peiser, 2001: 277-278). It should, therefore, be noted that the use of smart growth policies and strategies for rural areas is important and consequently smart development seems vital in order to consider the principles of sustainable development in rural areas. The terms of smart growth and smart development are central to Europe's new 2020 growth strategy, which contains concepts such as "acting based on local capacities and capabilities in future policies" and "emphasizing regional benefits,

knowledge and innovation, infrastructure (European Commission, 2010; Barca et al., 2012; and Combes & Overman, 2004). Also, the smart village approach associated with smart growth and smart development includes a change in the villagers' main life style and subsequently leads to the sustainability of these areas (Somwanshi et al. 2016: 395) which flexibly suggests various ways to improve it (Holmes & Thomas, 2015: 151). Consequently, the development of smart villages leads to sustainable development in rural areas in the long run (Beg, 2018: 1) and can improve the quality of life and socio-economic well-being (Beg, 2018: 2; Singh & Patel, 2018).

After an overview of the concept of smart growth as the basis for formulating the concept of sustainable rural development, several related studies in this field are in the following:

Norouzi (2021) believes that the most important indicators of a smart village are in terms of agriculture, industry, services, education, health, etc. and the best conditions in the studied village (Avargan) for the development of a smart village is in the economic dimension while the worst conditions is in the institutional dimension. Babaei et al. (2021) suggest that there are no appropriate conditions for smart growth in the villages of Nazloo-Urmia county and most of the villages are far worse in terms of ecological indicators rather than other indicators. Roknoddin Eftekhari et al. (2020) believe that although the suburban villages of Tehran are greatly affected by the growth and expansion of cities and relations with them, this effect is more manifested in the form of population growth and physical expansion of rural settlements around cities and possess less signs of economic, social and ecological development in the context of sustainable rural development. In addition, none of the villages are in a state of smart growth. Anabestani and Kalateh Mimari (2020) and Anabestani and Javanshiri (2017) have studied the effective indicators in the formation of smart rural development and have determined that economic and physical indicators have the greatest role in this regard. Nazmfar et al. (2019) think that smart growth is one of the main solutions to solve problems for future development; in such a way that smart growth as a long-term strategy has an effective role in organizing by considering all its various dimensions. McGuire et al. (2022) in Rural Northern Ireland (2012-2014) concluded that top-down rural poverty reduction policies should be conducted by local knowledge and the most successful intervention was to improve access to local services which was strongly dependent on a strong rural transportation support network. Souvik Roy, Dennis Joseph (2021) assume that the Indian smartphone application market is really booming and India ranks first in terms of downloads via Android. However, the functional influence of smartphones is still low in rural India compared to its urban part. Anabestani and Kalateh Mimari (2020) believe that people with higher education and their tendency to stay in rural areas and the establishment of cross-industrial activities such as tourism, food and cultural production are key effective drivers in the formation of rural smart development.

Kalinka et al. (2020) assume that the level of local planning (village or neighborhood) is a development challenge for spatial planners. To examine and determine a spatial planning approach based on local needs, we must identify indicators that can be applied for short-term and long-term analysis of special regions in coastal areas. Cowie et al. (2020) argue that the Fourth Industrial Revolution (IR4) is a term includes a wide range of technological advances that fundamentally changes society in the same way as digital technology did during previous industrial revolutions. It is stated that the debate over the Fourth Industrial Revolution (IR4) is concentrated on the urban core and rural areas are marginalized. It examines these technologies from a rural perspective and considers what effect, either positive or negative can have on rural areas. They showed that the effects of technology (IR4) in rural areas can be as significant as urban areas and seek to understand the aspects of technology (IR4) in rural areas and support the transition to a smart rural future.

Zavratnik et al. (2020), Aziiza & Susanto (2020), and Visvizi & Lytras (2019) proposed a new development-oriented approach to emphasize that sustainable life is not achieved through technological solutions alone, and one of the major problems in rural areas is limited access to technology and they assumed information and communication technology (ICT) as the main issue in any smart city and rural development plan. Atkočiūnienė & Vaznonienė (2019) revealed that emerging traditional and interested networks are supported by the advancement of digital and telecommunication technologies, the increasing use of bioenergy, and the ability to employ useful knowledge for local people and business development. They promote the strategic development of rural communities; Anabestani & Javanshiri (2018) show that the Creative Rural Economy Index has the greatest effect on the formation of rural smart development.

Reviewing previous sources and researches associated with smart villages and its effect on sustainable rural development, it is inferred that due to the nature of the problem and perceptions, most of these studies examine and analyze smart growth indicators and factors affecting it through various indicators (Socio-economic, physical and land use, environmental and access and communications, etc) and the most important factors affecting smart rural from the perspective of these researchers are the factors of access, infrastructure, transportation, communications, innovation, knowledge , etc. In this regard, the present study identifies the key drivers of the effect of smart growth approach on sustainable development of rural settlements in Jiroft County, by which addressing this issue in rural areas can be an effective step towards achieving sustainable rural development.

3. Research Methodology

3.1. Geographical Scope of the Research

Jiroft County with an area of 9513 square kilometers is located in the Sothern part of Kerman Province with the longitude of 57º44', the latitude of 28º41' and the average altitude of 690 meter. It is limited to Kerman County from the north, AnbarAbad and Faryab Counties from the south, Bam County from the east and Rabor and Orzuiyeh Counties from the west. The statistical population of this study in quantitative phase is all rural areas of Jiroft County. According to the statistics provided by the Statistics Center of Iran in 2016, Jiroft County has a population of 308,858 people and 92937 households in which 153,153 people with 46543 are urban households and 155698 people with 46392 households are settled in rural areas of the county. In this study, to select sample villages according to the number of villages in the county and with the assumption that smart growth infrastructure is possible in large villages, the experimental group 18 villages in Jiroft county of those over 1000 people was selected using cluster sampling (multi-stage) and the sample size of Cochran.

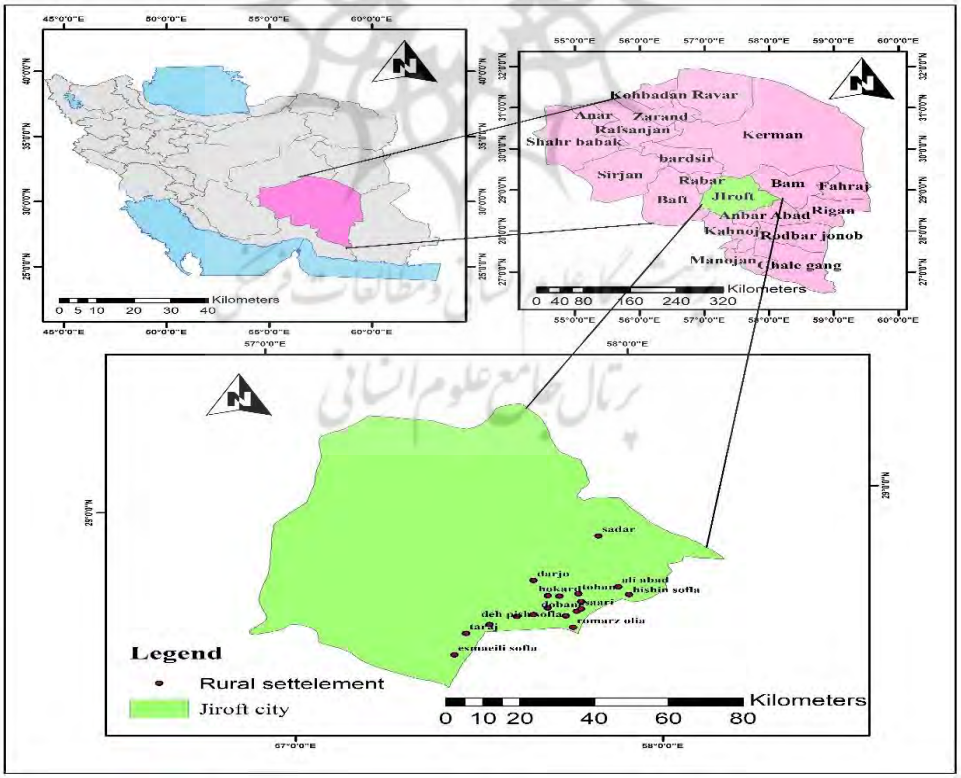

Figure 1. Location of the study area

Table 1. The features of the studied villages

District name	Names of Dehestan	Names of villages	Number of households	Number of populations
Jabalbarez	Rezvan	Heshin Sofla	391	1860
	Saghder	Saghder	463	1564
	Maskon	-	-	-
Central	Esfandagheh	Dolatabad	1387	4930
	Islam Abad	Doboneh	833	3217
		Deh-pish Sofla	398	1719
		Romorz Olia	406	1471
	Khatunabad	Hukerd	608	2016
		Golab Sofian Sofla	604	2316
	Dolat abad	Aliabad	2174	6170
		Saghari	681	2265
		Tohan	464	1606
	Halil	Narjo	405	1552
		Pushtler	450	1552
Esmaeili	Esmaeili	Ismaili Sofla	735	2355
	Hossein-Abad	Dehno Shahsavarkhan	381	1395
		Hossein Abad Dehdar	925	2886
		Konar Sandal	355	1536
	Ganj Abad	Terj	471	1874
Total	11	18	12131	42284

Source: Statistics Center of Iran, 2016 and research findings, 1400

3.2. Methodology

The present research is applied in terms of purpose and descriptive-analytical in terms of nature. Documentary and field methods have been applied to collect data. In expert-oriented methods, there is no precise formula or relationship for estimating sample size. In this type of method, the knowledge and expertise of experts are preferred rather than their quantity. Nevertheless, in futures studies and scenario building, the number of experts should generally not be less than 35 (Godet et al., 2008). The sample population of this study consists of 36 experts, specialists, university professors and executive authorities identified in rural areas. The validity and reliability of the data collection tool (questionnaire) were confirmed by professors and experts. In addition, benefiting from the theoretical foundations of the research and the opinion of experts guarantees the validity of the questionnaire. The data analysis as well as structural analysis of the effect of smart growth approach indicators on the sustainable development of rural settlements were conducted using MicMac software. First, the effect of indicators was ranged from 0 to four. Second, they were evaluated by experts and specialists using MicMac software. Then, the direct and indirect effects as well as indicators with direct and indirect potential effects and finally the most effective key indicators were identified.

Table 2. **Effective components and indicators of smart growth approach on sustainable development of rural settlements**

Components	Indicators
Economic	(1) reducing the economic costs of rural households, (2) utilizing existing infrastructure to increase villagers' employment and income, (3) supporting of economic development programs by the local community, (4) increasing innovation in economic activities (new marketing, etc.), (5) reducing the dependency ratio in rural households, (6) improving job opportunities and increasing job skills in rural areas, (7) moving rural communities towards self-reliance in production, (8) increasing investment in the process of innovative businesses (9) using local resources to strengthen the rural economy, (10) increasing the entrepreneurial spirit, starting and encouraging new local businesses, (11) reducing

Components	Indicators
	poverty among rural households, (12) improving savings capacity and increasing investment opportunities in rural areas, (13) improving land and housing prices in rural areas, (14) increasing the share of rural residents in the production of agricultural and non-agricultural products, (15) improving the income sources of villagers
Socio-cultural	(1) increasing the tendency of educated people to stay in the village, (2) improving the situation of civic associations and non-governmental organizations (Basij, wheat farmers, etc.), (3) villagers' satisfaction of well-being and happiness in the village (4) villagers' satisfaction of the social security in the village, (5) villagers' satisfaction of improving the quality of life in rural areas, (6) villagers' participation in decision-making for projects by local managers, (7) villagers' participation in the implementation process of projects by local managers, (8) villagers' participation in the process of operation and maintenance of projects by local managers, (9) villagers' trust to local managers and rural planners, (10) villagers' satisfaction of improved road communications, sidewalks and important path transportation of rural settlements, (11) improving the quality of access to services and amenities and infrastructural possibilities in the village, (12) villagers' satisfaction of access to public transport and its costs (taxi, bus, minibus, etc.) in the village, (13) villagers' satisfaction of increasing rural relations with outside (city and other villages), (14) villagers' satisfaction of expansion and development of information and communication technology (ICT) and increasing rural participation, (15) villagers' satisfaction of access to technology, initiative and innovation in rural areas, (16) villagers' satisfaction of smart payment systems for local taxes and expenses, (17) benefiting from technological solutions in order to achieve sustainable living.
Environmental	(1) improving the protection of agricultural lands and gardens of the village by the people and local managers, (2) preserving of historical and cultural monuments in the village, (3) protecting landscapes and natural ecosystems in the village, (4) encouraging redevelopment of natural and historical areas of the village and its surroundings, (5) managing optimal fuel and energy consumption in the village, (6) using clean and renewable energy in the village, (7) villagers' satisfaction of reducing environmental pollution in the village , (8) reducing and improving of waste production in rural settlements (9) creating livable areas in rural settlements, (10) developing abandoned lands of rural settlements, (11) improving forest and rangeland cover in the study area, (12) improving the protection of water and soil quality in the region.
Physical-spatial	(1) constructing and designing intensively in physical context integrating high density land uses in rural settlements, (2) developing dwelling units outside the approved area of the rural guide plan, (3) intensive activity (agricultural and non-agricultural) in rural settlements, (4) villagers' satisfaction of population density in the village, (5) supervising on constructions by rural manager to guide the physical development of the village, (6) villagers' satisfaction of housing construction for different tastes and special needs and the multiplicity of housing patterns, (7) providing appropriate design of buildings to prevent energy waste in them, (8) attempting to reduce the distance between housing, work, education and meeting daily needs, (9) reconstructing and renovating textures in old areas (recreating) of rural settlements, (10) paying attention to hybrid (mixed) uses and developing access to services at the settlement level, (11) paying attention to the endogenous (infill) development process and choosing the appropriate development position in the rural settlement, (12) improving the quality of accesses (on foot and by vehicle) at the settlement level, (13) villagers' satisfaction of the visual quality of public spaces (exterior construction, network of passages and their elements) in the village

4. Research findings

The descriptive findings of the study show that out of the total number of respondents to the questionnaires, 11 (35.5) are male and 20 (64.5) are female, and, 5 (16.1) are bachelor. 6 (19.4) have a master's degree and 20 (64.5) have a doctorate. Using field and library studies, the most important factors affecting the smart growth approach on the sustainable development of rural settlements were identified. Then, employing the structural equation model (MicMac), the degree of affected or affecting of the identified factors was determined (Table 3). According to the dimensions of economic, socio-cultural, environmental and

physical-spatial matrix, their filling degree is between 91 to 94%, which indicates that the selected factors have a relatively large effect on each other. Out of the 769 relationships that can be evaluated in these matrices, 58 have zero number, which means that the factors did not affect or were not affected by one another. 197 relationships were number one, meaning they had little effect on each other, 386 relationships were number two, indicating they had a relatively strong effective relationship, and 186 were number three, illustrating key factor relationships were very high and they have had high affected and affecting levels. Finally, there was no relationship with the value of p, which indicates the potential and indirect relationships of the factors (Table 3).

4.1. Economic drivers of the effect of smart growth approach on sustainable development of rural settlements

As can be seen, the direct effects and indirect effects of in the output scatter plot in Figure (2), the most distributed and scattered indicators are the effective variables.

Table 3. Analysis of matrix data and cross-effects

Matrix information	Amount (economic)	Amount (socio-cultural)	Amount (environmental)	Amount (physical-spatial)
Matrix dimensions	15	17	12	13
The number of repetitions	2	2	2	2
Number zero	16	17	12	13
Number one	50	56	21	70
Number two	108	142	71	65
Number three	51	74	40	21
Number P	0	0	0	0
Total	209	272	132	156
Degree of filling	92.88889%	94.11765%	91.66666%	92.30769%

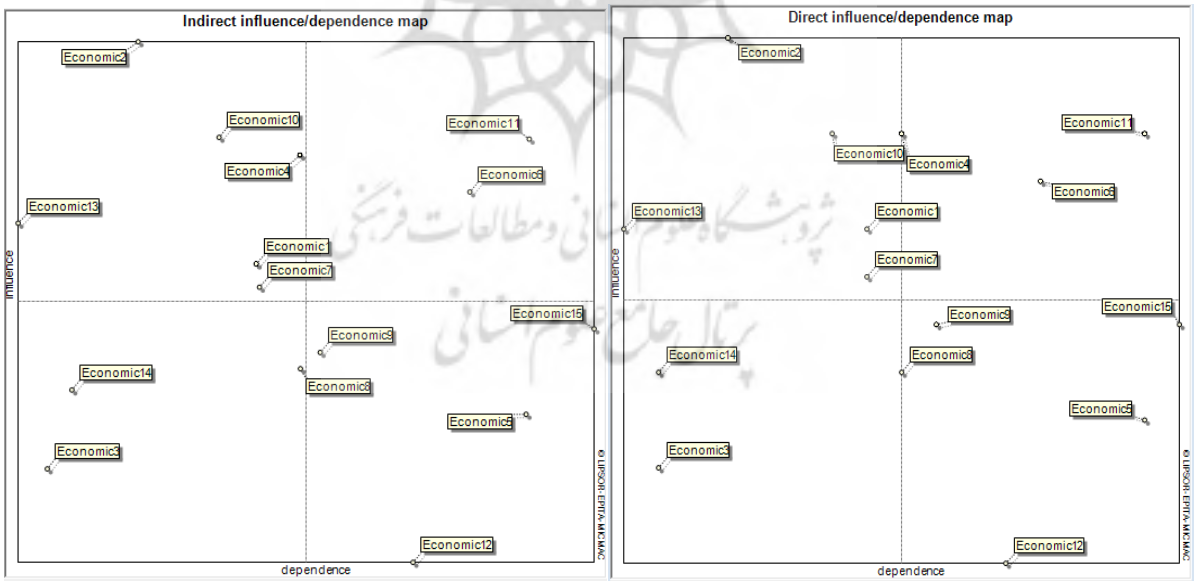

Figure 2. Map of the status of direct (a: right side) and indirect (b: left side) effects of economic factors affecting the smart growth approach on sustainable development

Table 4. Status analysis of the effect of economic factors of smart growth approach on sustainable development of rural settlements

Variable type	Relevant indicators
Effective variables	Reducing the economic costs of rural households (1), increasing the entrepreneurial spirit, starting and encouraging new local businesses (10), utilizing existing infrastructure to increase villagers' employment and income (2), improving land and housing prices in rural areas (13)
Impressive variables	Improving the income sources of villagers (15), improving savings capacity and increasing investment opportunities in rural areas (12), reducing the dependency ratio in rural households (5)
Independent variables (discrete)	Supporting of economic development programs by the local community (3)
Independent variables (secondary leverage)	Increasing the share of rural residents in the production of agricultural and non-agricultural products (14)
Independent variables (regulatory)	Moving rural communities towards self-reliance in production (7), increasing investment in the process of innovative businesses (8), using local resources to strengthen the rural economy (9)
Bidirectional variables (risk)	Increasing innovation in economic activities (new marketing, etc.) (4)
Bidirectional variables (objective)	Improving job opportunities and increasing job skills in rural areas (6), reducing poverty among rural households (11)

In this regard, according to Figure 3 (a) on the right side among the 15 variables investigated as indicators of economic factors, utilizing existing infrastructure to increase villagers' employment and income (33), increasing innovation in economic activities (new marketing, etc.) (31), increasing the entrepreneurial spirit, starting and encouraging new local businesses (31), reducing poverty among rural households (31) respectively calculated the highest column value and had the highest effect rather than other variables.

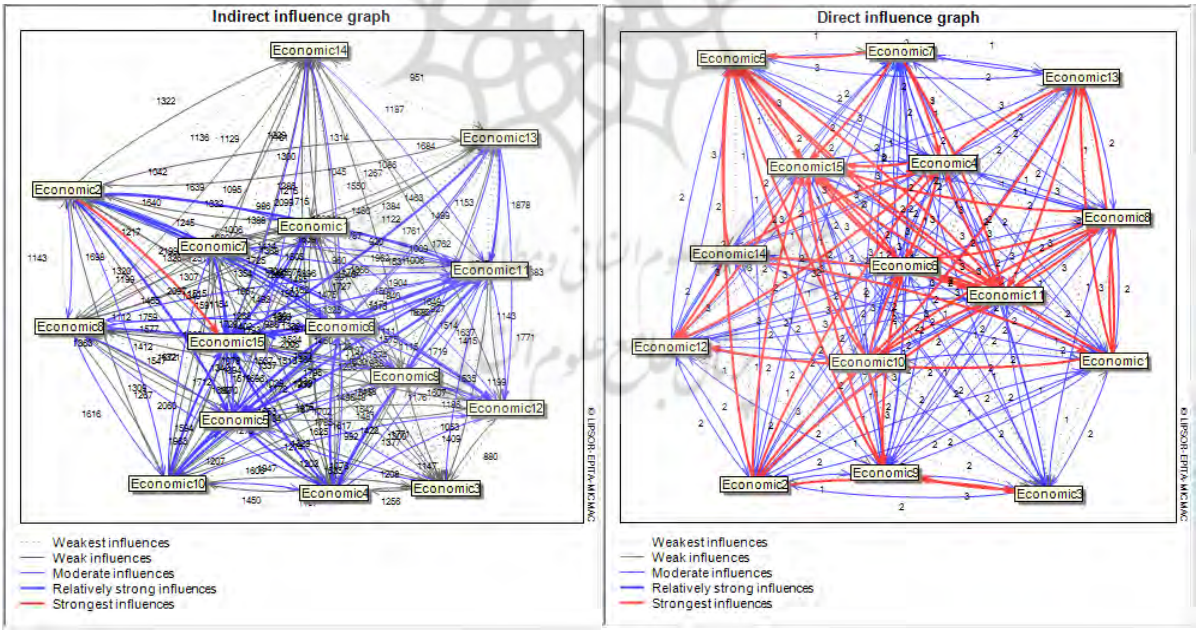

Figure 3. Map of direct (a: right side) and indirect (b: left side) relationships between economic variables of smart rural growth

In other words, the most important feature of these variables is low affected and high affecting level. In indirect effect of variables on each other, the software computed the variables' exponent of 2, 3, 4, 5 and consequently the relevant effects are calculated, among which the variables of improving the income sources of villagers (28054), reducing poverty among rural households (26672), reducing the dependency ratio in rural households (26605), improving job opportunities and

increasing job skills in rural areas (25406), improving savings capacity and increasing investment opportunities in rural areas (24195), using local resources to strengthen the rural economy (22219), increasing investment in the process of innovative businesses (21797), increasing innovation in economic activities (new marketing, etc.) (21787), had the highest column value and were most affected by the other variables (Figure 3b left side).

According to the direct and indirect effect matrix in Figure (4), it can be noted that indicators of utilizing existing infrastructure to increase villagers' employment and income, increasing innovation in economic activities (new marketing, etc.), increasing the entrepreneurial spirit, starting and encouraging new local businesses ranked first to third in terms of direct effect, respectively, had the largest share associated with the issue of rural smart growth. In the right side of Figure (4), the variables of utilizing existing infrastructure to increase villagers' employment and income, increasing the entrepreneurial spirit, starting and encouraging new local businesses, reducing poverty among rural households are ranked first to third, respectively, in terms of indirect effect.

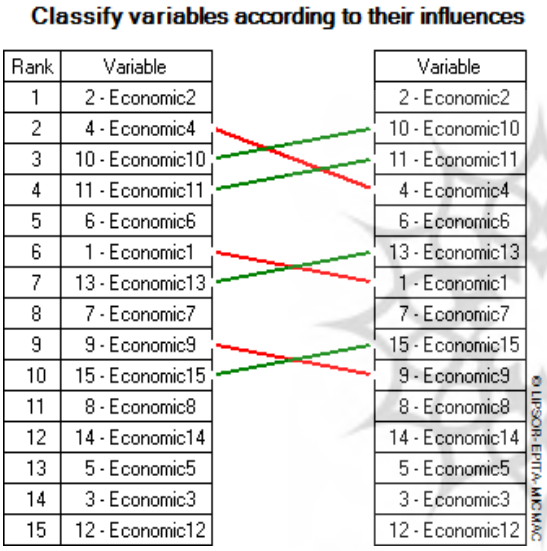

Figure 4. Classification of economic variables based on the degree of direct (left side) and indirect (right side) effect

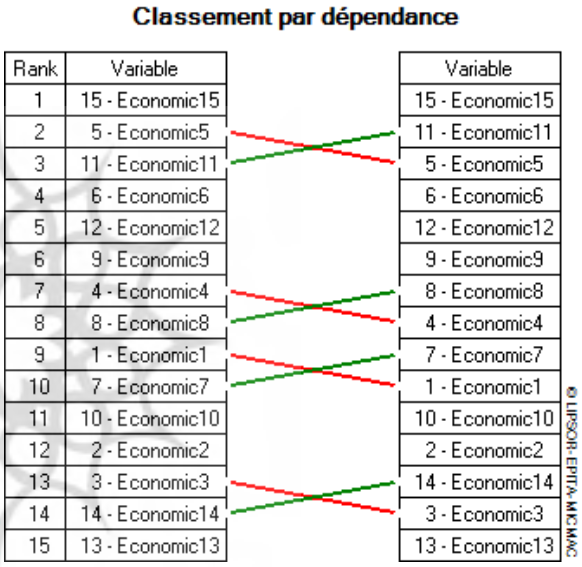

Figure 5. Classification of economic variables based on the degree of direct (left side) and indirect (right side) dependency

According to direct and indirect dependency matrix in Figure (5), it can be noted that improving the income sources of villagers, reducing the dependency ratio in rural households, reducing poverty among rural households are ranked first to third in direct dependency, respectively, and had the largest share related to the issue of rural smart growth. In the right side of Figure (5), the variables of improving the income sources of villagers, reducing poverty among rural households, reducing the dependency ratio in rural households are ranked first to third in indirect dependency, respectively.

2.4. Socio-cultural drivers of the effect of smart growth approach on sustainable development of rural settlements

As illustrated, the direct effects and indirect effects in the output scatter plot in Figure (6), the most distributed and scattered indicators are the dichotomous and independent variables.

Figure 6. Map of the status of direct (a: right side) and indirect (b: left side) effects of Socio-cultural factors affecting the smart growth approach on sustainable development

Table 5. Status analysis of the effect of Socio-cultural factors of smart growth approach on sustainable development of rural settlements

Variable type	Relevant indicators
Effective variables	Villagers' satisfaction of access to technology, initiative and innovation in rural areas (15), villagers' satisfaction of improved road communications, sidewalks and important path transportation of rural settlements (10)
Impressive variables	Increasing the tendency of educated people to stay in the village (1), improving the situation of civic associations and non-governmental organizations (Basij, wheat farmers, etc.) (2), villagers' participation in decision-making for projects by local managers (6), benefiting from technological solutions in order to achieve sustainable living (17)
Independent variables (discrete)	Villagers' satisfaction of the social security in the village (4), villagers' satisfaction of smart payment systems for local taxes and expenses (16)
Independent variables (secondary leverage)	Villagers' participation in the implementation process of projects by local managers (7), villagers' participation in the process of operation and maintenance of projects by local managers (8), villagers' trust to local managers and rural planners (9)
Independent variables (regulatory)	Villagers' satisfaction of access to public transport and its costs (taxi, bus, minibus, etc.) in the village (12)
Bidirectional variables (risk)	Villagers' satisfaction of increasing rural relations with outside (city and other villages) (13), villagers' satisfaction of improving the quality of life in rural areas (5)
Bidirectional variables (objective)	Villagers' satisfaction of expansion and development of information and communication technology (ICT) and increasing rural participation (14), villagers' satisfaction of well-being and happiness in the village (3), improving the quality of access to services and amenities and infrastructural possibilities in the village (11)

In this regard, according to Figure 7 (a) on the right side among the 17 variables of socio-cultural factors, villagers' satisfaction of increasing rural relations with outside (city and other villages) (41), villagers' satisfaction of improving the quality of life in rural areas (38), improving the quality of access to services and amenities and infrastructural possibilities in the village (38), villagers' satisfaction of access to technology, initiative and innovation in rural areas (38), villagers' satisfaction

of expansion and development of information and communication technology (ICT) and increasing rural participation (37), villagers' satisfaction of improved road communications, sidewalks and important path transportation of rural settlements (36), villagers' satisfaction of access to public transport and its costs (taxi, bus, minibus, etc.) in the village (34), villagers' participation in the process of operation and maintenance of projects by local managers (33) respectively calculated the highest column value and had the highest effect rather than other variables. In other words, the most significant feature of these variables is low affected and high affecting level. In indirect effect of variables on each other, the software computed the variables' exponent of 2, 3, 4, 5 and consequently the relevant effects are calculated. The variables of benefiting from technological solutions in order to achieve sustainable living (42257), improving the quality of access to services and amenities and infrastructural possibilities in the village (41475), villagers' participation in decision-making for projects by local managers (39484), villagers' satisfaction of expansion and development of information and communication technology (ICT) and increasing rural participation (39362) had the highest calculated column value, respectively, and had the highest effect on other variables (Figure 7b left side).

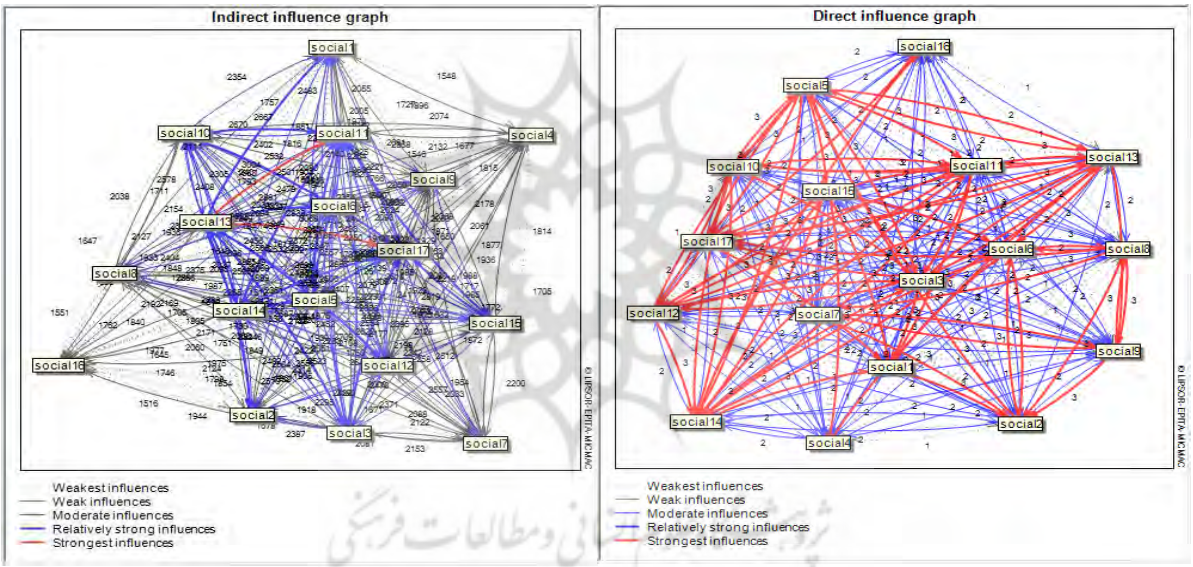

Figure 7. Map of direct (a right) and indirect (b left) relationships between Socio-cultural variables of smart rural growth

According to the direct and indirect effect matrix in Figure (8), it can be noted that indicators of villagers' satisfaction of increasing rural relations with outside (city and other villages), villagers' satisfaction of improving the quality of life in rural areas, improving the quality of access to services and amenities and infrastructural possibilities in the village ranked first to third in terms of direct effect, respectively, which had the largest share related to the issue of rural smart growth. In the right side of Figure (8), the variables of villagers' satisfaction of increasing rural relations with outside (city and other villages), villagers' satisfaction of improving the quality of life in rural areas, improving the quality of access to services and amenities and infrastructural possibilities in the village are ranked first to third, respectively, in terms of indirect effect. According to direct and indirect dependency matrix in Figure (9), it can be concluded that benefiting from technological solutions in order to achieve sustainable living, improving the quality of access to services and amenities and infrastructural possibilities in the village, villagers' participation in decision-making for projects by local managers are ranked first to third in direct dependency, respectively, and had the largest share associated with the issue of rural smart growth. In the right side of Figure (9), the variables of benefiting from technological solutions in order to achieve sustainable living, improving the quality of access to services and amenities and infrastructural possibilities in the village, villagers'

participation in decision-making for projects by local managers are ranked first to third in indirect dependency, respectively.

4.3. Environmental drivers of the effect of smart growth approach on sustainable development of rural settlements

The direct effects and indirect effects of in the output scatter plot in Figure (10) depicted that the most distributed and scattered indicators are the effective variables.

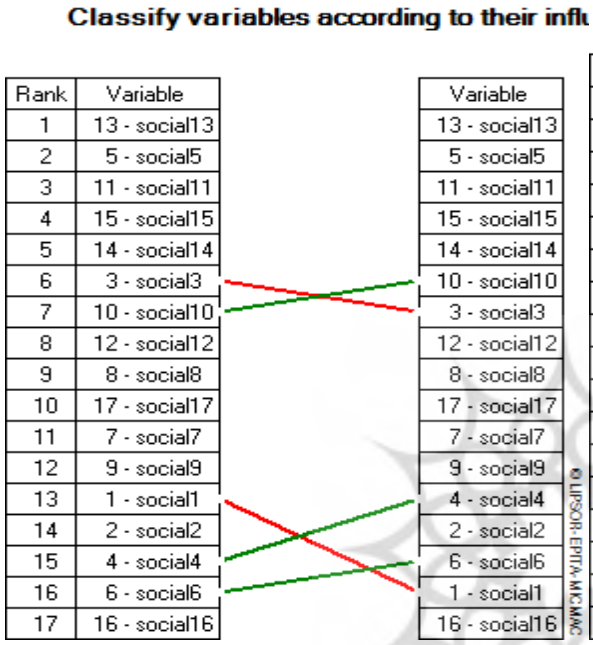

Figure 8. Classification of socio-cultural variables based on the degree of direct (left side) and indirect (right side) effect

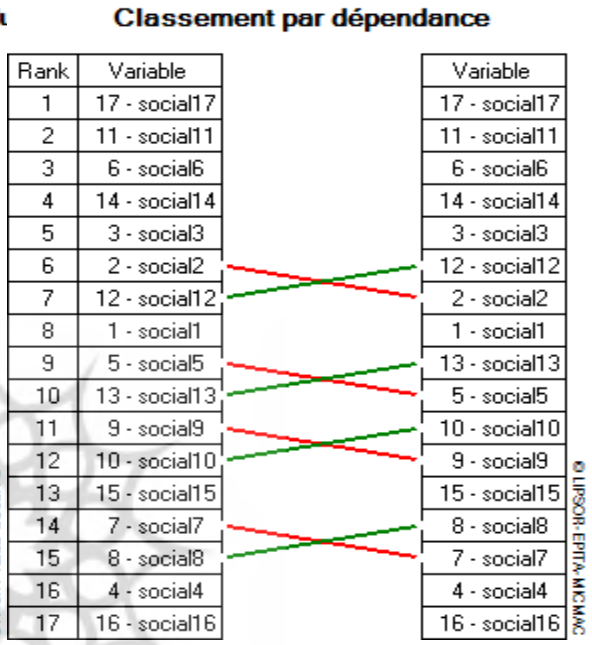

Figure 9. Classification of socio-cultural variables based on the degree of direct (left side) and indirect (right side) dependency

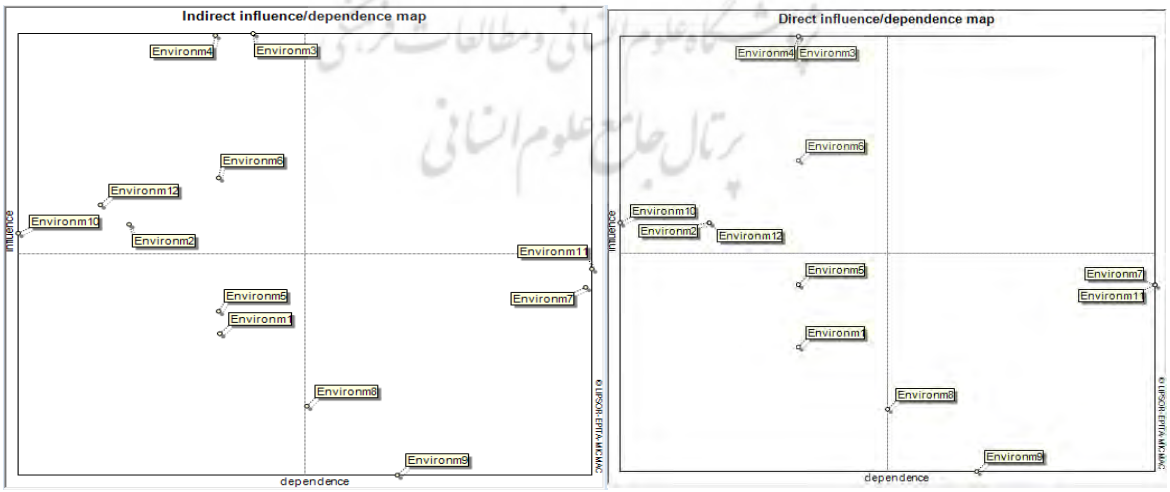

Figure 10. Map of the status of direct (a: right side) and indirect (b: left side) effects of environmental factors affecting the smart growth approach on sustainable development

Table 6. Status analysis of the effect of environmental factors of smart growth approach on sustainable development of rural settlements

Variable type	Relevant indicators
Effective variables	Encouraging redevelopment of natural and historical areas of the village and its surroundings (4), protecting landscapes and natural ecosystems in the village (3), developing abandoned lands of rural settlements (10), preserving of historical and cultural monuments in the village (2), using clean and renewable energy in the village (6), improving the protection of water and soil quality in the region (12)
Impressive variables	Reducing and improving of waste production in rural settlements (8), villagers' satisfaction of reducing environmental pollution in the village (7), improving forest and rangeland cover in the study area (11), creating livable areas in rural settlement s(9)
Independent variables (discrete)	–
Independent variables (secondary leverage)	Improving the protection of agricultural lands and gardens of the village by the people and local managers (1)
Independent variables (regulatory)	Managing optimal fuel and energy consumption in the village (5)
Bidirectional variables (risk)	–
Bidirectional variables (objective)	–

Based on Figure 11 (a) on the right side among the 12 variables studied as indicators of environmental factors, encouraging redevelopment of natural and historical areas of the village and its surroundings (27), protecting landscapes and natural ecosystems in the village (27), using clean and renewable energy in the village (25), preserving of historical and cultural monuments in the village (24), developing abandoned lands of rural settlements (24), improving the protection of water and soil quality in the region (24) respectively calculated the highest column value and had the highest effect rather than other variables. In other words, the most noticeable feature of these variables is low affected and high affecting level.

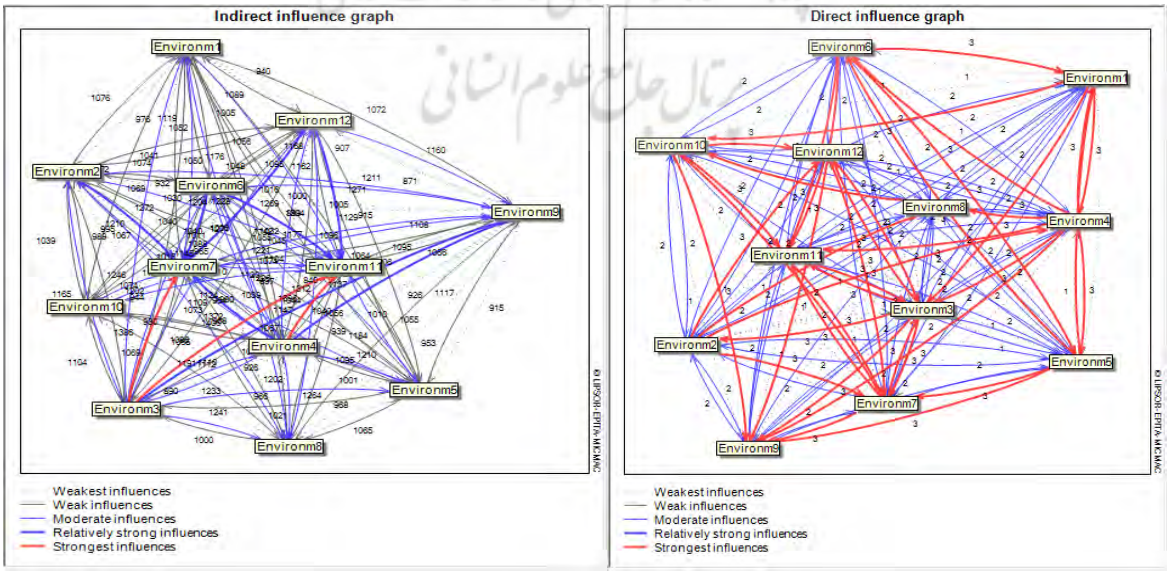

Figure 11. Map of direct (a: right side) and indirect (b: left side) relationships between environmental variables of smart rural growth

In indirect effect of variables on each other, the software computed the variables' exponent of 2, 3, 4, 5 and consequently the relevant effects are calculated. The variables of improving forest and rangeland cover in the study area (14811), villagers' satisfaction of reducing environmental pollution in the village (14777), creating livable areas in rural settlements (13748), reducing and improving of waste production in rural settlements (13254) had the highest column value and were most affected by the other variables (Figure 11b left side).

According to the direct and indirect effect matrix in Figure (12), it can be noted that indicators of protecting landscapes and natural ecosystems in the village, encouraging redevelopment of natural and historical areas of the village and its surroundings, using clean and renewable energy in the village ranked first to third in terms of direct effect, respectively, and had the largest share related to the issue of rural smart growth. In the right side of Figure (12), the variables of protecting landscapes and natural ecosystems in the village, encouraging redevelopment of natural and historical areas of the village and its surroundings, using clean and renewable energy in the village are ranked first to third, respectively, in terms of indirect effect. Based on direct and indirect dependency matrix in Figure (13), villagers' satisfaction of reducing environmental pollution in the village, improving forest and rangeland cover in the study area, creating livable areas in rural settlements are ranked first to third in direct dependency, respectively, and had the largest share in terms of the issue of rural smart growth. In the right side of Figure (13), the variables of improving forest and rangeland cover in the study area, villagers' satisfaction of reducing environmental pollution in the village, creating livable areas in rural settlements are ranked first to third in indirect dependency, respectively.

4.4. Physical-spatial drivers of the effect of smart growth approach on sustainable development of rural settlements

The direct effects and indirect effects in the output scatter plot in Figure (14) illustrated that the most distributed and scattered indicators are the effective variables.

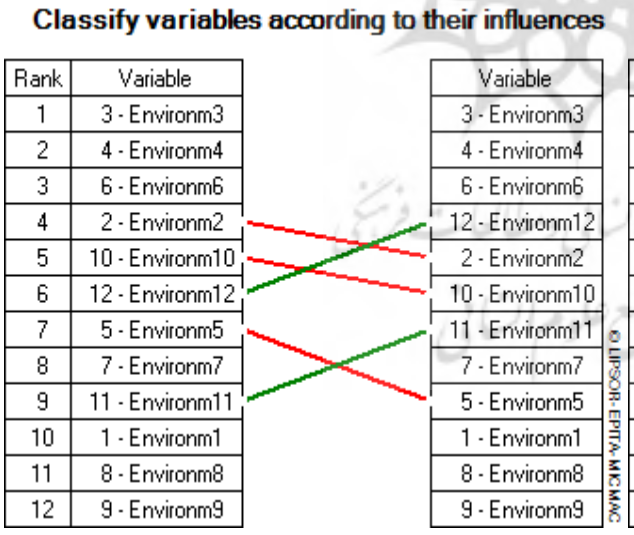

Figure 12. Classification of environmental variables based on the degree of direct (left side) and indirect (right side) effect

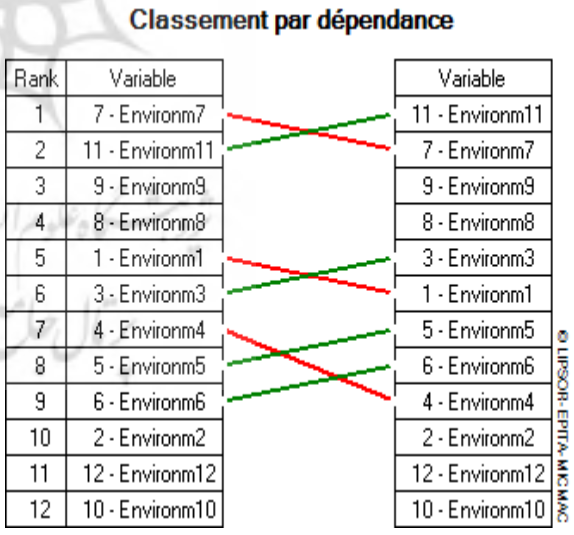

Figure 13. Classification of environmental variables based on the degree of direct (left side) and indirect (right side) dependency

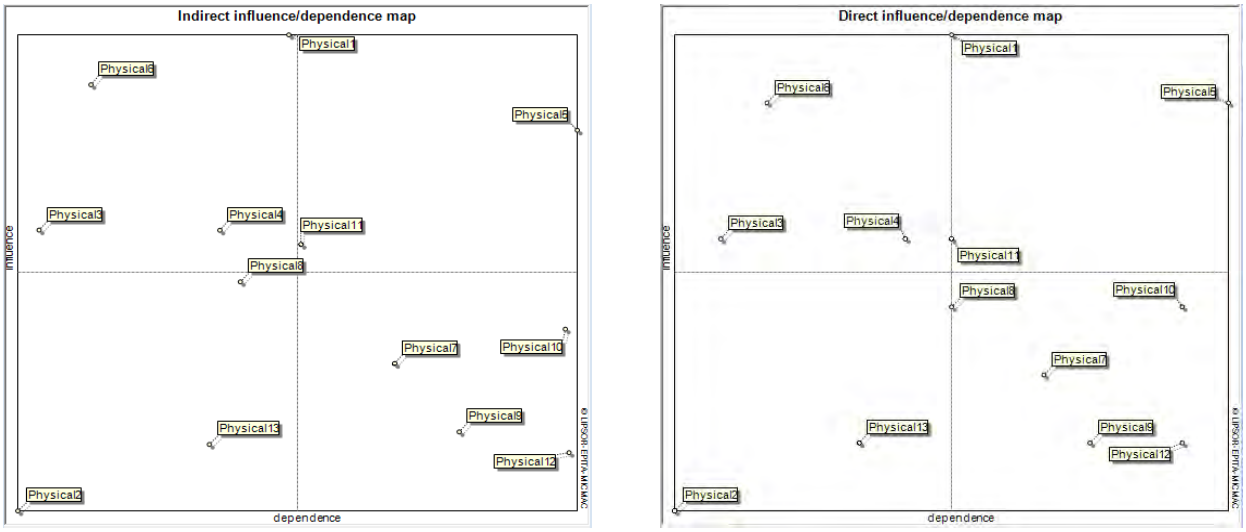

Figure 14. Map of the status of direct (a: right side) and indirect (b: left side) effects of physical-spatial **factors affecting the smart growth approach on sustainable development**

Table 7. Status analysis of the effect of physical-spatial **factors of smart growth approach on sustainable development of rural settlements**

Variable type	Relevant indicators
Effective variables	Villagers' satisfaction of housing construction for different tastes and special needs and the multiplicity of housing patterns (6), intensive activity (agricultural and non-agricultural) in rural settlements (3)
Impressive variables	Providing appropriate design of buildings to prevent energy waste in them (7), reconstructing and renovating textures in old areas (recreating) of rural settlements (9), paying attention to hybrid (mixed) uses and developing access to services at the settlement level (10), improving the quality of accesses (on foot and by vehicle) at the settlement level (12)
Independent variables (discrete)	Developing dwelling units outside the approved area of the rural guide plan (2)
Independent variables (secondary leverage)	Villagers' satisfaction of the visual quality of public spaces (exterior construction, network of passages and their elements) in the village (13)
Independent variables (regulatory)	Villagers' satisfaction of population density in the village (4), attempting to reduce the distance between housing, work, education and meeting daily needs (8), paying attention to the endogenous (infill) development process and choosing the appropriate development position in the rural settlement (11)
Bidirectional variables (risk)	Constructing and designing intensively in physical context integrating high density land uses in rural settlements (1)
Bidirectional variables (objective)	Supervising on constructions by rural manager to guide the physical development of the village (5)

According to Figure 15 (a) on the right side among the 13 variables investigated as indicators of physical-spatial factors, the variables of constructing and designing intensively in physical context integrating high density land uses in rural settlements (24), supervising on constructions by rural manager to guide the physical development of the village (23), villagers' satisfaction of housing construction for different tastes and special needs and the multiplicity of housing patterns (23) respectively calculated the highest column value and had the highest effect rather than other variables. In fact, the most notable feature of these variables is low affected and high affecting level. In indirect effect of variables on each other, the software computed the variables' exponent of 2, 3, 4, 5 and consequently the relevant effects are calculated. The variables of supervising on constructions by rural manager to guide the physical development of the village (10391), improving the quality of accesses (on foot and by vehicle) at the settlement level (10327), paying

attention to hybrid (mixed) uses and developing access to services at the settlement level (10298) had the highest column value and were most affected by the other variables (Figure 15b left side).

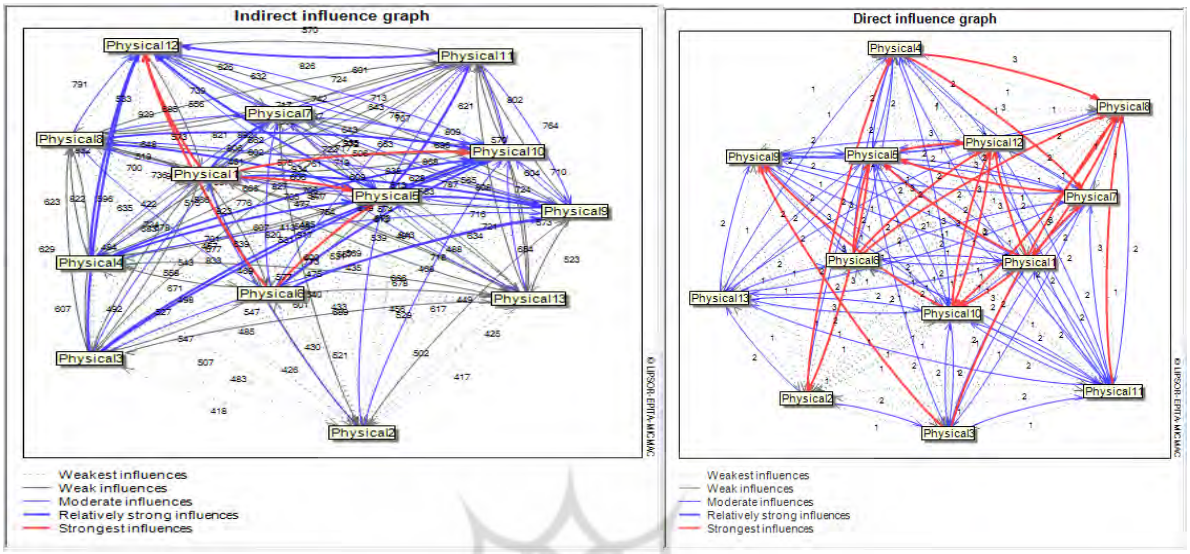

Figure 15. Map of direct (a: right side) and indirect (b: left side) relationships between physical-spatial variables of smart rural growth

According to the direct and indirect effect matrix in Figure (16), it can be noted that indicators of constructing and designing intensively in physical context integrating high density land uses in rural settlements, supervising on constructions by rural manager to guide the physical development of the village, villagers' satisfaction of housing construction for different tastes and special needs and the multiplicity of housing patterns ranked first to third in terms of direct effect, respectively, and had the largest share related to the issue of rural smart growth.

Classify variables according to their influences

Rank	Variable	Variable
1	1 - Physical1	1 - Physical1
2	5 - Physical5	6 - Physical6
3	6 - Physical6	5 - Physical5
4	3 - Physical3	3 - Physical3
5	4 - Physical4	4 - Physical4
6	11 - Physical11	11 - Physical11
7	8 - Physical8	8 - Physical8
8	10 - Physical10	10 - Physical10
9	7 - Physical7	7 - Physical7
10	9 - Physical9	9 - Physical9
11	12 - Physical12	13 - Physical13
12	13 - Physical13	12 - Physical12
13	2 - Physical2	2 - Physical2

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Figure 16. Classification of physical-spatial variables based on the degree of direct (left side) and indirect (right side) effect

Classement par dépendance

Rank	Variable	Variable
1	5 - Physical5	5 - Physical5
2	10 - Physical10	12 - Physical12
3	12 - Physical12	10 - Physical10
4	9 - Physical9	9 - Physical9
5	7 - Physical7	7 - Physical7
6	1 - Physical1	11 - Physical11
7	8 - Physical8	1 - Physical1
8	11 - Physical11	8 - Physical8
9	4 - Physical4	4 - Physical4
10	13 - Physical13	13 - Physical13
11	6 - Physical6	6 - Physical6
12	3 - Physical3	3 - Physical3
13	2 - Physical2	2 - Physical2

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Figure 17. Classification of physical-spatial variables based on the degree of direct (left side) and indirect (right side) dependency

Based on direct and indirect dependency matrix in Figure (17), supervising on constructions by rural manager to guide the physical development of the village, paying attention to hybrid (mixed) uses and developing access to services at the settlement level, paying attention to the endogenous (infill) development process and choosing the appropriate development position in the rural settlement, respectively, and had the largest share in terms of the issue of rural smart growth.

5. Discussion and Conclusion

Identifying and analyzing the key drivers of the effect of the smart growth approach as a tool for sustainable rural development has been studied. If the key drivers of smart growth are considered as an infrastructure for sustainable rural development, it can reduce the negative effects associated with this issue. In addition, the necessary and executive planning to increase and improve the key drivers of smart growth can contribute to the process of sustainable rural development. In fact, this study has been conducted with the aim of identifying the key drivers of the smart growth approach on the sustainable development of rural settlements in Jiroft County. To achieve it, first 36 experts, specialists, university professors and executive authorities were selected as a sample to participate in this research, and in the next stage, using the Delphi method and a questionnaire the most important key drivers of the effect of smart growth approach on sustainable development of rural settlements in Jiroft County were identified and scored. a Total of 57 indicators in 4 categories of economic, socio-cultural, environmental and physical-spatial factors formed cross-matrix and in the next stage using MicMac software, the obtained weights were applied and the intensity of direct and indirect effect of variables and finally 14 key drivers were recognized as the most important future drivers of smart growth on the sustainable development of rural settlements in Jiroft County.

Ultimately, the key drivers affecting the formation of smart rural growth are extracted and presented in Table (8). The drivers included utilizing existing infrastructure to increase villagers' employment and income with a net effect of (+10), improving land and housing prices in rural areas with a net effect of (+9), villagers' satisfaction of increasing rural relations with outside (city and other villages) (+8), villagers' satisfaction of access to technology, initiative and innovation in rural areas with a net effect of (+6), encouraging redevelopment of natural and historical areas of the village and its surroundings with a net effect of (+4), villagers' satisfaction of housing construction for different tastes and special needs and the multiplicity of housing patterns with a net effect of (+7), intensive activity (agricultural and Non-agricultural) in rural settlements with a net effect of (+6).

Table 8. Final Key drivers for forming smart rural growth based on structural analysis model

Row	Predators	Net direct impact	Net indirect effect
1	Utilizing existing infrastructure to increase villagers' employment and income	+10	+7205
2	improving land and housing prices in rural areas	+9	+6959
3	increasing the entrepreneurial spirit, starting and encouraging new local businesses	+5	+4004
4	increasing innovation in economic activities (new marketing, etc.)	+3	+2005
5	villagers' satisfaction of increasing rural relations with outside (city and other villages)	+8	+8356
6	villagers' satisfaction of access to technology, initiative and innovation in rural areas	+6	+5990
7	villagers' satisfaction of improving the quality of life in rural areas	+5	+6084
8	villagers' satisfaction of improved road communications, sidewalks and important path transportation of rural settlements	+4	+4248
9	encouraging redevelopment of natural and historical areas of the village and its surroundings	+4	+2002
10	protecting landscapes and natural ecosystems in the village	+4	+1809
11	developing abandoned lands of rural settlements	+3	+1510
12	villagers' satisfaction of housing construction for different tastes and special needs and the multiplicity of housing patterns	+7	+2793
13	intensive activity (agricultural and non-agricultural) in rural settlements	+6	+2398
14	constructing and designing intensively in physical context integrating high density land uses in rural settlements	+4	+1531

In this section, the findings of the study were compared with the results of other researchers. The findings of this study is consistent with the results of the study by Anabestani & Kalateh Mimari (2020) in which identified indicators of increasing people with higher education and their tendency toward staying in rural areas and establishing cross-industrial activities such as tourism, food and cultural production as key effective drivers on the formation of smart rural development in this regard. The results of the study by Zavratnik et al. (2020), Aziiza & Susanto (2020) and Visvizi & D. Lytras (2019) emphasize that sustainable life is not achieved only through technological solutions and the main problems of rural areas are limited access to technology. Consequently, they considered information and communication technology (ICT) as the main issue in any smart urban and rural development plan which is in line with the results of this study. It is also in agreement with the research by Elgar, Stefaniak, & Wohl, (2020) according to which smart growth indicators are effective in the process of sustainable development. Furthermore, it is consistent with Tregear & Cooper (2016) believing that smart growth can contribute to maintaining ecological, social, economic and physical sustainability by making rural settlements more livable, sustainable economic development, creating diverse and affordable housing options and therefore has significant benefits for rural communities. It is also in line with research by Tsimpo & Wodon (2018) that the combined use of smart growth indicators can lead to the benefits of financial and economic sustainability and thus help to receive more local taxes, recognizing the occupations and local benefits which may attract more people. The more people shop in an area, the more economic activity will be. Accordingly, smart growth offers options in the field of housing, transportation, occupations and welfare facilities (including social, cultural, recreational, educational services) and uses comprehensive planning to guide, design, develop, manage, revitalize and build communities. In general, this approach considers the relationship between development and quality of life. The features and ideas of smart growth in a community vary from place to place. In a general scenario, smart growth invests time and resources and provides new life for rural centers and worn-out old structures. Smart growth takes into account the redevelopment of developed areas. In fact, proponents of smart growth would like to optimize existing facilities rather than building new ones.

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Authors' contributions

The authors equally contributed to the preparation of this article.

Conflict of interest

The authors declare no conflict of interest.

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Original Article

تحلیل پیشران‌های کلیدی اثرگذاری رهیافت رشد هوشمند بر توسعه پایدار سکونتگاه‌های روستایی ایران

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چکیده مبسوط

۱.مقدمه

امروزه رهیافت رشد هوشمند نقش بسیار مهمی در توسعه پایدار روستایی دارد. این رویکرد تلاش می‌کند کیفیت زندگی انسان‌ها را ارتقاء دهد و درصدد پاسخگویی به مسائل و مشکلات اجتماعی-اقتصادی، زیست‌محیطی و کالبدی است و می‌تواند راهگشای مدیریت روستایی برای استفاده بهینه از امکانات و حل معضلات روستایی باشد. درواقع رهیافت رشد هوشمند می‌تواند مسیری را برای برون‌رفت از ناپایداری و رسیدن به توسعه پایدار را در نواحی روستایی فراهم نماید. بر این اساس، با توجه به مباحث یاد شده در منطقه مورد مطالعه بهره گیری از رویکردهای آینده پژوهی می تواند زمینه را جهت بهبود ر شد هو شمند در را ستای د ستیابی به تو سعه پایدار بویژه در نواحی روستایی فراهم کند. بر این اساس هدف مطالعه حاضر تحلیل پیشران‌های کلیدی اثرگذاری رهیافت رشد هوشمند بر توسعه پایدار سکونتگاه‌های روستایی با رهیافت آینده‌پژوهی می باشد. لذا پژوهش حاضر در پی پاسخ گویی به این سوال است که پیشران‌های کلیدی اثرگذاری رهیافت رشد هوشمند بر توسعه پایدار سکونتگاه‌های روستایی شهرستان جیرفت کدام اند؟

۲. مبانی نظری تحقیق

رشد هوشمند به اصولی از توسعه و عملیات برنامه ریزی اشاره دارد که الگوی کاربری زمین و حمل و نقل موثر را ایجاد کرده است. به گونه در واقع طرفداران رشد هوشمند پیش از آنکه درصدد ساختن تأسیسات جدید باشند خواهان بهینه کردن تاسیسات موجود هستند. بر این اساس اصطلاح "رشد هوشمند" به طور گسترده ای برای توصیف الگوهای فشرده توسعه که ویژگی های منفی رشد پراکنده را به تصویر نمی کشد، به کار گرفته می شود. بر این بنیان رویکردهای ر شد هو شمند به ر شد و تو سعه در مناطق رو ستایی و ایجاد الگویی برای توسعه کمک می‌کند که اهداف اجتماعی چندگانه، از جمله اهداف سلامت عمومی را پشتیبانی می‌کند. با مرور منابع و تحقیقات پیشین مرتبط با هو شمند سازی رو ستاها و تاثیرگذاری آن برتو سعه پایدار روستایی این گونه استنباط می شود که با توجه به ماهیت مسئله و بردا شتها، بیشتر این تحقیقات به برر سی و تحلیل شاخص های رشد هوشمند و عوامل موثر بر آن از طریق شاخص مختلف (اجتماعی- اقتصادی، کالبدی و کاربری اراضی، زیست‌محیطی و دسترسی و ارتباطات و...پرداخته اند. و مهمترین عوامل موثر در زمینه هو شمند سازی رو ستاها از دیدگاه این پژوهشگران عوامل د ستر سی، زیرساخت ها، حمل و نقل، ارتباطات، نوآوری و دانش و.... می‌باشد.

۳. روش‌شناسی تحقیق

تحقیق حاضر بر اساس هدف از نوع کاربردی و بر اساس ماهیت، توصیفی- تحلیلی است. که برای جمع آوری اطلاعات از روش اسنادی و میدانی استفاده شده است. در روش‌های خبره‌محور، فرمول یا رابطهٔ دقیقی برای برآورد حجم نمونه وجود ندارد. در این نوع روش‌ها دانش

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آینده‌پژوهی و سناریونگاری عموماً تعداد خبرگان نباید کمتر از ۳۵ نفر باشد. جامعه نمونه این پژوهش را ۳۶ نفر از کارشناسان، متخصصان و استادان دانشگاهی و مسئولان اجرایی شناسایی شده در حوزه روستایی تشکیل می دهند. اعتبار و روایی ابزار گردآوری اطلاعات(پرسش نامه) را استادان و خبرگان تایید کردند. برای تجزیه و تحلیل داده ها و تحلیل ساختاری تاثیرگذاری شاخص های رهیافت رشد هوشمند بر توسعه پایدار سکونتگاه های روستایی از نرم افزار Micmac استفاده شد، که در ابتدا تاثیر متغیرها نسبت به یکدیگر از صفر تا چهار بر اساس طیف تعریف شد، در این نرم افزار و زیر نظر کارشناسان و متخصصان ارزش گذاری شد، سپس تاثیرات مستقیم و غیر مستقیم و همچنین شاخص‌های دارای پتانسیل اثرگذار و اثرپذیر مستقیم و غیرمستقیم و در نهایت تاثیرگذارترین شاخص های کلیدی شناسایی شده است.

۴. یافته‌های تحقیق

شناسایی و تحلیل پیشران های کلیدی اثرگذاری رهیافت رشد هوشمند به عنوان ابزاری برای توسعه پایدار روستایی مورد مطالعه قرار گرفته است. لذا در صورتی که پیشران های کلیدی رشد هوشمند به عنوان زیر ساختی برای توسعه پایدار روستایی در نظر گرفته شود، می‌تواند تأثیرات منفی مرتبط با این مقوله را کاهش دهد. همچنین با برنامه‌ریزی های لازم و اجرایی برای افزایش و بهبود پیشران های کلیدی رشد هوشمند می‌توان به فرآیند توسعه پایدار روستایی کمک کرد. در واقع این پژوهش با هدف شناسایی پیشران های کلیدی اثرگذار رهیافت رشد هوشمند بر توسعه پایدار سکونتگاه های روستایی شهرستان جیرفت تدوین شده است. برای رسیدن به هدف مورد نظر، نخست تعداد ۳۶ نفر از کارشناسان، متخصصان و استادان دانشگاهی و مسئولان اجرایی به عنوان نمونه برای مشارکت در این پژوهش انتخاب شد و در مرحله بعد با روش دلفی و از طریق پرسشنامه به شناسایی و امتیاز دهی مهم ترین پیشران های پیشران های کلیدی اثرگذار رهیافت رشد هوشمند بر توسعه پایدار سکونتگاه های روستایی شهرستان جیرفت اقدام شد که در مجموع ۵۷ شاخص در ۴ دسته عوامل اقتصادی، اجتماعی- فرهنگی، محیطی و کالبدی- فضایی ماتریس های متقاطع را تشکیل دادند و در مرحله ی بعد با استفاده از نرم افزار میک مک وزن های بدست آمده اعمال و شدت تاثیرگذاری و تاثیرپذیری مستقیم و غیرمستقیم متغیرها و در نهایت ۱۴ پیشران کلیدی به عنوان مهم ترین پیشران های آتی تاثیرگذار رشد هوشمند بر توسعه پایدار سکونتگاه های روستایی شهرستان جیرفت شناخته شدند.

۵. بحث و نتیجه‌گیری

۱۴ پیشران‌های کلیدی تاثیرگذار بر شکل‌گیری رشد هوشمند روستایی عبارتند از بهره‌وری از زیرساختهای موجود در راستای افزایش اشتغال و درآمد روستاییان با مقدار اثرگذاری خالص(+۱۰)، بهبود قیمت اراضی و مسکن در سطح روستا با مقدار اثرگذاری خالص(+۹)، میزان رضایت‌مندی از افزایش روابط روستا با بیرون از آن (شهر و روستاهای دیگر) (+۸)، میزان رضایت از دسترسی به فناوری، ابتکار و نوآوری در محیط روستا با مقدار اثرگذاری خالص(+۶)، میزان تشویق به توسعه مجدد نواحی طبیعی و تاریخی روستا و پیرامون با مقدار اثرگذاری خالص(+۴)، رضایت‌مندی از ساخت مسکن برای سلایق مختلف و نیازهای خاص و تعدد الگوهای مسکن با مقدار اثرگذاری خالص(+۷)، میزان فعالیت فشرده(کشاورزی و غیرکشاورزی) سکونتگاه های روستایی با مقدار اثرگذاری خالص(+۶) . به طورکلی، این رویکرد ارتباط میان توسعه و کیفیت زندگی را مدنظر دارد. بنابراین، ویژگی‌ها و ایده‌های رشد هوشمند در یک جامعه از یک مکان به مکان دیگر متفاوت است. در یک سناریوی کلی رشد هوشمند زمان و منابع را سرمایه گذاری کرده و زندگی جدیدی برای مراکز روستایی و بافت های فرسوده و قدیمی فراهم می کند. رشد هوشمند توسعه مجدد نواحی توسعه یافته را مدنظر دارد، در واقع طرفداران رشد هوشمند پیش از آنکه درصدد ساختن تأسیسات جدید باشند خواهان بهینه کردن تاسیسات موجود هستند.

کلیدواژه‌ها: پیشرانها، رشد هوشمند، توسعه پایدار، سکونتگاه‌های روستایی، شهرستان جیرفت.

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