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Identification and Ranking of Barriers to Sustainable Development in Iran

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ABSTRACT

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This paper tried to test independence or dependence of sustainable development by evaluating the relationship or lack of significant relationship between the considered independent variables. Another objective of this paper is to determine and rank barriers to sustainable development. In both cases, this paper finds its target. Kolmogorov Smirnov test showed that according to the amount of significance of variables, the assumption for sample normal distribution is not rejected. Pearson correlation coefficient test showed that the absolute value of correlation coefficient of subsidiary hypotheses are respectively 0.158695, 0.088511, 0.126509, 0.097899, 0.127403, 0.03755, 0.173447, 0.105498, 0.084488, and the Sig statistic for all variables equals to or is smaller than 0.003. These calculations indicate that there is a significant direct relationship between defined independent variables in this study and meta-cognitive strategies and the Sig statistics for all variables in the studied statistical population equals to or is smaller than 0.003. Analysis and study of the computational results of the new and advanced methods of partial least squares for structural equation (VPLS) showed that the t-student estimated for each of the model coefficients was more than 95% and it can be concluded that the research hypotheses with calculated coefficients are confirmed. Also the coefficient of determination was calculated as ($R = 0.892$), which indicates that approximately 89%, variations of the dependent variable (sustainable development) are explained and described with objectives of progress and efficacy in this study. This paper also showed that per one unit increase in the barriers, how much sustainable development reduces

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KEYWORDS: Sustainable development, development patterns, barriers to development, ranking models

1 - Introduction

In all cases, particularly in terms of social sciences, development has been defined harmonic with social science principles and rules and often very limited definitions are offered. The author of this article believes that development shall be defined as a sustainable process through which human life improves, however, this dynamic and sustainable process could be changeable according to time and place, and in fact "change" is one of the features of this process. Any definition except the above mentioned definition of development creates time constraints and thus will not be extended. Development process indicates the relationship between individuals and society, culture, history, religion, geography, dominated political philosophy and policies of the government. Before describing the dialectic of this process, it is briefly mentioned that the man himself is a multidimensional social phenomenon, human social life is a multidimensional process, and both quantitative and qualitative changes at any time according to the history of various nations is measured compared to the quantity and quality previous to the contemporary period. Development process itself is an evolutionary process and like any evolutionary process must be started from a place and time and is influenced by social context, political philosophy, cultural values, resources and labor and geographical conditions, and transfers from a degree with some features to another degree with some other features. It is mentioned that in some cases evolution does not happen, but devolution and narrowing of the potential involution happens, and it does not always move to higher levels. There are many examples in human history in which development process has changed its direction and there is no other factor that could explain the shift except human and especially development process managers and involved practitioners. In this history it has been seen that when in a community with a high level of development process, the life quality of people reduces or is not in the priority, the development process gets narrower and understanding the involution (both potential and actual) gets more difficult. For example, today United States has entered a narrow involution phase. The agent for this change is exactly what has collapsed the Roman and Persia Empire, China and ... (See picture in the page), which is alienation of people and violent class conflict. Today, some countries such as Iran have not correctly identified the involution (both potential and actual). What is important in the development process is quality and diversity, quality of life includes whatever a community can materially and spiritually provide, and variety includes more extensive facilities, more confidence in development process and the power to provide multiple sources of income and their value. As mentioned, quality is in various degrees and is evaluated by criteria and standards including health, reducing anxiety, long life, reduced working hours in a week, clean fun, good and safe roads, good schools, access to universities and investigation circles, which all are part of sustainable and comprehensive development process and require a multi-dimensional existence.

(Shariati, M. 2009) Obstacles to development in Iran have rooted both inside and outside Iran. Both in ancient history and in contemporary history of changes, growth or lack of adequate growth and development have been created by the dialectic of internal and external factors and time (both the old and current). Internal barriers are factors that seem purely domestic, but in fact the boundary between the two factors cannot be detected through dialectic (the relationship between internal and external factors and phenomena).

(Yaghinlo, M. 1998) in examining factors affecting the sustainable development, it has been seen that sometimes development has happened in different societies, but has not been stable and in other words it has been a short-term development. This requires rigorous scientific review to identify existing obstacles and bottlenecks. Future studies shall explore various needs and issues in the country, investment status and manpower employed in state organizations and institutions, which sometimes have led to development, but it was an unsustainable development. So sustaining the development with the help of scientific management is one of the important issues which compel authorities to seek the main obstacles to achieve sustainable development and find true ways. It should not be forgotten that one of the ways to achieve sustainable development is financial investment, but it is not the only way, but rather management problem is considered as the major bottlenecks to achieve sustainable development.

2 - Research Background

In this section, the research background on barriers to sustainable development was discussed and opinions of some organizations and scholars in this field are expressed. Plan and Budget Organization, 1996, review factors and barriers to sustainable development; the Environmental Protection Organization, 1994, the United Nations Conference on Environment and Sustainable Development; (Kahrom, I. 1996), the context of national strategy for environment and sustainable development in the Islamic Republic of Iran; (Makhdoom, M. 1996), Cornerstone of Land Logistics; (Miller, G. T., 1995), Environmental Science; (Hunt, D. et al. 1995), Environmental management systems; (Bahraini, H. 1997), Urban Planning and Sustainable Development; (Pakzad, J. 2006), theoretical foundations of urban planning; (Mofidi, S.M. et al. 2008), Urban Village, a model for sustainable urban development; (Aldus, T., 1997), Urban villages: a concept for creating a mixed-use urban developments on a sustainable scale; (Franklin, B. 2002), constructing an image: The Urban Village concept in UK; (Willis, M. 2006), Sustainability: The issue of our age and a concern for local government; (Termeer, C. 2009), Barriers to new modes of horizontal governance; (Abrahamian, E. 1998), Iran between two revolutions; (Faghihi, A. 2005), Bureaucracy and development in Iran; (Taheri, A. 1993), local government in Iran and decentralization; (Zanjani, M. 2001), the history of ancient Civilization. Table of comparison late studies shows as table no.1, as follow.

Table (1) Comparison of studies

Row	Research scholar name	Year	Research subject
1	Plan and Budget Organization	1996	Prosperous Iran
2	Environmental Protection Organization	1994	Earth Conference
3	Kahrom, Ismael	1996	Context of national strategy for environment and sustainable development in the Islamic Republic of Iran
4	Makhdoom, Majid	1996	Cornerstone of Land Logistics
5	Miller, G. T.	1995	Environmental Science
6	Catherine, J. & Hunt, D.,	1995	Environmental management systems
7	Bahraini, Hossein	1997	Urban Planning and Sustainable Development
8	Pakzad, Jahanshah [10];,	2006	Theoretical foundations of urban planning
9	Mofidi, Majid and Yamani, Parisa	2008	Urban Village, a model for sustainable urban development
10	Aldus, T.	1997	Urban Villages: A concept for creating mixed-use urban developments on a sustainable scale
11	Franklin, Bridget	2002	constructing an image: The Urban Village concept in UK
12	Willis, Michael	2006	Sustainability: The issue of our age and a concern for local government

13	Termeer, C.	2009	Barriers to new modes of horizontal governance
14	Abrahamian, Ervand	1998	Iran Between two Revolutions
15	Faghihi, Aboulhassan	2005	Bureaucracy and development in Iran
16	Taheri, AbdoulQassem	1993	Local Governments in Iran and decentralization
17	Zanjani, Mahmud	2001	the history of Ancient Civilization

The expressed views may not be applied and hence a new perspective can be collected and presented based on different environmental and time needs. Conducted studies have investigated barriers and strategies for sustainable development from social, cultural, scientific, industrial, employment, economic and other perspectives. Each perspective tried to propose barriers to sustainable development from its point of view. Hence it has been decided that this paper assess an acceptable model adopted for the ranking of developmental barriers. Internet search has provided a model called sustainable community foundation which has defined 24 variables in three main groups of human welfare, environmental health, and economic welfare. “The Sustainable Society Foundation, SSF, is a non-profit organization, established in 2006 with the objective of stimulating and assisting societies in their development towards sustainability. The SSF is based in The Netherlands and operates globally. The SSF has developed the Sustainable Society Index, SSI, which shows at a glance the level of sustainability of 151 countries.” Obviously, this foundation biennially ranks countries based on the levels of achievements of countries and their development in each of these variables. The inability of countries to achieve these variables is considered the main cause of their lower rating. Identifying the barriers to sustainable development lies in examining the roots of failure to achieve these variables. For example, in 2010 with an overall score of 5.72 and in 2008 with a score of 5.55 and in 2006 with a score of 5.34, Iran ranks in all the 3 years was determined as 64. Figure below shows the estimated original sample and the spider web display of ranks in each country each year based on the level of achievement for each of the indicators. Diagram of Iran’s acquisition of SSI indicators (2010), shows as figure one.

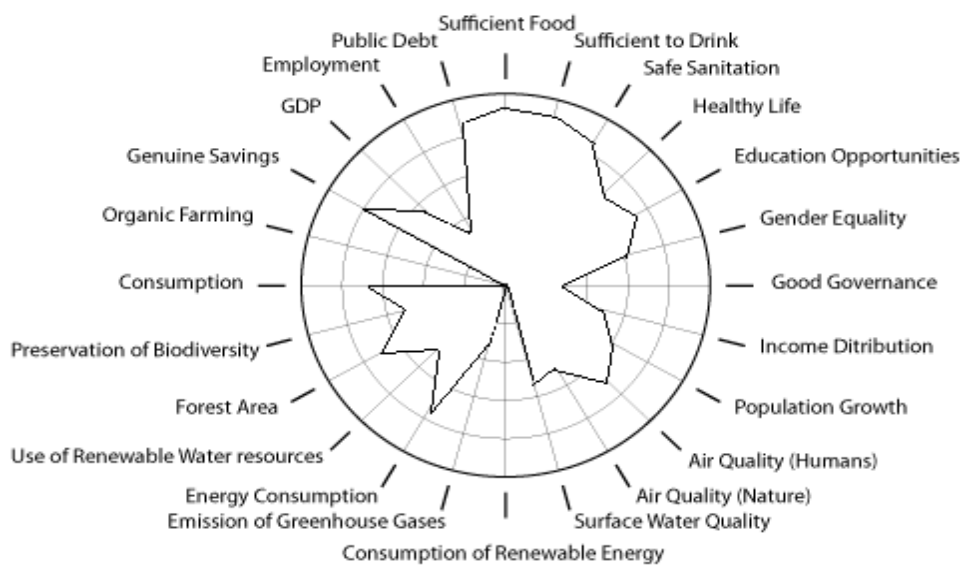


Figure (1) Diagram of Iran's acquisition of SSI indicators in 2010

It should be mentioned that the defined indicators should have been determined as the foundation of a sustainable community based on sustainable development factors, and barriers to sustainable development are not included. Hence, this paper seeks to determine the overall barriers to sustainable development which can be common in any society and shall be investigated and tested in future studies. Barriers to sustainable development considered in this study respectively include: barriers in economic, agriculture, industry, science and technology production, employment, education, foreign investment, culture and communication, rules and regulations sectors. These 9 expressed barriers are studied in this article.

2-1 - Research necessity

Remember that sustainable development means development with fixed or increasing rate in the time process. Identify and determining the barriers to growth and development in the community helps to fix its basic root and on the other hand leads to sustainable development. Even if practically all the obstacles are not known, the research shows that well-known obstacles to sustainable development can be used to improve the current state of society and also other barriers can be identified through the time. Generally, identifying barriers to sustainable development and prioritizing them to solve development problems in society is one of the most important debates among planners and strategists of the community.

3 - Research Methodology

This research in terms of purpose is an applied research and in terms of data collection is a descriptive research and used Delphi survey which aimed at obtaining consensus from experts familiar with the subject of the article.

3-1 - Research Methodology

This article by designing the research plan tried to collect literature and then by designing the proposed conceptual model, formed a questionnaire for the statistical community. Finally, after distributing questionnaires and collecting opinions and based on analysis of obtained data, conclusions and proposals are discussed. Major tasks and activities carried out in this article include: determine the article's hypothesis, statistical population, sampling method, scope of research, data analysis, determine validity and reliability of the questionnaire, and test of the research hypotheses, then the definition and method of each are discussed.

3-2 – Research hypotheses

Research hypotheses are derived from the main question. The main question in this research is whether there is a significant relationship between development barriers (barriers in the economic, agriculture, industry, science and technology production, employment, education, foreign investment, culture and communication, rules and regulations sectors), and sustainable development in Iran? Thus sustainable development can be defined as the dependent variable and development barriers (barriers in the economic, agriculture, industry, science and technology production, employment, education, foreign investment, culture and communication, rules and regulations sectors) are determined as independent variable.

- The main hypothesis

There is a significant relationship between barriers to development and sustainable development.

- The sub - hypotheses

- 1 - There is a significant relationship between barriers in economic sectors and sustainable development.
- 2 - There is a significant relationship between barriers in agriculture sectors and sustainable development.
- 3 - There is a significant relationship between barriers in industry sectors and sustainable development.
- 4 - There is a significant relationship between barriers in science and technology production sectors and sustainable development.
- 5 - There is a significant relationship between barriers in employment sectors and sustainable development.
- 6 - There is a significant relationship between barriers in education sectors and sustainable development.
- 7 - There is a significant relationship between barriers in foreign investment sectors and sustainable development.
- 8 - There is a significant relationship between barriers in culture and communications sectors and sustainable development.
- 9 - There is a significant relationship between barriers in rules and regulations sectors and sustainable development.

3-3- Statistical population, sample and sampling method

Statistical data in this study is the years between 1981 and 2011. Sampling and sampling method is not used in this study. All information used for calculation is based on data and documentation in printed statistical and economic books of trustee organizations in Iran. This study is only based on library research principles and development of models and test methods available for ranking barriers to sustainable development.

3-4- Methods of data analysis

To study the normality of data distribution, Kolmogorov Smirnov test is used and to determine the relationship between the main hypotheses and sub-hypotheses, the Pearson correlation coefficient test is used. To determine the relationship between sub- hypotheses (barriers in the economic, agriculture, industry, science and technology production, employment, education, foreign investment, culture and communication, rules and regulations sectors) as independent variables and sustainable development as the dependent variable, the PLS method for structural equations is used. Finally for ranking barriers to sustainable development in this study the Friedman test is used.

4 - Research findings

4-1- Evaluation of normal distribution of sample using Kolmogorov - Smirnov test

To study the normality of research sub-hypotheses (barriers in economy, agriculture, industry, science and technology production, employment, education, foreign investment, culture and communication, rules and regulations sectors), Kolmogorov Smirnov test was used, and the results in table two were obtained.

Table (2) one sample Kolmogorov-Smirnov test

	Economy	Agriculture	Industry	Science and technology	Employment	Education	Foreign investment	communication	Rules and regulations
Kolmogorov-Smirnov Z	1.566	1.175	1.205	1.844	1.521	1.367	1.961	1.281	1.166
Asymp. Sig. (2-tailed)	0.072	0.063	0.058	0.090	0.061	0.074	0.088	0.059	0.078

Given the significance level of 5% for each of the development objectives and efficacy variables, the assumption for normal distribution of the sample was not rejected. The relation of subsidiary and main research hypotheses is presented in the figure below. This relationship has been used in the calculation of structural equations.

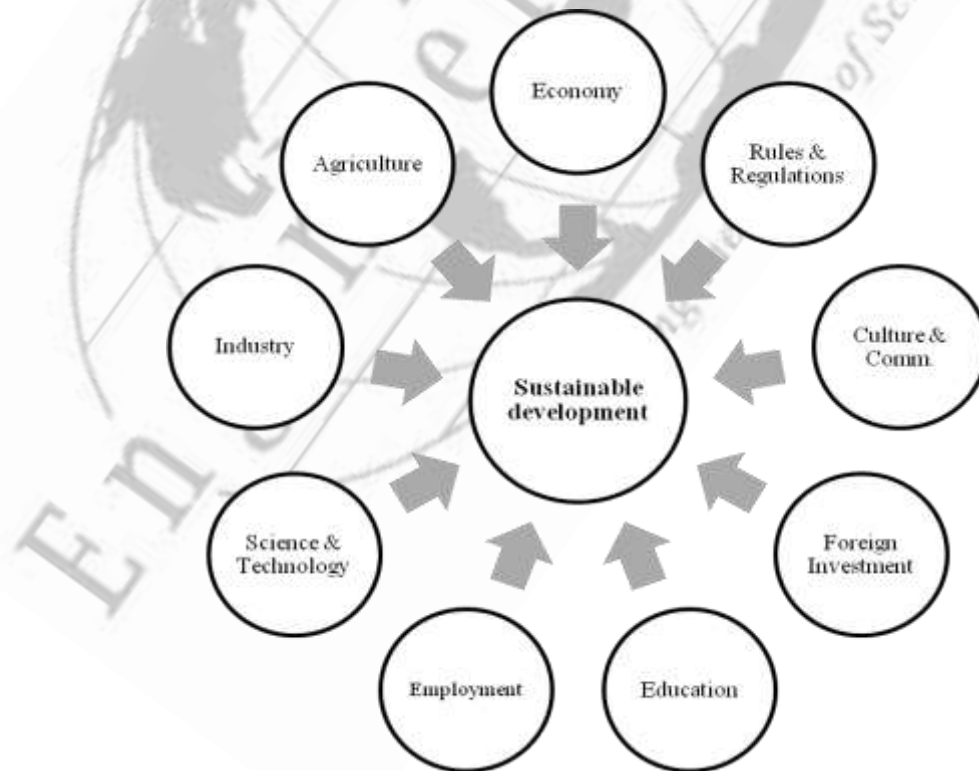


Figure (2), the relationship between subsidiary and main research hypotheses

4-2 Results of Pearson correlation coefficient

Results of Pearson correlation coefficient (table three) show that all the variables with meta-cognitive strategies have direct significant relationship and this relationship is confirmed with 99% of confidence.

Table (3) Pearson correlation coefficients for independent and dependent hypotheses

	Correlation coefficient	Sig	Test result
Economy	0.158695	0.001	There is a direct significant relationship
Agriculture	0.088511	0.003	There is a direct significant relationship
Industry	0.126509	0.002	There is a direct significant relationship
Science and technology	0.097899	0.000	There is a direct significant relationship
Employment	0.127403	0.000	There is a direct significant relationship
Education	0.03755	0.003	There is a direct significant relationship
Foreign investment	0.173447	0.000	There is a direct significant relationship
Culture and communication	0.105498	0.001	There is a direct significant relationship

- 1- The correlation coefficient for economic barriers is 0.158695 and the Sig statistic is 0.001.
- 2- The correlation coefficient for agricultural barriers is 0.088511 and the Sig statistic is 0.003.
- 3- The correlation coefficient of industry barriers is 0.126509 and the Sig statistic is 0.002.
- 4- The correlation coefficient of science and technology production barriers is 0.097899 and the Sig statistic is 0.000.
- 5- The correlation coefficient of employment barriers is 0.127403 and the Sig statistic is 0.000.
- 6- The correlation coefficient of education barriers is 0.03755 and the Sig statistic is 0.003.
- 7- The correlation coefficient of foreign investment barriers is 0.173447 and the Sig statistic is 0.000.
- 8- The correlation coefficient of culture and communication barriers is 0.105498 and the Sig statistic is 0.001.
- 9- The correlation coefficient of rules and regulations barriers is 0.084488 and the Sig statistic is 0.002.

4-3- Factor analysis for variables and the main factors

In this section factor analysis is based on the new and advanced methods of VPLS (partial least squares) for structural equations to analyze factors and more important coefficients, and to estimate coefficients of independent variables and to determine the effectiveness of each of the independent variables on each other. The following graphical diagram shows the output

of VPLS software which contains variables coefficients and their significance (t-statistic).

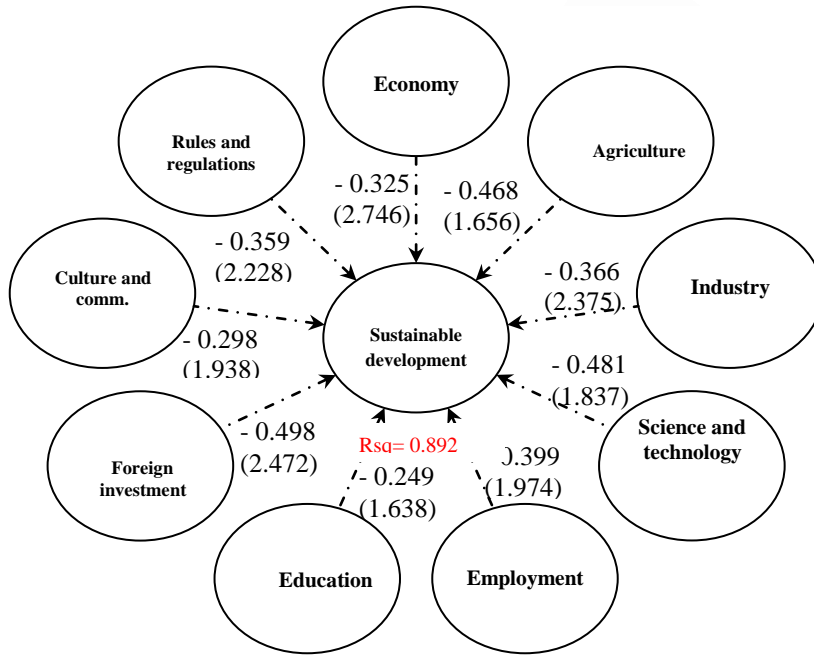


Figure (3) structural equations VPLS software output

Figure three obtained by structural equations method calculations shows that the coefficient of determination is (R = 0.892) and indicates that approximately 89%, the variations of dependent variable (sustainable development) in this study are explained and described by dimensions of sub-hypotheses (the obstacles in economic, agriculture, industry, science and technology production, employment, education, foreign investment, culture and communication, rules and regulations sectors). Table four shows the influencing coefficient for the effect of each of the independent variables on the dependent variable and the t-statistic to investigate the significance of variables.

Table (4) estimation of model coefficients

Urbanization index	Estimation of model coefficients	t-student	Result
Economic → sustainable development	-0.345	2.746	There is a direct significant relationship
Agricultural → sustainable development	-0.468	1.656	There is a direct significant relationship
Industry → sustainable development	-0.366	2.375	There is a direct significant relationship
Science and technology production → sustainable development	-0.481	1.837	There is a direct significant relationship

Employment → sustainable development	-0.399	1.974	There is a direct significant relationship
Education → sustainable development	-0.249	1.638	There is a direct significant relationship
Foreign investment → sustainable development	-0.498	2.472	There is a direct significant relationship
Culture and communication → sustainable development	-0.298	1.938	There is a direct significant relationship
Rules and regulations → sustainable development	-0.359	2.228	There is a direct significant relationship

The T - student value estimated for each of the model coefficients is higher than confidence level of 95% (1.96), so it can be concluded that the following research hypotheses are confirmed as follows.

- 1- With one unit increase in obstacles of economic sector, sustainable development is reduced to 0.345.
- 2- With one unit increase in obstacles of agriculture sector, sustainable development is reduced to 0.468.
- 3- With one unit increase in obstacles of industry sector, sustainable development is reduced to 0.366.
- 4- With one unit increase in obstacles of science and technology production sector, sustainable development is reduced to 0.481.
- 5- With one unit increase in obstacles of employment sector, sustainable development is reduced to 0.399.
- 6- With one unit increase in obstacles of education sector, sustainable development is reduced 0.249.
- 7- With one unit increase in obstacles of foreign investment sector, sustainable development is reduced to 0.498.
- 8- With one unit increase in obstacles of culture and communication sector, sustainable development is reduced to 0.298.
- 9- With one unit increase in obstacles of rules and regulations sector, sustainable development is reduced to 0.359.

4-4 Prioritizing barriers to sustainable development by using the Friedman test

To examine the rank of each of the obstacles to sustainable development, Friedman nonparametric variance analysis is used.

Table (5) results of barriers to sustainable development ranking test

Rank	Ranking mean	Barriers to sustainable development
1	4.70	Barriers in economic sector
2	4.28	Barriers in agriculture sector
3	3.23	Barriers in industry sector
4	3.18	Barriers in science and technology production sector
5	4.65	Barriers in employment sector
6	2.84	Barriers in education sector
7	4.09	Barriers in foreign investment sector
8	2.36	Barriers in culture and communication sector
9	2.12	Barriers in rules and regulations sector

As Table 5 shows the priority order of barriers to sustainable development from rank one to the end is respectively as obstacle in the economic, employment, agriculture, foreign investment, industry, science and technology production, education, culture and communications, and rules and regulations sectors.

5 - Conclusion

This paper by evaluating the relationship or lack of significant relation between the considered independent variables (obstacle in the economic, employment, agriculture, foreign investment, industry, science and technology production, education, culture and communications, and rules and regulations sectors) tried to test independence or dependence of sustainable development. Another objective of this paper was to rank barriers to sustainable development according to available data. In both cases, this paper finds its target. Kolmogorov Smirnov test showed that according to the level of significance of variables (higher than 5%), the assumption for sample normal distribution is not rejected.

Table of comparison late studies shows as table no.1. Iran's acquisition of SSI indicators (Diagram 2010) shows as figure one. Evaluation of normal distribution of sample using Kolmogorov-Smirnov test shows significance level of 5% for each of the development objectives and efficacy variables, the assumption for normal distribution of the sample was not rejected. The relation of subsidiary and main research hypotheses is presented in the figure two. Results of Pearson correlation coefficient (table three) show that all the variables with meta-cognitive strategies have direct significant relationship and this relationship is confirmed with 99% of confidence. Figure three shows the output of VPLS software which contains variables coefficients and their significance (t-statistic). Table four shows the influencing coefficient for the effect of each of the independent variables on the dependent variable and the t-statistic to investigate the significance of variables. Table 5 shows the priority order of barriers to sustainable development from rank one to the end is respectively as obstacle in the economic, employment, agriculture, foreign investment, industry, science and technology production, education, culture and communications, and rules and regulations sectors.

- Pearson correlation coefficient test showed that the absolute value of correlation coefficient of subsidiary hypothesis is respectively 0.158695, 0.088511, 0.126509, 0.097899, 0.127403, 0.03755, 0.173447, 0.105498, 0.084488, and the Sig statistic for all variables equals to or is smaller than 0.003. These calculations indicate that there is a significant direct relationship between defined independent variables in this study and meta-cognitive strategies.
- Analysis of the computational results of the advanced methods of partial least squares for structural equation (VPLS) showed that the t-student estimated for each of the model coefficients was more than 95% of confidence level and it can be concluded that the research hypotheses are confirmed. Also, as it is inferred from the diagram above, the coefficient of determination was ($R = 0.892$), which indicates that approximately 89%, variations of the dependent variable (sustainable development) in this research are explained and described.
- With one unit increase in sub- hypotheses variables, sustainable development, respectively reduces to 0.345, 0.468, 0.366, 0.481, 0.399, 0.249, 0.498, 0.298, and 0.359.

6 – Recommendations

One of the main results in this paper is to determine the values of correlation coefficients between independent and dependent variables. It is recommended that using the research process in this article, readers use and considers the following issues.

- 1 - Determine a method to measure the digital amount of sustainable development according to the determined sub-variables and computing coefficients (Pearson) in a sample population and its periodic measurements to pursue the development amount.
- 2 - Determine the regression equation for the amount of sustainable development in a sample population to define the optimization projects and increase the amount of sustainable development in a sample population.
- 3 -For projects which consider increasing and maximizing the sustainable development in a community, mathematical modeling shall be based on maximization and results shall be compared with the calculations of the current computational state and shall propose solutions for improvement.

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