

Explanation of Inequality and Ranks of Universities in Tehran City to Achieve Sustainable Development

Case study: Universities of Tehran City

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Abstract:

This study aims at evaluating and ranking the universities of Tehran city at input, process and output indicators as well as investigating the inequality between them in order to achieve sustainable development. The statistical population of this research consists of 383 state university students in Tehran City and they are selected as samples by random sampling method. This research has descriptive-analytic survey method and is applied in terms of objective. It is documentary in terms of data collection method and the reliability of its questionnaire is equal to 0.951. Data analysis is done by Topsis and SPSS. According to research results, the first ranks belong to Tehran and Sharif universities in input indicators; Tehran and Amir Kabir universities in process indicators; and Tehran and Amir Kabir universities in output indicators respectively at comprehensive and technical and engineering universities. Furthermore, the results of ranking indicate that there are differences between universities of Tehran City in terms of these indicators.

Keywords: Sustainable development, university, ranking, inequality

Introduction

The study of educational inequality is the researchers and experts' one of the interesting fields. The educational inequality term has been widely used in most of the documents related to policy making, reports and media discussions. A part of these issues is related to definitions of inequality and the other part belongs to its measurement indicators (Vibeke Opheim, 2004: 5). Both the equality and inequality are the valuable terms, so discussion

about them cannot be normative; therefore the acceptable level of inequality or justice is based on the individual and optional preferences. The educational opportunity inequality is defined as the impact of student's socio-economic status based on his learning (Horn, 2010: 10). In terms of opportunity equality, the inequality can be as the lack of equality. The opportunity equality is primarily related to the access; and in this case for instance, access to higher education; in other words, whether all enthusiastic students can enroll in higher education (Vukasovic & Claudias, 2010: 6).

The use of educational indicators is one of the basic ways to identify the disadvantaged areas and evaluate the performance and success of educational systems in covering the weaknesses and shortcomings. The indicators are among the tools which are commonly used to measure the educational performance. The performance indicators, which are used in higher education system, have the same functions which are done by indicators in other areas such as the economic or social systems. The indicators are valuable since they provide the current information, analyze the trends and predict changes. Indicators are used to describe the nature of a system in order to determine how the system components are interconnected, interacted and changed. Furthermore, the data of performance indicators is used to judge the progress toward the goals or standards (Shavelson, & Jeannie, 1991). The performance indicators in higher education express the higher education problems through collecting the clear and objective evidence and as a basis for making the educational system accountable. Furthermore, the indicators can be utilized to discover the causes of education system failures (Ogawa, 1998: 47). Based on the objectives of Science, Technology and Innovation System in the second chapter (the ideal Science and Technology situation) and according to the local Holistic Scientific Map, the superior documents emphasize on its first rank among the Islamic and international universities and focus on the macro strategies of local science and technology development (designing the efficient system for supervision, evaluation and implementation of comprehensive ranking systems and quality assurance of scientific, technology and innovation institutions with an emphasis on protecting the applicants' rights and transparency and supply and demand market development), so this study performs the micro evaluation of universities in Tehran and understand the difference between them to reduce the inequalities and achieve the sustainable development according to the superior documents and evaluation of scientific situation in Iran and based on the classification of educational system components into three categories of input, process and

output indicators and based on wide and various indicators in both documentary and non-documentary indicators.

1- Research literature

Sustainable development means combining the economic, social and environmental objectives to maximize the current human welfare without undermining the abilities of future generations in order to meet their needs (OECD¹: 1). In short, the sustainable development means the increased capacity and dynamics of national system in all political, economic, social, cultural and environmental aspects and subsets in a way that the national system is able to meet the growing and nature-friendly needs and interact with changing internal and external conditions (theoretical principles and documents of the fourth plan, 2004). Through obvious link of main university functions namely the research, education and everyday sustainable activities of university, the overall approach of university for sustainable development proves the application of vague sustainable development concept in the real world to students. This approach considers Taylor's conference commitments for sustainable development. A systemic approach specifies that if a sustainable approach is the goal of development at a university as a small town, all interconnected sectors should be taken into account. Such an integrated and complementary approach is an ideal target for most of the higher education institutions and it provides a framework for implementing the sustainable development within the organization. This approach seeks to break down barriers between the functional units of institute (Faham & Rezvanfar, 2015).

Nowadays, the equal educational opportunities especially at schools imply that anyone has access to equal effective educational opportunities which lead to realization of desired learning outcomes (Evans Valsky, 2013: 80). According to the structuralists, despite the fact that there is the inequality in the educational system, the educational inequality is substantially more likely due to the differences in individual talent, attitudes and responsibility except for the consequences of system performance (Parsons, 1959; Inkles & smith, 1974; Schultz, 1961). Neo-Marxist economists such as Bowles and Jenits conclude that the educational institutions of modern societies regenerate the inequality rather than its modification and elimination (Chenge, 2009: 83). The equality principle is one of the components of socialism. According to the socialists, the private ownership of production

¹ organization for economic co-operation and development (OECD)

tool is the source of all damaging economic, social and cultural injustices and inequalities. Therefore, they insist on the equality principle (Alizadeh, 2007: 46). According to anarchists, the government does not pay attention to the poor and needy citizens, and only think about providing the capitalist class interests. They argue that as long as the government continues, the monopoly capitalism, and power concentration and thun the inequality will not be disappeared (Alam, 2004: 12). The educational opportunity equality and justice can be investigated according to two different perspectives. In other words, it can be taken into account as the aim or tool to achieve the long-term goal of social equality. According to the classical liberal concept, the equality means that all people are equal and free in their rights regardless of race, color, national and social origin. According to this concept, the educational equality means that the people should be equal at the start of working life and education. In a socialist attitude, the education is seen as the principal mean of equalizing the social differences. The equality of educational opportunities is realized when everyone are equal in access to education. This goal is now accepted at the international level, but it is not fully realized. The concept of liberal in educational opportunity equality is based on the idea that every person is born with a relatively certain and fixed capacity of intelligence, but the individual intelligence is not related to his social class. Therefore, the educational system should be designed in a way that it destroys the geographic and economic obstacles which prevent the students' abilities in lower classes in order to achieve the developed innate intelligence. The educational system should enhance social mobility and lead the lower class individuals to higher social status. According to the full application of liberal concept of educational equality, not only the ready lower class people should be developed, but the higher class youth should receive the lower level education, and put in inferior jobs (Leinonen, 2000: 14).

2- Ranking the universities

During the history of creation and development of universities, there has constantly been the competition between the universities and higher education centers for attracting the students, professor and financial and non-financial donations as well as promoting the social status. For years, the competition took place only by assessing the implied reputation of universities, and there was not any objective information for supporting this reputation. In other words, the university reputation and renown, which was often due to the governmental

support and advertising, was considered as the indicator of judgment about appropriateness or inappropriateness of university (Shin, 2011).

The inclusion in classification and ranking the global universities has improved the higher education level because due to the emergence of global ranking, the universities are not able to evade and avoid the national and international comparisons, and this has made changes in performance of universities (Rauhvargers, 2011: 68). There is little consensus about how to rank universities. Most of the researchers believe that ranking has made the unhealthy competition between universities; and the universities are trying to adjust their activities based on ranking criteria in order to keep their ranks at higher levels. In contrast, some experts have expressed the opposite view and stated that ranking will improve the quality of higher education institutions and universities. It should be noted that the quality is a term related to the mind; and the quality ranking should be done in the light of objectives of universities and higher education institutions (Yamani Douzi Sorkhabi, 1993).

At the national level, the higher education institutions and government utilize the performance indicators for different purposes. The higher education institutions use the performance indicators for four reasons.

- 1- Performance supervision and comparison with objectives
- 2- Contribution to assessment and organizational performance measurement
- 3- Providing the information quality assurance for foreign inspectors
- 4- Providing the information and reporting to the government for responsiveness (Rowe, 2004).

Five overall criteria namely the research, education, international reputation, and socio-economic activities and resources are used to rank the local universities. These criteria have indicators each which has its own value and weight; and finally the university status is specified in terms of ranking by calculating them from raw data received from universities and applying the weights and calculating the sum of them according to the formulas. The weight of educational indicators is generally low in ranking system of our country and even in the best-known ranking global systems; and even this low number of educational indicators does not accurately measure the educational quality in some ranking systems (Sadlak, 2007). Ranking the universities is performed at both macro and micro levels. The macroeconomic assessment evaluates the current status of country at a national scale. The

status of each higher education subset is generally investigated and beyond the universities and higher education institutions and relevant organizations. This evaluation determines the higher education process in each main field (educational, research, student, cultural, budget, and credit infrastructures) and specifies their relative status at the international arena. The micro assessment evaluates the status of universities and higher education institutions in comparison with each other. Despite the fact that most of the developed indicators are similar at micro and macro sectors, the level of assessment is different. The micro assessment will ultimately lead to classification of universities and higher education institutions. The micro and macro assessment indicators include the quantitative, qualitative and analytical indicators of higher education; and they have been developed in the following five main areas: educational, research, student, cultural, credit and facilities (higher education assessment indicators in the Islamic Republic of Iran, adopted by the Supreme Council of the Cultural Revolution (SCCR) in 2004.

3- Academic position evaluation indicators of higher education system

1) According to the definition of UNESCO in investigating the global status of science, three main fields are used for position evaluation indicator to provide the scientific comparison for countries at the regional and global levels:

- A) Material resources allocated to scientific and technological activities;
- B) Detection of knowledge production in terms of publications;
- C) Measurement of technology production in terms of registered members' rights (Ghofrani, 1998).

2) OECD science and technology indicators: The research and development indicators applied by the OECD are classified into two groups including the data-related and output-related indicators. The limitations of OECD indicators are as follows:

A) OECD scientific and technological indicators have been created based on the analysis of input and output. None of these indicators are able to continue the accumulation of scientific knowledge.

B) The innovation by small firms is another source in the field of technological change and it is not displayed in research and development expenditures;

- C) The research and development expenditures are only a part of costs in the field of innovation.
- D) The impact of research and development (R&D) and innovation activities cannot be fully displayed in the OECD science and technology indicators.
- E) Patent is one of the output indicators due to several disputing factors.
- F) The OECD science and technology indicators cannot be usually used in developing countries.
- G) The OECD science and technology indicators indicate the cross-sectional imaging of technology state (Shafia, 2001: 42).
- 3) According to Scott, all performance evaluation criteria such as academic performance evaluation criteria can be classified into three categories based on the structure (input), process and output (Scott, 2003).

3-1- Higher education indicators based on the educational system components in this research are as follows:

A) Educational system input parameters

The indicators related to the input refer to the internal factors of education system including the human, financial and physical resources (Hosseinasab, 1993: 59). The educational system inputs include faculty members, students, staff support, curriculum, laboratories and computer websites, facilities and library resources, and procedures and standards (Al-Turki & Duffuaa, 2003: 330). Input parameters refer to the human, financial and physical resources in supporting the enterprise programs, activities and provided services; for instance, an indicator such as the allocation of resources should be related to the data of registration ratio, the quality of teaching-related resources, and learning quality (Burke et al, 2002).

B) Educational process indicators

They refer to the indicators related to processes which are done by educational group members and include the teaching process, managerial process, supervision and support

process, the student support process, and quality control process (Al-Turki & Duffuaa, 2003: 330). The criteria such as the academic failure, rejection rate, and promotion rate and rate of selection in different fields of study can reflect the performance of any higher education institution (Hosseininasab, 1993). The process indicators include the tools used for providing the educational programs, activities and services in the organizational space. The process indicators refer to a set of qualitative information about aspects of teaching and learning quality such as the policies and practices related to teaching and learning, performance management and staff professional development, curriculum quality, and students' learning assessment, quality of facilities, services and technology. The process indicators can be investigated by experimental research through practical, useful and appropriate measures in high quality education and learning in higher education institutions usually through the institutional assessment. The process indicators provide a proper understanding of common measures and quality of activities and lead to the higher quality in the effective information of policy decisions. They are valuable sources of information in teaching and its quality because they investigate the student's learning experience core (Kuh, Pace & Vesper, 1997).

C) Indicators of educational system output

The educational output refers to the graduates, researchers, basic and applied research, providing services for community such as the in-service education and educational workshops (Al-Turki & Duffuaa, 2003, 330). The ratio of graduates per year to the total number of students in the same year, and also the ratio of employed graduates in the labor market to the total number of graduates of institute in the same year are among the output indicators (Hosseininasab, 1993: 59). The output indicators reflect the quantity of production results including the immediate measurable results and direct consequence of implemented activities for such results (Burke, 1998).

4- Comparison of ranking systems

Famous international rankings such as "THE-QS" and Shanghai rankings compare the universities as a whole. This approach has been more criticized (Marginson, 2007; Van Raan, 2005; Loannidis, et al, 2007). On the one hand, there is a significant difference between the universities and they cover limited universities which have a greater chance to obtain better ranks than large universities with diverse educational groups, because they focus all their capabilities on advancing the education and research and output of both of them, and reveal

their capabilities in international rankings. On the other hand, the universities and higher education institutions have different strengths in educational departments and different branches of engineering sciences, social sciences, art and medical sciences; and each university can have better educational and research potential in educational departments and attitudes towards the other universities (Van Raan, 2004). The holistic rankings do not consider these differences while comparing and ranking the universities; and sometimes a university, which is stronger in a thematic field and has a few educational departments than the other fields, obtains higher position in rankings than the university, which has various educational departments in various fields, and this is more common especially at universities, which focus on basic and engineering sciences, due to the higher number of scientific works in these fields. Furthermore, it should be noted that there are other common scientific products such as the book, report and booklet in human sciences, social sciences and arts; and the scientific outcomes of these types are much lower than the article (Usher & Savino, 2006; Usher & Cervenán, 2005)

In a dissertation entitled "the criticism of scientific ranking policy at global universities in global ranking systems based on the current criteria and providing the proposed model, Rojan, Hoshyar (2011) concludes that most of the immigrants are accepted at superior universities in the world or gain scholarships and pass their doctoral courses out of their homelands after education in bachelor and master courses. Most of these universities are at the top of ranking system table, and thus people will be usually attracted to such universities. The dissatisfaction with educational system, the cultural level, the lack of social progress opportunity and job assurance, the lack of necessary facilities for research, the lack of scientific and professional growth, different feelings about local and foreign universities, the lack of relationship between the local and international educational systems, and so on.

Rocki argues that the applied methods in rankings only refer to some of the measures. The current methods, which are often based on weighting some different indicators and tools of categories, all indicate that there is not a real and objective ranking system which can be applicable to all organizations and higher education institutions (Rocki, 2005).

5- Research methodology

This research is applied in terms of objective, and has survey and library method based on the data collection method. The statistical population consists of universities of Tehran City;

and 363 subjects are selected as samples through stratified random sampling and Cochran Formula, and then the questionnaires are distributed among them. For documentary purposes, we use the statistics of 2012-2013, the documents of Supreme Council of the Cultural Revolution (SCCR), the Ministry of Science, Research and Technology, the Institute of Research and Planning in Higher Education, and the Educational Assessment Organization of Iran as well as the results of performance evaluation in research and technology. The questionnaire is designed based on the standard questionnaires; and the Cronbach's alpha of its sections is presented in Table 1. The face validity of questionnaire is confirmed by professors; and its construct validity is approved by factor analysis. The descriptive and inferential statistics methods are used for data analysis; and TOPSIS software. The educational inequality is separately investigated based on the access of university to each indicator through TOPSIS technique, and then the rank of universities in each indicator is separately studied in each indicator; and the positions of universities in access to indicators are determined by integrating the indicators in input, process, and output forms. After forming the $n*m$ matrix in multi-criteria decision making (TOPSIS), the indicators and universities are put in its columns and rows; and then the weights of indicators are obtained by Entropy method after solving the scale of indicators. Afterwards, the positive ideal (A) and negative non-ideal (A) solutions are determined for each indicator and criterion. After calculating the distance of each indicator (criterion), the value of C statistic, which refers to the relative closeness of universities to ideal solution and is from 0 to 1, is obtained; and the more its value is close to 1, the more the university obtains the higher rank in that indicator than others, and thus the universities are ranked in each indicator by this method.

Table 1: Cronbach's alpha

No.	Questionnaire	Number of questionnaires	Number of items	Cronbach's alpha
1	A (academic achievement motivation)	383	28	0.851
2	B (Social capital)	383	8	0.808
3	C (Cultural capital)	383	22	0.866
4	D (Quality of higher education process)	383	30	0.946
5	E (Environmental attitude)	383	16	0.872

6	F (Attitude towards work)	383	47	0.927
7	G (Scientific interaction)	383	10	0.845
8	H (Social interaction)	383	10	0.763
9	Total (Non-cognitive variables)	383	171	0.951

Research question: Is there a difference between universities of Tehran in terms of input, process and output indicators?

6- Research findings

6-1- Ranking the universities of Tehran in input indicators

The universities of Tehran are ranked in terms of input indicators which consist of eight indicators namely the cultural, student, educational, credit and facilities, social capital, cultural capital, economic capital, and academic achievement indicators. In general, the integrated input indices at comprehensive universities namely Tehran University, Tarbiat Modares University, and Shahid Beheshti University have obtained the first to third ranks. At technical and engineering universities, Sharif University of Technology, Amirkabir University of Technology, and University of Science and Technology have received the first to third ranks respectively.

Table 2: Ranking the universities of Tehran in integrated input indicators

Comprehensive Universities		
Name of university	TOPSIS value	Rank
Tehran	0.912	1
Tarbiat Modares	0.535	2
Shahid Beheshti	0.272	3
Allameh Tabatabaei University	0.266	4
Shahed University	0.257	5
Alzahra University	0.092	6
Kharazmi University	0.077	7
Technical and engineering universities		
Name of university	TOPSIS value	Rank
Sharif University of Technology	0.536	1

Amirkabir University of Technology	0.516	2
University of Science and Technology	0.486	3
Khaje Nasir Toosi University of Technology	0.273	4

6-2- Ranking the universities of Tehran in process indicators

The universities of Tehran are ranked in terms of process indicators which consist of six indicators namely the credit and facilities, educators, educational, student, cultural, and quality of higher education. Comprehensive universities namely Tehran University, Tarbiat Modares University, and Allameh Tabatabaei University are put in the first to third ranks. At technical and engineering universities, Amirkabir University of Technology, Sharif University of Technology, and University of Science and Technology have received the first to third ranks respectively.

Table 3: Ranking the universities of Tehran in integrated process indicators

Comprehensive Universities		
Name of university	TOPSIS value	Rank
Tehran	0.891	1
Tarbiat Modares	0.275	2
Allameh Tabatabaei University	0.253	3
Shahid Beheshti	0.229	4
Alzahra University	0.217	5
Kharazmi University	0.15	6
Shahed University	0.136	7
Technical and engineering universities		
Name of university	TOPSIS value	Rank
Amirkabir University of Technology	0.398	1
Sharif University of Technology	0.336	2
University of Science and Technology	0.261	3

Khaje Nasir Toosi University of Technology	0.246	4
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6-3- Ranking the universities of Tehran in output indicators

The universities of Tehran are ranked in terms of output indicators which consist of eight indicators namely the education, research, commercialization, scientific interaction, social interaction, attitudes towards work, attitudes towards environment, and students. Comprehensive universities namely Tehran University, Tarbiat Modares University, and Alzahra University are put in the first to third ranks. At technical and engineering universities, Amirkabir University of Technology, Sharif University of Technology, and Khaje Nasir Toosi University of Technology have received the first to third ranks respectively.

Table 4: Ranking the universities of Tehran in integrated output indicators

Comprehensive Universities		
Name of university	TOPSIS value	Rank
Tehran	0.738	1
Tarbiat Modares	0.488	2
Alzahra University	0.31	3
Shahed University	0.309	4
Shahid Behashti	0.302	5
Allameh Tabatabaei University	0.274	6
Kharazmi University	0.166	7
Technical and engineering universities		
Name of university	TOPSIS value	Rank
Amirkabir University of Technology	0.555	1
Sharif University of Technology	0.393	2
Khaje Nasir Toosi University of Technology	0.307	3
University of Science and Technology	0.289	4

7- Conclusion and suggestions

The use of various documentary and non-documentary indicators is one of the main results of this research; while the limited and often research indicators are applied in other studies and international rankings.

According to the research results, the comprehensive universities namely University of Tehran, Tarbiat Modares university and Shahid Beheshti University have obtained the first to third ranks respectively, and also the Technical and Engineering Universities namely Sharif University of Technology, Amirkabir University of Technology, and University of Science and Technology have obtained the first to third ranks respectively in terms of input indicators. At the process level, the comprehensive universities namely University of Tehran, Tarbiat Modares University, and Allameh Tabatabaei University, and also Technical and Engineering Universities namely Amirkabir University of Technology, Sharif University of Technology, and University of Science and Technology have obtained the first to third ranks respectively. At the output level, the comprehensive universities namely University of Tehran, Tarbiat Modares University, Alzahra University, and also the Technical and Engineering Universities namely Amirkabir University of Technology, Sharif University of Technology and Khaje Nasir Toosi University of Technology have obtained the first to third ranks respectively.

According to the results of ranking in input, process and output indicators, there are differences and inequalities between universities of Tehran in terms of these indicators. The results of this research for ranking are consistent with international rankings in which the University of Tehran and Sharif University of Technology have put in the first rank in our country. Furthermore, according to research by Van Raan, the universities are separately compared in two distinct comprehensive, technical and engineering groups in order to prevent the difference.

It is suggested selecting and investigating some of the indicators due to the vast number of indicators because the use of various indicators will prolong the research. The roles of the underlying factors and non-cognitive output are often neglected in studies, and thus the new studies can utilize them according to variety of these indicators.

Reference:

-Alam, A. R. (2004). Anarchism: Past and Present and changes in scope, Faculty of Law and Political Science, No. 65, 112-87.

- Al-Turki, U., & Duffuaa.S. (2003). Performance measures for academic department. *The International Journal of Educational Management*. 17(7).330-338.
- Alizadeh, A..A. (2007). Socialism. *Magazine amount*, No. 92,49-46.
- Burke, J.C., Minassians, H. & Yang, P. (2002). State performance reporting indicators: What do they indicate? *Planning for Higher Education*, 31(1), 15-29.
- Burke, J.C. (1998). Performance Funding: Arguments and Answers. *New Directions for Institutional Research*,No. 97, 85-90.
- Cheng, H. (2009). Inequality in Basic Education in China: A Comprehensive Review. *International Journal of Educational Policies*.3(2): 81-106.ISSN:1307-3842.
- Evans, R. J., Valsky, C.& Valsky, T. (2013). *Organizational Behavior in Education* translator doctor Mohamad Hasni, Maryam Samari, Hossein mohebi and Leila Jowdat. Urmia University Press.
- Ghofrani, M.A. (1998). Evaluation the scientific situation of the country, the Institute for Higher Education Research and Planning Education , Ministry Culture and Higher Education.
- Horn, D. (2010). Essays on educational institutions and inequalitu of opportunity, A Doctoral Dissertation submitted to the central European University in partial Fulfillment of the requirements for the Degree of Doctor of Philosophy.
- Hosseininasab, D. (1993). Performance development centers in universities faculty members. Tehran, published by the Institute for Research and Planning in Higher Education.
- Hoshyar, Rojan. (2011). Academic Ranking of World Politics Review World University ranking systems based on the current standards and proposed new models: a study of immigrant academics universities in Iran, Tehran University, Tehran.
- Kuh, G. D., Pace, C. R., & Vesper, N. (1997). The development of process indicators to estimate student gains associated with good practices in undergraduate education. *Research in Higher Education*, 38(4), 435-454.
- Leinonen, T. (2002). Equality of education: a comparative study of educational ideologies of the word bank and the goverement of Zambia in 1971-1996. University of Tampere.
- Ogawa, R. & Collom (Ed). (1998). *Educational Indicators: What are they? How can use them?* University of California, Riverside.
- Parsons, T.(1959). The school class as a social system: some of its functions in American society. *Harvard Educational Review*(Fall).
- RAUHVARGERS, A. (2011). *Global University Rankings and their Impact*. A report for the European Universities Association (EUA) (Brussels, EUA). www.eua.be/pubs/globaluniversity_rankings_and_their_impact.pdf
- Rocki, M. (2005). Statistical and mathematical aspects of ranking: Lessons from Poland. *Higher Education in Europe*, 30 (2) , 173-181.
- Rowe, K. (2004). *Analysing & Reporting Performance Indicator Data: 'Caress' the data and user beware!* ACER, April, background paper for The Public Sector Performance & Reporting Conference, under the auspices of the International Institute for Research (IIR).
- Sadlak, J. & Liu, N.C. (eds.) (2007). *The World-Class University and Ranking: Aiming Beyond Status*,UNESCO-CEPES, Cluj University Press, Bucharest, Romania.
- Scott, R. (2003). "Organzations : Rational, Natural and open system". U S : Prrentice-Hall.



- Shafia, M.A. (2001). Appropriate indicators to assess the quality of performance in higher education, edition 1.
- Shavelson, R., & Mc Donnell, L. M., & Jeannie, O. (1991). What Are Educational Indicators and Indicator Systems? ERIC, Clearinghouse on Assessment and Evaluation.
- Shin, J. C. (2011). Toutkoushian, Robert K;Teichler, Ulrich, University Ranking; Teoretical Bases, Metodolology, and impact on global higher education, London: Springer Science, 1-55.
- Technology Atlas. (1998). an overview, united Nations Asian and pacific centre for Transfer of technology.
- Usher A., Savino, M. (2007), A global survey of university ranking and league tables, Higher Education in Europe, Vol. 32, No. 1, 5-15.
- Vibeke Opheim (2004). Equity in education thematic review, CNIFU, Country analytical report, Norway.
- Vukasovic,M & Claudias.S.(2010). Inequality in Higher Education.the Serbian case,1-16.
- Yamni Dozi Sorkhabi, Mohammed. (1993). Analysis of education system development. Journal of Research and Planning in Higher Education,No. 1, 84-65.