

GLOBALIZATION MEASUREMENT AS A MANAGEMENT TOOL

Romana Korez-Vide, MSc.
University of Maribor, Slovenia
romana.korez-vid@uni-mb.si

Dr. Vesna Čančer
University of Maribor, Slovenia
vesna.cancer@uni-mb.si

Dr. Vito Bobek
University of Primorska, Slovenia
vito.bobek@fm-kp.si

Abstract

If the intention of an approach towards measuring globalization is to represent an economy's policymaking tool, it should enable to not only analyze an economy's position but also its potentials for international integration in the period of contemporary globalization. In this paper we developed a theoretical framework for analyzing an economy's globalization level, and set up the hierarchical model for its assessment by the analytic hierarchy process methodology. The model is empirically tested on the case of Slovenia and nine comparable countries. Our approach can be treated as an attempt towards diminishing theoretical uncertainties and deficiencies in the methodology of other, the most well-known approaches towards measuring globalization.

Key Words: *measuring globalization, composite indicators, analytic hierarchy process, Slovenia.*

1 Introduction

National governments are increasingly interested in the position and potentials of their economies for international integration in the period of contemporary globalization. In this paper we argue that an economy's globalization level is not sensibly to be viewed as an indispensable condition, but as a process, which should be intensified, if it leads towards higher economy's growth and development. The system of indicators, set up in the paper, represents the shift in the comprehension of an economy's globalization level – it does not mean only the extent and intensity of an economy's international integration, but also the capabilities for suchlike integration. The motive for setting up suchlike system of indicators is arising from the problems of majority of the most well-known approaches towards measuring an economy's globalization level. These problems are the consequence of three facts: firstly, internationally common and the most disposable and comparable indicators of international economic integration, as for example the share of international trade in gross domestic product (GDP), the share of foreign direct investment (FDI) in GDP, the share of international portfolio investment in GDP, do not consider an economy's level of development, consequently, the results of the analyses on their basis are unreal; secondly, due to the slow introduction of altered international statistical standards in the field of collecting statistical data on FDI

and activities of MNCs, the possibilities for analysing an economy's globalization level on the basis of these indicators are still limited; thirdly, there is no uniform interpretation of globalization.

2 Theoretical Framework for Analyzing an Economy's Globalization Level

Except the empirical studies that discuss a national economy's globalization level on the basis of a common definition of globalization, as increased international integration of markets (A. T. Kearney 2004; OECD 2003; WB 2003), and on the basis of the role of FDI and activities of MNCs in the world economy respectively (Gestrin et al. 2001; Fish and Oesterle 2003; Rugman 2005; OECD 2002; UNCTAD 2002, 2003, 2004; A. T. Kearney 2004a), are known also the other, more holistic oriented ones. The possible direction of development of relevant indicators of an economy's globalization level, based on a more holistic view, has been indicated as early as in the beginning of the nineties by the Yips' (1992) so called globalization drivers, which have been empirically verified on the strategies of American and Japanese companies (Johansson and Yip 1994) and on the Central- and Eastern-European Countries (Kozminski and Yip 2000). This direction, which has been followed also by the World Bank (Collier and Dollar 2002), considers variety of heterogeneous but mutually linked spheres of an economy's performance, which together create an entirety, required by the contemporary world economic environment. Such comprehension of an economy's globalization level is in accordance with the statement that the contemporary economy should be discussed as a complex system of various organizations at various levels and with various intentions of their performance (Hämäläinen 2003, 23): an economy attains the most favorable results, if all of its mutually dependent spheres of operation are able to conform to the requirements of the changed conditions and modes of performance of the contemporary world economy.

Theoretical origins for explaining an economy's globalization level from the holistic point of view can be found also in the theories of international production. Dunning's' (1997) eclectic paradigm firmly ranges among suchlike possible theoretical explanations of an economy's globalization level. This fact could be additionally confirmed by the recent Dunning's' attempt of paradigms' completion by the institutions of an economy. The necessity of the inclusion of North's' (1990) formal and informal institutions into the explanation of international production is argued by the complex contemporary economic and political world order, where the extent and the quality of institutions at all levels of an economy's value creation are becoming increasingly important part of competitive advantages of companies and economies (Dunning 2004, 19).

Among the appeals towards more holistic consideration of an economy's globalization level could be ranged the effects of FDI and activities of MNCs on economy's growth and development as well, since these effects are not always necessarily positive. The achievement of benefits from FDI and activities of MNCs requires the specific developmental level of education, technology, infrastructure, capital market, effective and impartial tax system, clear regulation and trade openness (Blomström 2002, 15). These characteristics usually demand changes of economic policies.

The additional argument for the holistic approach towards analyzing an economy's globalization level can be found in the contemporary economic geography, which is paradoxical in the period of global competition. On the one hand, the changes in technology and competition have lowered many traditional roles of the specific territories, since the mobile productive sources could be effectively purchased at global markets, the non-mobile ones, however, could be acquired through corporate networks. On the other hand, the concentration of specialized, knowledge-based functions inside the specific areas is increasing, which intensifies the importance of nearest companies' environment for their competitiveness (Dunning 1997, 35; Porter 1998, 64). According to the Porters' theory of clusters not only companies compete but also economies, which requires greater role of the government at microeconomic sphere, new way of thinking and operation of management and different dialogue between companies and other institutions of an economy. Thus, the new argument for holistic approach towards analyzing an economy's globalization level can be found in the abovementioned thesis about competition between economies.

3 Setting up the Hierarchical Model of an Economy's Globalization Level

The goal of hierarchical model formation on the basis of the analytic hierarchy process (AHP) methodology¹ is to develop the consistent composite indicator for measuring, analyzing and monitoring an economy's globalization level. The process of this formation comprises three steps:

1. Structure of hierarchical tree of indicators, definition of statistical sample of observed economies and collection of statistical data;
2. Determination of indicators' importance with respect to the goal and the higher level of indicators by pair wise comparisons and calculation of indicators' weights in the hierarchical tree of indicators;
3. Restructure of hierarchical tree of indicators and recalculation of their weights.

In the continuation of the paper we explain all three aforesaid steps.

3.1 Structure of Hierarchical Tree of Indicators, Definition of Statistical Sample and Collection of Statistical Data

According to the developed theoretical framework for analyzing an economy's globalization level (see chapter 2) economies undertake international economic activities and attain positive effects on the basis of these activities only in the interaction with economy's potentials for suchlike integration in the period of contemporary globalization. Among these potentials range mainly created and specialized productive resources, creation and diffusion of innovations, changed characteristics of products markets (traditional mass markets are splintering into a myriad of differentiated niche markets) and institutional² incentives (Hämäläinen 2003, 25). As to suchlike comprehension of an economy's globalization level we divided the indicators for its assessment into *primary* and *supplementary* ones: international economic activities are understood as primary indicators, whilst potentials for suchlike integration are understood as supplementary indicators. In the selection of relevant indicators of both groups we strived that the indicators are explicit and that they represent key spheres of an economy's extent and intensity of international integration and potentials for

suchlike integration respectively. The selection of indicators of international economic activities was very much limited by the non-availability of internationally comparable statistical data on activities of MNCs.

We structured the selected indicators, which are evident from table 1, into the hierarchical tree (figure 1). The nucleus of developed theoretical framework for analyzing globalization, namely that the potentials for international integration are, in addition to the extent and intensity of suchlike integration, the main constituent part of an economy's globalization level represents the first basis for determination of indicators' hierarchical levels. The second basis, however, represents the specific importance of cluster development among potentials for an economy's international integration in the period of contemporary globalization.

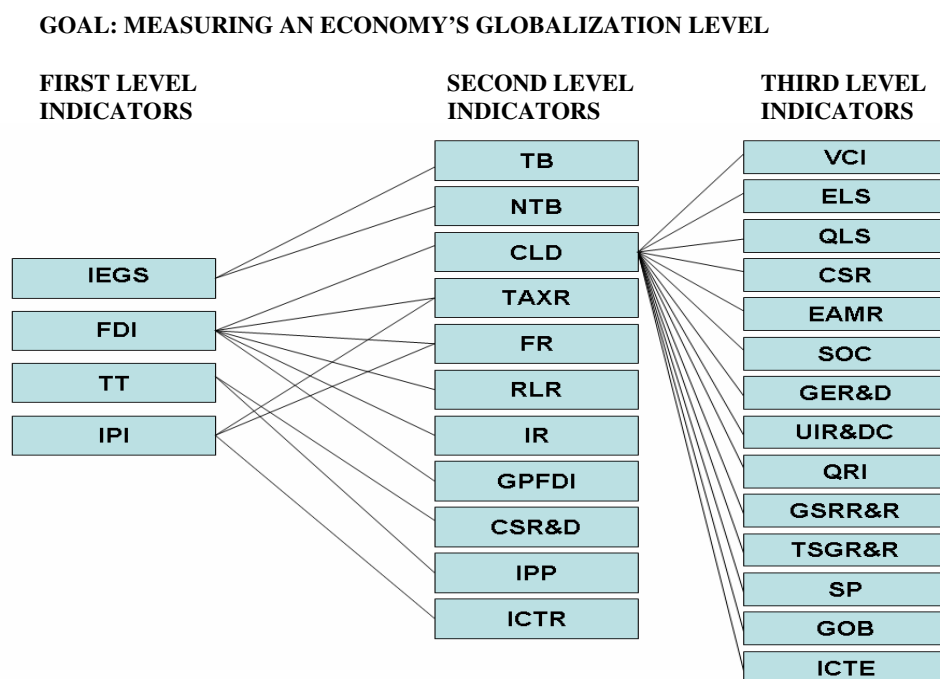


Figure 1: The hierarchical tree of an economy's globalization level indicators. Symbols: See table 1.

We empirically verified measuring and analyzing of an economy's globalization level on the basis of structured hierarchical model by the AHP methodology on the statistical sample of Slovenia and its nine comparable European countries, namely: Hungary, the Czech Republic and Poland (developed new EU member countries³), Ireland, Finland, Denmark, Norway (European countries with up to 5.5 million inhabitants), and Portugal and Greece (European countries with a similar GDP per capita). To obtain a clearer basis for economy's policymaking we extracted a smaller statistical sample of economies: Slovenia and its comparable new EU member countries - Hungary, the Czech Republic and Poland. Empirical analysis was performed on the basis of average values of indicators for the period of 2000-2002.

Table 1: The selected indicators for measuring an economy's globalization level.

<i>Group of indicators</i>	<i>Sphere of indicators</i>	<i>Description</i>	<i>Statistical data sources</i>
Primary	International economic activities	Import and export of goods and services (% in GDP) (IEGS)	WTO 2001, 2002, 2003
		Foreign direct investment (% of inward and outward flows in GDP) (FDI)	UNCTAD 2002, 2003
		Transfer of technology (million US\$ per capita) (TT)	WEF 2001, 2003
		International portfolio investment (% of assets and liabilities in GDP) (IPI)	IMF 2002, 2003
Supplementary	Created and specialized productive resources	Venture capital investment (% of GDP) (VCI)	WEF 2001, 2003
		Scientific publications (per million inhabitants) (SP)	WEF 2001, 2003
		ICT environment (1=bad, 7=good) (ICTE)	WEF 2001, 2003
	Creation and diffusion of innovations	Government expenditures for R&D (% of GDP) (GER&D)	EIU 2004
		Technical sciences graduates in R&D (per million inhabitants) (TSGR&D)	WEF 2001, 2003
		ICT readiness (1=low, 7=high) (ICTR)	WEF 2001, 2003
		Companies' expenditures for R&D (1=low, 7=high) (CSR&D)	WEF 2001, 2003
		Government subsidies/reliefs for companies' R&D activities (1=low, 7=high) (GSRR&D)	WEF 2001, 2003
		Quality of research institutions (1=low, 7=high) (QRI)	WEF 2001, 2003
		Intellectual property protection (1=low, 7=high) (IPP)	WEF 2001, 2003
Universities–industry R&D collaboration (1=low, 7=high) (UIR&DC)	WEF 2001, 2003		
Characteristics of products markets	Extent of local suppliers (1=few, 7=many) (ELS)	WEF 2001, 2003	
	Quality of local suppliers (1=low, 7=high) (QLS)	WEF 2001, 2003	
	Cluster development (1=limited, 7=high) (CLD)	WEF 2001, 2003	
Institutional incentives	Non-tariff barriers (1 = high, 7 = low) (NTB)	WEF 2001, 2003	
	Tariff barriers (mean tariff rate (%)) (TB)	EIU 2004	
	Government policy towards FDI (1=bad, 5=good) (GPFDI)	EIU 2004	
	Tax regulation (1=bad, 10=qualitative) (TAXR)	EIU 2004	
	Financial regulation (1=bad, 10=qualitative) (FR)	EIU 2004	
	Companies setting-up regulation (1=high, 5=low) (CSR)	EIU 2004	
	Efficiency of anti-monopoly regulation (1=low, 7=high) (EAMR)	WEF 2001, 2003	
	State ownership/control (1=high, 5=low) (SOC)	EIU 2004	
	Restrictiveness of labor regulation (1=high, 5=low) (RLR)	EIU 2004	
	Industrial relations (1=bad, 5=good) (IR)	EIU 2004	
Government officials bribery (1=high, 7=low) (GOB)	WEF 2001, 2003		

3.2 Determination of Indicators' Importance and Calculation of their Weights in the Hierarchical Tree of Indicators

The indicators' importance was determined by the help of questionnaire, which was composed on the basis of hierarchical tree of indicators. In this process the indicators were compared⁴ by pairs with respect to the goal – measuring globalization level of an economy (primary indicators), and the higher level of indicators (supplementary indicators) by means of numerical and verbal intensity levels⁵ of AHP methodology (see Saaty 1994, Forman et al. 2000, Čančer 2003, Čančer et al. 2005). In this paper we describe some of selected judgments, namely the examples of judgments on the supplementary indicators' importance with respect to the primary ones.

Table 2: The comparison matrix of the supplementary indicators with respect to foreign direct investment.

CR=0	I2	I3	I4	I5	I6 Government policy towards FDI
I1 Cluster development	3	4	5	6	2
I2 Tax regulation		2	3	4	1/2
I3 Financial regulation			2	3	1/3
I4 Restrictiveness of labor regulation				2	1/3
I5 Industrial relations					1/4

Table 2 shows, for example, that cluster development is equally to moderately more important (numerical intensity level is 2) than government policy towards FDI with respect to foreign direct investment. This judgment can be argued by the fact that cluster development is very much dependent from the government policy towards FDI, although not entirely – there has to exist also some incentives for clustering in the economic and social environment, which represent a major engine for foreign direct investment readiness. From table 2, it is evident as well, that the importance of tax regulation, financial regulation, restrictiveness of labor regulation and industrial relations for foreign direct investment is subordinated to the importance of cluster development and government policy towards FDI. Due to various motives for foreign direct investment it is risky to be very deterministic in these judgments; however, it is not possible to overlook the fact that cluster development and government policy towards FDI could be key obstacles or stimulations in the field of foreign direct investment. Other intensity levels can be similarly read by using the verbal representations of numerical judgments (see note 5).

On the basis of determined importance of all of the indicators in the hierarchical tree (figure 1) their weights were calculated by the computer program Expert Choice (Forman et al. 2000). The three highest weights amongst primary indicators belonged to foreign direct investment, transfer of technology and import/export of goods and services, whilst the three highest weights amongst the indirect indicators achieved non-tariff barriers, intellectual property protection and financial regulation.

3.2 Restructure of Indicators' Hierarchical Tree and Recalculation of their Weights

Since there were available not only the statistical data for the lowest level of indicators but also for the second and the first level, we had to restructure the hierarchical tree with the intention to put all indicators at first level and to consider their statistical data (Čančer et al. 2005). For the purpose of restructure of indicators' hierarchical tree and recalculation of their weights we had to compare the mutual importance of primary and supplementary indicators, as well. Since these two groups of indicators represent different spheres of an economy's globalization level, namely position and potentials, we assigned the equal importance to both of them. In the final, restructured hierarchical model the sequence of primary indicators' weights remains identical with the sequence in the initial hierarchical tree, whilst there appeared some changes in the sequence of weights and the structure of supplementary indicators: three of the highest weights in the final hierarchical model attained intellectual property protection, non-tariff barriers and tax regulation.

4 Measuring and Analyzing an Economy's Globalization Level

The final hierarchical model represented the basis for measuring and analyzing an economy's globalization level. In this analysis final globalization levels (measures) of economies were obtained by means of distributive type of synthesis. The values of economies' composite globalization measures, obtained by synthesis with respect to the goal, ranked Slovenia on the eighth place amongst ten countries in the first statistical sample (table 3).

Table 3: Final values of economies' globalization measures – first statistical sample.

1st statistical sample: Slovenia and its comparable European countries					
Country	Rank	Final Value	Country	Rank	Final Value
Ireland	1.	0.21888	Hungary	6.	0.09089
Denmark	2.	0.12165	Norway	7.	0.08095
Finland	3.	0.10553	Slovenia	8.	0.07339
Portugal	4.	0.09793	Poland	9.	0.06106
The Czech Republic	5.	0.09560	Greece	10.	0.05413

Synthesis with respect to each indicator, which was performed on the second statistical sample - Slovenia and developed new EU member countries as of 1st May 2004, enabled detailed insight into economy's globalization measure on each indicator.

Table 4: Local values of economies' globalization measures.

Indicator	Hungary	The Czech R.	Slovenia	Poland
Import and export of goods and services	0.31589	0.30328	0.25494	0.12589
Foreign direct investment	0.25450	0.45639	0.14658	0.14254
Transfer of technology	0.45994	0.13353	0.21365	0.19288
International portfolio investment	0.46338	0.23133	0.21798	0.08731
Venture capital investment	0.20307	0.25671	0.21456	0.32567
Scientific publications	0.28889	0.28889	0.25926	0.16296
ICT environment	0.26717	0.26339	0.24512	0.22432
Government expenditures for R&D	0.18307	0.32037	0.33638	0.16018
Technical sciences graduates in R&D	0.22525	0.21029	0.33687	0.22759
ICT readiness	0.26330	0.26540	0.25013	0.22117
Companies' expenditures for R&D	0.25000	0.25000	0.26974	0.23026
Government subsidies/reliefs for companies' R&D activities	0.28472	0.25694	0.25000	0.20833
Quality of research institutions	0.25989	0.24859	0.24859	0.24294
Intellectual property protection	0.26744	0.25581	0.27907	0.19767
Universities–industry R&D collaboration	0.25658	0.26974	0.24342	0.23026
Extent of local suppliers	0.22051	0.29231	0.24615	0.24103
Quality of local suppliers	0.24868	0.28571	0.24339	0.22222
Cluster development	0.27586	0.22414	0.23276	0.26724
Non-tariff barriers	0.27778	0.24242	0.27273	0.20707
Tariff barriers	0.24212	0.50442	0.05820	0.19526
Government policy towards FDI	0.27778	0.27778	0.22222	0.22222
Tax regulation	0.28218	0.22277	0.25743	0.23762
Financial regulation	0.25830	0.23247	0.25092	0.25830
Companies setting-up regulation	0.28571	0.21429	0.28571	0.21429
Efficiency of anti-monopoly regulation	0.29878	0.23781	0.28049	0.18293
State ownership/control	0.26667	0.26667	0.26667	0.20000
Restrictiveness of labor regulation	0.25000	0.16667	0.33333	0.25000
Industrial relations	0.29412	0.23529	0.23529	0.23529
Government officials bribery	0.28659	0.20732	0.29268	0.21341

Table 4 shows that Slovenia is ranked on twelve of twenty-nine spheres (indicators) on the last but one place amongst developed new EU member countries in the period 2000-2002. It is evident, for example, that Slovenia achieved 27.907% of total value of indicator of intellectual property protection amongst observed countries, and that the indicator of Slovenian restrictiveness of labor regulation attained 33.333% of total value of this indicator for all observed countries. From this table it is also evident that, in the same period, Slovenia achieved relatively good results in the fields of government expenditures for R&D, technical sciences graduates in R&D, companies' expenditures for R&D, intellectual property protection, restrictiveness of labor regulation and government officials bribery, however, in the fields of tariff barriers, government policy towards FDI and industrial relations Slovenia achieved low position.

Additional analysis of an economy's globalization level on the basis of constructed hierarchical model by AHP method and its main supporting software product Expert Choice is offered by the possibility to perform various types of sensitivity analyses (see Forman et al. 2000). Thus, for example, by dynamic and gradient sensitivity analyses it is possible to verify the impact of indicators' changed weights on an economy's globalization measure, by head-to-head and two-dimensional sensitivity analyses; however, it is possible to analyze the differences among two countries in each indicator and the differences among two indicators of all countries in the statistical sample respectively. Furthermore, it is possible to monitor an economy's globalization level by the construction of several identical hierarchical models. Besides, existent hierarchical model can be supplemented or changed by indicators and by countries and thus, adapted to the developmental level and demands of an economy.

5 Conclusion

In this paper we introduced holistic theoretical comprehension of an economy's globalization level. We argued that an economy's globalization level should be viewed as a combination of the economy's position and potentials for international integration. We supported this thesis by the development of our own theoretical framework for analyzing an economy's globalization level. On the basis of this framework we selected the relevant indicators and joined them into primary and supplementary ones. We presented the procedure for construction of indicators' hierarchical model by the analytic hierarchic process (AHP) methodology and the possibilities for analyzing an economy's globalization level on the basis of suchlike model. Upon this model, Slovenia ranked on the seventh place amongst its comparable European countries and achieved relatively good position in the fields of several supplementary indicators amongst developed new EU member countries in the observed period of time. This empirical analysis has shown as well, that Slovenian economic policy would have to undertake additional efforts in the fields of tariff barriers, government policy towards FDI and industrial relations. We have shown in this paper, that the constructed hierarchical model together with Expert Choice, as a main supporting software product of the AHP methodology, can turn globalization measurement from inapplicable instrument into an economy's management tool.

Notes

1. The decision to apply the AHP methodology in the field of measuring globalization is argued with two principal arguments (Bobek et al. 2005, 731-738): 1) the weights of individual indicators in the composite indicator are not determined statistically and not completely arbitrarily, but are based on pair wise comparisons of individual indicators in the hierarchical model and thus, on expertise of relative importance of each indicator; 2) Expert Choice, as a main supporting software product for AHP methodology, assures to the users two the most important advantages: a) the possibility to apply judgments control mechanism (in)consistency ratio, which warns decision makers on possible deficiencies in their understanding of contents and relations of importance between single indicators and thus, lowers arbitrariness of decisions; b) the possibility of performance of two modes of synthesis: distributive mode, which can be used for comparison of globalization levels of all economies included in the hierarchical model and ideal mode which can be used for comparison of globalization level of defined economy with economy with the highest globalization level.
2. North (1990) defines institutions by three major elements that shape the political, economic and social interaction of economic agents: informal behavioral constraints and incentives (values, customs, traditions etc.), formal rules (constitutions, laws, regulations and contracts) and their enforcement.
3. As of 1st May 2004.
4. Pair wise comparisons of indicators were performed by the research group of five experts from economic, business and social sciences.
5. The AHP scale for the intensity levels of judgments is as follows (Forman et al. 2000, 55; Čančer et al. 2005): the verbal representation of numerical intensity level 1 is, 'Indicators are equally important;' 3 - 'The considered indicator is moderately more important than the compared one;' similarly: 5 - 'strongly'; 7 - 'very strongly'; 9 - 'extremely'. We can also use the inverse intensity, e.g. 1/3 means, 'The considered indicator is moderately less important than the compared one', and intermediate intensity, e.g. 4 means, 'The considered indicator is moderately to strongly more important than the compared one.'

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