

ASSESSMENT OF CHANGES IN THE QUALITY OF LIFE OF EMERGING ECONOMIES IN THE CONTEXT OF DEVELOPED ECONOMIES OF THE EUROPEAN UNION

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Abstract. *The present article has focused on the theoretical and practical aspects of the measurement of quality of life by the quality of life index (IQOL). A special focus of the present article is placed on complexity of quality of life measurement. In the article, an integrated Quality of Life Measurement Model and IQOL are formulated on the basis of theoretical assumptions and synthesis of factors of external and internal environments of quality of life and indicators reflecting them. The Quality of Life Measurement Model presented in the article has been empirically tested assessing quality of life in 20 purposefully selected developed and emerging economies of the European Union during the period from 2005 till 2013. The newly created IQOL is one of the ambitions to promote the methodological background for business and political actors and improvement of the quality of life in emerging economies.*

Key words: *quality of life; factors, indicators of quality of life; measurement of quality of life; quality of life index.*

1. Introduction

Quality of life with its dynamic and complex nature is becoming an ever more relevant theme attracting more and more discussions. The theory of quality of life formed as a separate research field and emerged in the discourse of science in Western Europe and North America only in the 1960's. Since then the issues of measurement and improvement of the quality of life of a society, individual social groups, and individuals have been gaining importance, with the aim to identify and solve economic and social

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problems arising in the society, to set quality of life improvement priorities, and to assess effectiveness of economic policies.

In spite of a growing interest in the concept and measurement of quality of life, the issue remains difficult and unresolved. A lot of different definitions, their interpretations and different measures of quality of life may be found in economic literature. There is a lack of distinction between the concepts of *well-being*, *quality of life*, and *living standards*, which are often used as synonyms (Easterlin, 2003; Veenhoven, 1996, 2000). In the present paper the term *quality of life* is used in a wide sense, encompassing both macro and micro level factors. In this study the terms *well-being* and *life satisfaction* are treated as components of quality of life, which may be measured using objective and subjective indicators belonging to the micro level.

Although some researchers (Cummins, 1996; Felce & Perry, 1997; Haas, 1999; Hagerty et al., 2001; Veenhoven, 2000, 2005) agree about the complexity of the conception of quality of life, there is no commonly accepted classification of factors affecting quality of life and unanimous opinion concerning economic and other factors determining quality of life. Scientists indicate assumptions on the basis of which quality of life factors may be identified and systematized and their interrelationships may be studied (Hagerty et al., 2001). Quality of life remains a contested concept, which is measured in different ways: using objective or subjective dimensions, analyzing one or several factors of quality of life, creating composite indices.

Based on these arguments, **the aim of this paper** is to formulate an integrated model for assessment of quality of life and to test it empirically assessing the quality of life in the emerging EU countries in contrast to developed economies.

This paper is structured as follows. The second section of this paper presents analysis of the conceptualization and measurement of the quality of life, identifying the main problems with terminology and emphasizing its complex and interdisciplinary nature. A logical scheme of scientific research in quality of life is presented and the integrated model for measurement of quality of life is formulated in Section 3. Having formed the Quality of Life Index function, it is necessary to assess validity and adaptability of the I_{QOL} on the examples of the European Union countries. Empirical application of the Quality of Life Index in the European Union countries is presented in Section 4.

2. Theoretical review of the main problems of the measurement of quality of life

The absence of a unified quality of life concept. It is important to note that at present there is no clear conception of quality of life which would integrate a wide range of scientific disciplines in scientific literature. The fullness of human life and the quality of life in the country was already discussed in the works of early Greek philosophers, including Aristotle (384-322 B.C.), Plato (422-347 B.C.), and Socrates (469-399 B.C.). There are a lot of maxims and thoughts on what determines quality of life, how it

should be understood and how the highest degree of quality of life may be achieved. In spite of the interest of philosophers and scientists from various fields in quality of life, it was usually used as a self-explanatory concept, the meaning of which was equated to the concept of material wealth (Easterlin, 2001, 2003; Quality, 2005) expressed by the Gross Domestic Product (GDP) per capita.

Moreover, the concept of quality of life is often used interchangeably with the terms happiness, well-being, life satisfaction (Easterlin, 2003; Veenhoven, 2004), which brings still more confusion in the research of quality of life. According to R. Veenhoven (2004), quality of life is an umbrella term for different notions of the good life. In contrast to the previous proposition, B. K. Haas (1999) stresses that the terms *quality of life*, *satisfaction with life*, *functional status* and *well-being* can no longer be used interchangeably. She argues that they represent different levels and aspects of the broad concept of quality of life.

According to K. D. Keith (2001), the concept of quality of life cannot be defined exactly for several reasons. Firstly, it is a multidimensional and universal concept with a great number of factors – both objective and subjective. Secondly, there is a lack of consensus about its meaning because the subject of quality of life research also varies widely. Therefore, the essence of the concept of quality of life may be more accurately revealed not by trying to define the concept, but by identifying the factors determining quality of life.

It is necessary to note that there is no unanimous opinion concerning factors determining quality of life and their interrelationship. Scientific literature presents a wide range of factors determining quality of life (Table 1).

TABLE 1. The Domains and Factors of Quality of Life

Authors	A. Sen (1993)	Felce & J. Perry (1997)	WHO (1997)	R.A. Cummins (2000)	M. R. Hagerty (2001)	M. Kenny (2005)	J. Stiglitz et al. (2010)
Physical health	x	x	x	x	x	x	x
Macroeconomic environment	x					x	
Material well-being		x		x	x		x
Political environment		x				x	x
Physical environment			x			x	x
Education	x						x
Personal security				x	x		x
Work, job security		x		x	x	x	
Social relationships		x	x	x	x	x	x
Family				x	x	x	
Gender equality						x	
Spirituality			x			x	
Emotional well-being		x	x	x	x		

To summarize, different authors (Sen, 1993; Felce & Perry, 1997; Cummins, 2000; Hagerty et al., 2001; Kenny, 2005; Stiglitz et al., 2010) present peculiar views on factors determining quality of life and treat them differently, which makes quality of life research more difficult.

The main factors affecting quality of life identified in various fields of science are the following ones: physical and psychological health, personal security, educational achievement, family, income, housing, i.e., the factors of internal environment; freedom, political stability, economic environment, accessibility of education, social security, culture – the factors of external environment.

Measurement of quality of life by a composite index. Analysis of scientific literature failed to reveal any formulated principal requirements for measurement of quality of life. Depending on purposes of a particular study, various methods are used to measure quality of life: questionnaires and scales for public opinion polling (e.g., R. A. Cummins Comprehensive Quality of Life Scale), individual economic indicators (e.g., GDP per capita), health parameters to measure health-related quality of life (WHO-100) or composite indices (e.g., Human Development Index, *The Economist Intelligence Unit's* Quality of Life Index, Legatum Prosperity index, etc.). The aforementioned measures of quality of life are drawn by including only macro or micro environment, objective or subjective factors.

The analysis of the main problems of quality of life conceptualization and measurement (Cummins, 2000; Hagerty et al., 2001; Kenny, 2005; Stiglitz et al., 2010; Veenhoven, 2013) showed that quality of life cannot be completely defined by one or several economic and social indicators. Thus, complex measurement of quality of life is required. Following the scientific literature (Freudenberg, 2003; Giovannini et al., 2005; Saisana et al., 2005), composite index can be defined as an artificially made instrument of quantitative and qualitative measurement of a particular sphere.

The scientific literature analysis of the measurement of quality of life by the index has induced distinguishing the main problems. Firstly, there is no commonly accepted classification of factors affecting quality of life and unanimous opinion concerning economic and other factors determining quality of life. According to E. Giovannini (2005), if the theoretical framework is formed incorrectly and there is no clear understanding and definition of the multidimensional phenomenon to be measured, the index may distort the situation presented.

The other biggest number of discussions among scientists was caused by the stage of the determination of weight coefficients. It is very important to select appropriate weighting and aggregation procedures that respect both the theoretical framework and the data properties. It is often difficult to form the substantiation of the measurement of weight coefficients and all variables are provided with the same weight coefficients (Cummins, 2000). In spite of that, other authors (Kenny, 2005) point out that different weight coefficients enable us to calculate the quality of life index more precisely as well as provide indicators with weight coefficients of different value. The authors of

the paper regard the assessment of significance of factors affecting quality of life as a necessary stage in the index of quality of life calculation.

On the basis of the analysis of scientific literature and results of quality of life studies, the main problems of the measurement of quality of life have been identified, and can be united in a single scheme (Figure 1).

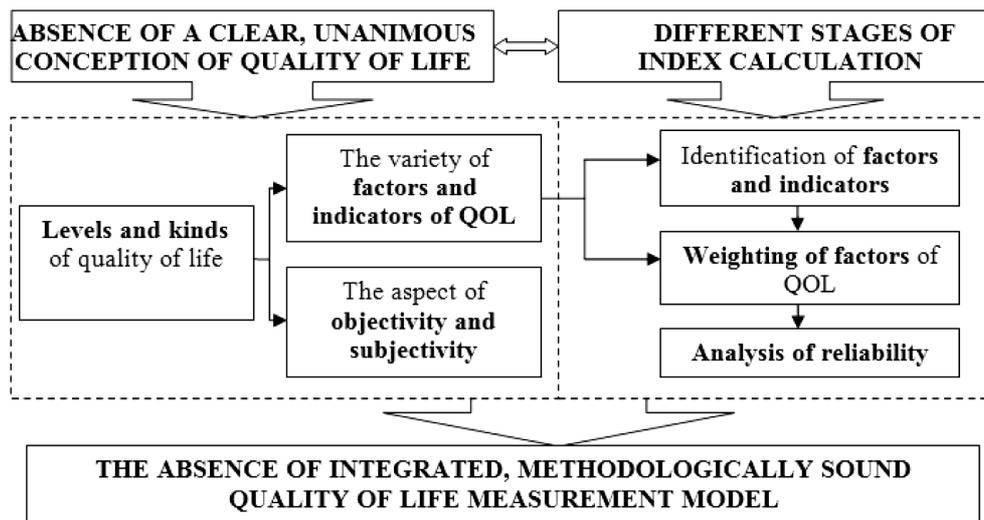


FIGURE 1. The main problems of the measurement of quality of life

To summarize the analysis of the main problems of the measurement of quality of life, it is concluded that quality of life is not sufficiently described in the scientific literature, particularly from economic point of view: there is a lack of systemic and integrated approach to conceptualization and measurement of quality of life, there is no methodologically sound quality of life measurement model, which would identify and systematize the main factors determining quality of life and providing for integrated measurement of quality of life.

3. The methodology of the Quality of Life Index

The scientific analysis of the main problems of quality of life measurement (Cummins, 2000; Hagerty et al, 2001; Veenhoven, 2013) proved that quality of life, as the concept involving multiple criteria which are determined by several groups of factors, different factors and indicators reflecting them, is best measured by means of indices. The measurement of quality of life by the quality of life index (I_{QOL}) helps to solve the problems of:

- Complexity – quality of life has to be analyzed from various perspectives and to include a range of quality of life factors and indicators reflecting them.

- Comparability – the comparison of quality of life of people living in different countries both among themselves and in time has to be possible.
- Simplicity – the results yielded by the quality of life index should be clear and easy to interpret.
- Universality – I_{QOL} should be universal and have a clear practical purpose, i.e., its results should be useful for public policy.

To achieve methodological substantiation and integrated measurement of quality of life, a logical scheme of scientific research in quality of life has been drawn (Appendix 1). The structure of this scheme has been determined by a clarified conception of quality of life and a lack of methods for systemic measurement and research practice. The scientific study includes 5 stages.

On the basis of analysis of scientific literature (Cummins, 2000; Hagerty et al., 2001; Kenny, 2005; Veenhoven, 2005; 2009; 2013) and results of quality of life studies, the factors of quality of life have been identified, and united in a single model (Figure 2) at *Stage 1*.

The Model for Measurement of Quality of Life includes external and internal environments as prerequisites for improvement of quality of life in the country. Both of these environments have four groups of factors. The factors relating to external environment include natural environment (climate conditions, quality of natural environment), political environment (political stability, political rights and civil liberties), economic environment (macro-economic environment, economic growth), and social environment (healthcare system, accessibility of education, social security, social inequality).

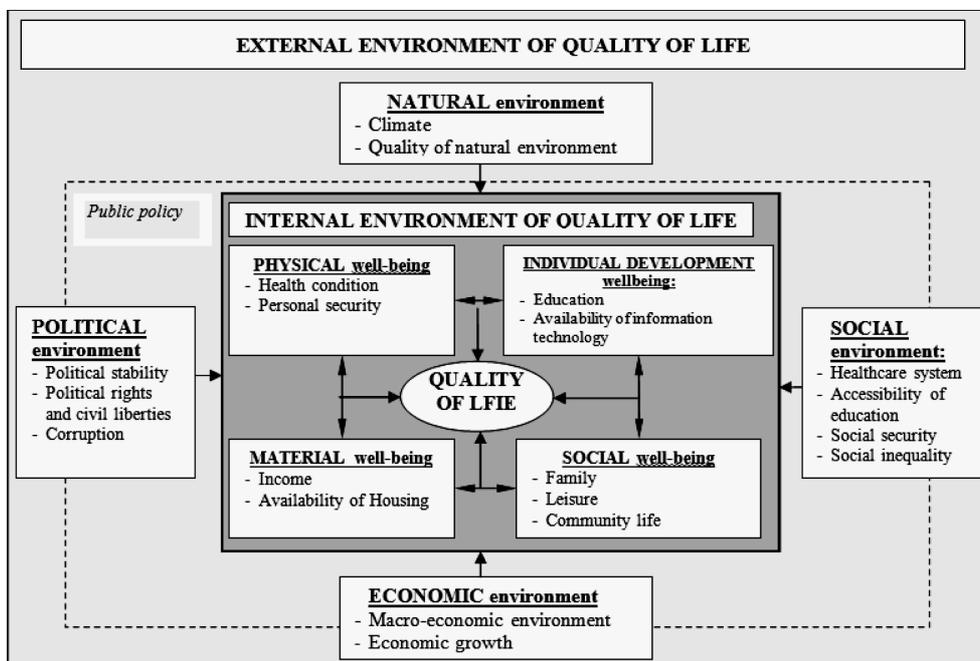


FIGURE 2. A Model for Assessment of Quality of Life

liberties, corruption), social environment (healthcare system, accessibility of education, social security, social inequality), and economic environment (macroeconomic and fiscal environment). The second part of the Quality of Life Measurement Model encompasses internal environment factors, which mostly depend on the individual himself. Those factors are the following: physical well-being (health condition, personal security), individual developmental well-being (education, availability of information technology), social well-being (family, leisure, and community life), and material well-being (income, availability of housing).

The analysis of the scientific literature (Ginevicius, Podvezko, 2009; Kilijoniene, Simanaviciene et al., 2010; Snieska, Bruneckiene, 2009) leads to the conclusion that it is difficult to identify and relate the most important factors of external macro-environment and internal environment that have a positive influence on quality of life in a country. The Model for Measurement of Quality of Life details only the main factors in the external and internal environments of quality of life which constitute preconditions for citizens of a particular country to seek and maintain quality of life.

Having identified and classified factors affecting quality of life, it is necessary to determine indicators reflecting the factors affecting quality of life (Table 2).

The indicators have been selected on the basis of the following main principles at *Stage 2*:

- Independence – the variables should not be highly correlated with one another. The problem of multicollinearity should be addressed by eliminating the variables that are correlated.
- Reliability and objectivity – the database of the empirical study must be reliable and objective.
- Accessibility – the data should be easily available to data users.
- Comparability – the indicators should allow the comparisons of quality of life of people living in different countries, i.e., they should be relative.

33 indicators have been distinguished, 19 of which reflect external environment factors, the other 14 reflect internal environment factors (Table 2).

It must be noted that each indicator reflected in external and internal environment factors (see Table 2) has a different impact on quality of life, i.e., several of them have a negative impact on quality of life (greenhouse gas emissions per capita, inflation, unemployment rate, inequality of income, infant mortality rate, etc.), and other indicators have the positive effect on quality of life (forest area, political stability indicator, GDP per capita, health expenditure, life expectancy at birth, real adjusted gross disposable income of households, etc.). Thus, it is important to measure quality of life in all its complexity.

Stage 2 also deals with normalization of values of indicators reflecting quality of life factors. Normalization is required prior to any data aggregation as the indicators in a data set often have different measurement units (Freudenberg, 2003). The Min-Max normalization method is applied to normalize the indicators' values. It is selected as the

TABLE 2. Indicators Reflecting Quality of Life Factors

GROUPS OF FACTORS	FACTORS	INDICATORS
EXTERNAL ENVIRONMENT		
NATURAL ENVIRONMENT	• Climate	• Latitude, to distinguish between warmer and colder climes
	• Quality of natural environment	• Forest area, % of land area • Greenhouse gas emissions per capita, t • Environmental expenditure by the public sector, % of GDP
POLITICAL ENVIRONMENT	• Political stability	• Political stability indicator • Government effectiveness indicator
	• Political rights and civil liberties	• Average of indices of political rights and civil liberties (Freedom House)
	• Corruption	• Corruption perception index
ECONOMIC ENVIRONMENT	• Macro-economic environment	• GDP per capita, in PPS • Inflation, annual % • Unemployment rate, %
	• Fiscal environment	• General government gross debt, % of GDP • General government deficit/surplus, % of GDP
SOCIAL ENVIRONMENT	• Healthcare system	• Practicing physicians, per 100 000 inhabitants • Health expenditure, % of GDP
	• Accessibility of education	• Public expenditure on education, % of GDP
	• Social security	• Expenditure on social protection, % of GDP
	• Social inequality	• Inequality of income – GINI coefficient • Gender pay gap, %
INTERNAL ENVIRONMENT		
PHYSICAL WELL-BEING	• Health conditions	• Infant mortality rate per 1000 live births • Life expectancy at birth
	• Personal security	• Intentional homicide rate per 100 000 inhabitants • Death due to suicide per 100 000 inhabitants
INDIVIDUAL DEVELOPMENT WELL-BEING	• Education	• Literacy rate, adults, % • School enrolment in tertiary education, %
	• Availability of information technology	• Home with personal computers, %
MATERIAL WELL-BEING	• Income	• Real adjusted gross disposable income of households per capita, PPS
	• Availability of housing	• Average number of rooms per person • Housing deprivation rate by number of items, %
SOCIAL WELL-BEING	• Family	• Divorces per 1000 persons • Crude birth rate per 1000 inhabitants
	• Leisure	• Household expenditures on recreation and culture, % of GDP
	• Community life	• Participation in various types of informal activities, % of population

most suitable normalization procedure that respects both the theoretical framework and the data properties. Min-Max normalizes indicators to have an identical range [0,1] by subtracting the minimum value and dividing by the range of the indicator values:

$$I_{qc}^t = \frac{x_{qc}^t - \min_c(x_q^{t_0})}{\max_c(x_q^{t_0}) - \min_c(x_q^{t_0})}; \quad (1)$$

Where: x_{qc}^t is the value of indicator q for country c at time t .

The present article asserts that factors and groups of factors determining quality of life have a different impact on quality of life and thus require different weight coefficients. Weight coefficients are provided to factors and groups of factors of quality of life at Stage 3.

To determine weight coefficients of factors and groups of factors affecting quality of life, an expert assessment has been chosen. In fact, 25 persons, whose activities are connected with social-economic policy/performance, healthcare system, education and the inducement of quality of natural environment development of the country, have been questioned. The individuals who took part in the survey might be regarded as the experts of the measurement of quality of life factors due to their qualification and practical experience (Table 3).

TABLE 3. The Allocation of the Experts According to Their Practical Experience

Practical experience by year	5–10 years	10–15 years	15–20 years	20–30 years	More than 30 years
The number of the experts	4	7	3	7	4

The experts who took part in the survey represent 4 groups of institutions: the government of the Republic of Lithuania along with administration and municipalities of Lithuanian cities; the institutions of education and science; healthcare institutions and finally, the institutions of natural environment. An expert evaluation has covered all Lithuanian cities from a geographical point of view.

The data of the questionnaire was processed and analyzed by the use of the Statistical Package for Data Analysis (SPSS) and the Programme Package of Microsoft Excel. The weight coefficients obtained as a result of this assessment are presented in Table 4.

The results of the expert evaluation let identify the main factors and groups of factors determining quality of life. According to the expert evaluation, the internal environment affects individual quality of life stronger than external environment, with the weight coefficients 0.60 and 0.40 respectively. The weight coefficients of groups of factors of external and internal environment differ marginally (Table 4).

TABLE 4. The Weight Coefficients of Groups of Factors and Factors of Quality of Life

Factors of Quality of Life	Weight coeff.	Factors of Quality of Life	Weight coeff.
EXTERNAL ENVIRONMENT	0.40	INTERNAL ENVIRONMENT	0.60
NATURAL ENVIRONMENT	0.22	PHYSICAL WELL-BEING (WB)	0.27
• Climate	0.45	Health conditions	0.55
• Quality of natural environment	0.55	Personal security	0.45
POLITICAL ENVIRONMENT	0.22	INDIVIDUAL DEVELOPMENT WB	0.25
• Political stability	0.30	• Education	0.55
• Political rights and civil liberties	0.40	• Availability of information technology	0.45
• Corruption	0.30		
ECONOMIC ENVIRONMENT	0.26	MATERIAL WELL-BEING	0.23
Macro-economic environment	0.50	Income	0.47
Fiscal environment	0.50	Availability of housing	0.53
SOCIAL ENVIRONMENT	0.30	SOCIAL WELL-BEING	0.25
• Healthcare system	0.30	Family	0.40
Accessibility of education	0.20	Leisure	0.30
Social security	0.22		
Social inequality	0.28	Community life	0.30

Analysis of scientific literature (Freudenberg, 2003; Giovannini et al., 2005; Saisana et al., 2005) and empirical studies revealed that a mathematical index calculation method is appropriate for measurement of quality of life as an object of study of the science of economics. Having selected and substantiated the indicators reflecting factors of quality of life and having applied weight coefficients obtained as a result of the expert assessment as well as the additive form of a function, the Quality of Life Index (I_{QOL}) Function is formed at Stage 3. A function of I_{QOL} will make it possible to measure quality of life in the country and to compare it to that in other countries:

$$I_{QOL} = 0.4 I_{EQOL} + 0.6 I_{IQOL}; \quad (2)$$

$$I_{QOL} = 0,4 \left(0,22 \sum_{i=1}^4 NE_i + 0,22 \sum_{i=1}^4 PE_i + 0,26 \sum_{i=1}^5 EE_i + 0,3 \sum_{i=1}^6 SE_i \right) + 0,6 \left(0,27 \sum_{i=1}^4 PW_i + 0,25 \sum_{i=1}^3 IDW_i + 0,23 \sum_{i=1}^3 MW_i + 0,25 \sum_{i=1}^2 SW_i \right); \quad (3)$$

Where:

I_{QOL} – quality of life index;

I_{EQOL} – external quality of life index;

NE – natural environment;

PE – political environment;

EE – economic environment;

SE – social environment;

I_{IQOL} – internal quality of life index;

PW – physical well-being;

IDW – individual development well-being;

MW – material well-being;

SW – social well-being.

In contrast to quality of life measurement models proposed by other researchers, which do not distinguish the main components and groups of factors of quality of life (the integrated approach to measurement is not being applied) and use formulas with equal-value factors instead, the present Model distinguishes three levels with different weight coefficients given to index components, groups of factors, and individual factors.

The index is counted and the analysis of reliability of I_{QOL} is done at *Stage 4*. Having formed the Quality of Life Index function, it is necessary to assess validity and adaptability of the I_{QOL} on the examples of the developed vs emerging European Union countries, which constitutes the purpose of the further section of this paper.

4. Empirical application of the Quality of Life Index in the developed and emerging European Union countries

The Quality of Life Measurement Model presented in the article has been empirically tested assessing quality of life in 20 purposefully selected emerging and developed economies of the European Union (Appendix 2). The emerging economy countries, which joined the EU in 2004 and 2007, i. e., from the last Eastern enlargements, include the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia and Slovakia, two Mediterranean countries - Malta and Cyprus, and finally, Bulgaria and Romania.

In the empirical application of I_{QOL} to measure quality of life of emerging economies of EU, data of the period 2005–2013 are used. The database of the empirical study conducted consists of statistical data on the European Union Member-States published by EUROSTAT and the World Bank, Human Development Report data, information published by the European Foundation for the Improvement of Living and Working Conditions (EUROFOUND), the World Resources Institute and Transparency International databases, and indicators of natural environment factors in quality of life presented in the CIA World Fact Book.

Taking into account significant limitations of the study and having performed testing of the Quality of Life Measurement Model in the EU countries, it has been established that the results of the I_{QOL} are more sensitive to different normative methods than to weight coefficient assignment scenarios. Because of the space limitation in the paper, the value of I_{QOL} was calculated using the method of the normalization of the distance from the minimum and the maximum values. Furthermore, the weight coefficients are assigned to all factors and groups of factors. The analysis affirms that the results of the I_{QOL} are statistically reliable, they do not contradict the classic measures of quality of life, yet are more exhaustive, measuring quality of life in the context of totality of factors of external and internal environment. The influence of different methodologies brought on the accuracy of the measurement of quality of life within the country by I_{QOL} is going to be analyzed in another article.

Following the scientific literature (Giovannini et al., 2005; Saisana et al., 2005) and the purposes of the quality of life assessment, the following intervals for evaluation of I_{QOL} have been determined: 0–0.19 – minimal I_{QOL} level; 0.2–0.49 (low I_{QOL} level),

TABLE 5. I_{QOL} of the EU Countries Studied and Its Values in 2005–2013

	2005	2006	2007	2008	2009	2010	2011	2012	2013
IRELAND	0.73	0.73	0.74	0.75	0.74	0.73	0.74	0.71	0.72
FINLAND	0.62	0.63	0.63	0.62	0.61	0.62	0.63	0.63	0.64
SWEDEN	0.70	0.71	0.69	0.69	0.66	0.67	0.68	0.68	0.68
FRANCE	0.65	0.64	0.64	0.65	0.62	0.64	0.65	0.64	0.64
GERMANY	0.56	0.57	0.57	0.59	0.56	0.57	0.60	0.60	0.61
UNITED KINGDOM	0.61	0.62	0.61	0.62	0.58	0.61	0.60	0.60	0.61
SPAIN	0.59	0.60	0.57	0.54	0.52	0.52	0.53	0.51	0.51
GREECE	0.51	0.51	0.51	0.52	0.50	0.48	0.47	0.45	0.44
SLOVENIA	0.58	0.60	0.61	0.60	0.57	0.57	0.58	0.54	0.52
SLOVAKIA	0.40	0.41	0.43	0.42	0.38	0.41	0.42	0.43	0.43
CZECH REPUBLIC	0.43	0.45	0.47	0.44	0.41	0.42	0.46	0.44	0.46
HUNGARY	0.43	0.43	0.41	0.41	0.36	0.36	0.38	0.36	0.38
MALTA	0.55	0.56	0.54	0.53	0.49	0.52	0.53	0.54	0.54
CYPRUS	0.52	0.54	0.55	0.56	0.52	0.52	0.53	0.50	0.51
LITHUANIA	0.30	0.35	0.35	0.33	0.33	0.32	0.35	0.34	0.33
LATVIA	0.34	0.35	0.34	0.31	0.26	0.29	0.25	0.26	0.28
ESTONIA	0.41	0.43	0.42	0.38	0.37	0.39	0.40	0.39	0.41
POLAND	0.42	0.43	0.44	0.45	0.40	0.43	0.45	0.44	0.44
ROMANIA	0.29	0.30	0.29	0.25	0.24	0.24	0.25	0.26	0.26
BULGARIA	0.35	0.36	0.33	0.34	0.28	0.27	0.29	0.29	0.28

Minimal 0–0.19	Low 0.2–0.49	Medium 0.5–0.69	High 0.7–0.79	Very high 0.8–1
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0.5–0.69 (medium I_{QOL} level); 0.7–0.79 (high I_{QOL}) and 0.8–1 (very high I_{QOL} level). According to I_{QOL} scale, the EU countries were divided as indicated in Table 5.

The empirical application of I_{QOL} reveals the change of the quality of life of emerging economies countries in the context of developed EU countries. Only Ireland has the highest I_{QOL} value during the analyzed period. The analysis of the situation of Ireland, according to the quality of life environment factors and their groups, lets identify the main reasons of the highest value of I_{QOL} . The analysis of population and social conditions statistics published by Eurostat (2015) reveals that Ireland has the highest results of the indicators reflecting internal environment of quality of life (Figure 3). Firstly, Ireland has one of the highest life expectancy at birth rates and high levels of educational attainment in the EU countries during the period of 2005–2013. Ireland also is the top ranked country in the EU with the lowest divorces results and the highest crude birth rates. To put in a different way, family as the factor of quality

of life is a worth in Ireland. The values of indicators reflecting the group of personal security factors are in a very high position, too. Moreover, according to the statistical data published by Eurostat (2015), Ireland is one of the richest countries in the selected Central and Eastern European countries with a gross domestic product (GDP) per capita in purchasing power standards (PPS).

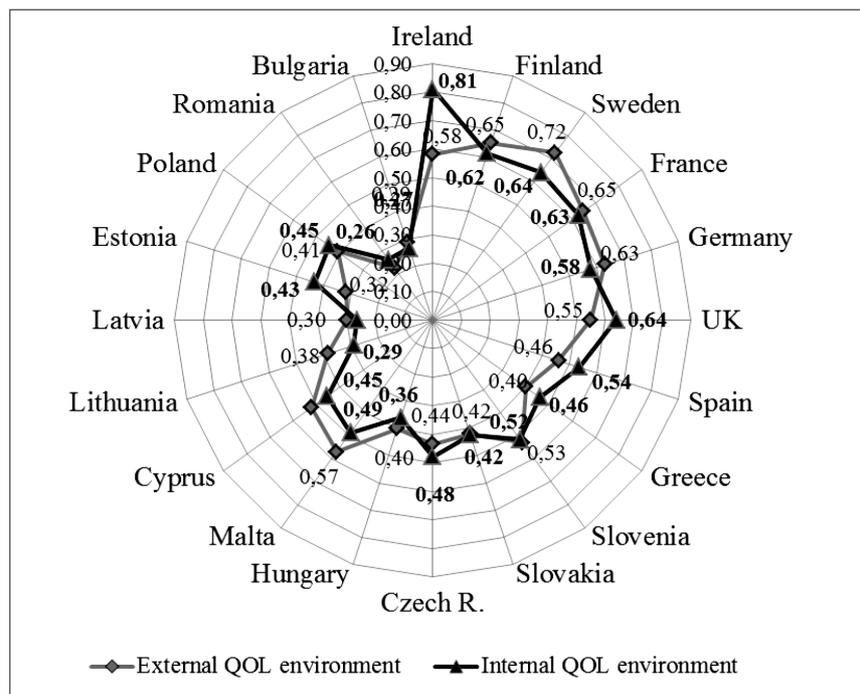


FIGURE 3. External Quality of Life Index and Internal Quality of Life Index of the EU countries in 2013

Considering high results of indicators reflecting internal quality of life environment and in spite of one of the most severe economic crisis since 2008, Ireland has the highest I_{QOL} value throughout the analyzed period.

The remaining developed EU countries (Sweden, Finland, France, Germany, etc.) have their I_{QOL} in the interval of 0.5–0.69 and constitute the list of countries with the medium level of quality of life. This list also contains emerging economy countries, which joined the EU in 2004 and 2007, and several southern EU members (Spain, Greece, etc.). During the period of 2005–2013, the lowest I_{QOL} on average was in the new EU members Romania (0.26), Bulgaria (0.31) and Hungary (0.39) and in the Baltic states: Latvia (0.30), Lithuania (0.33), Estonia (0.4).

In 2005–2013 the level of quality of life (I_{QOL}) in the analyzed EU countries was variable and changing in both time and space. During the period from 2005 till 2008, I_{QOL} was growing in a number of the EU Member States, including Ireland

(2.74 %), Germany (5.36 %), the United Kingdom (1.64 %), Greece (1.96 %), and in the emerging economy countries quality of life was growing faster: Slovenia (3.45 %), Slovakia (5 %), Cyprus (7.69 %), Lithuania (10 %) and Poland (7.14 %); however, during 2008-2009, I_{QOL} showed a decline.

It is difficult to identify the main reasons of the annual change of the quality of life of the EU countries because of the change of the situation not only in the analyzed country, but also in the ones compared. Obviously, emerging economies vary significantly by their size, industry structure, political, social, and economic environment. These differences have a significant impact on the distinctiveness of their individuals' quality of life. However, the analysis of changes in I_{QOL} from 2009 till 2013 revealed that during the studied period the effects of groups of factors of internal environment on the I_{QOL} increased more rapidly than the effects of groups of factors of external environment of quality of life (Figure 4).

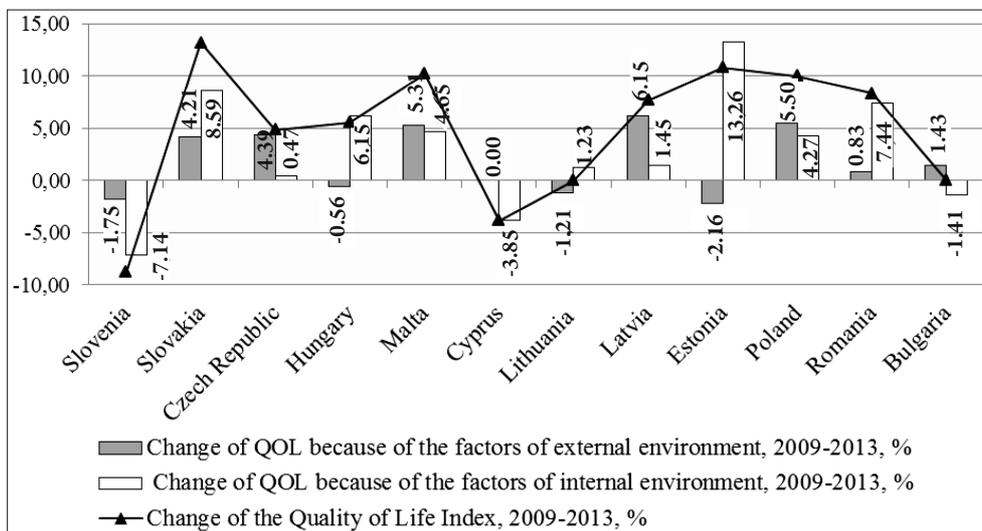


FIGURE 4. Changes in the Quality of Life Index because of external and internal environment in the emerging economies during the years 2009-2013, %

The results proved that during the period from 2009 till 2013 I_{QOL} was growing more rapidly in a number of emerging economy countries than in the developed EU Member States. Also the analysis of correlations between external I_{QOL} and internal I_{QOL} components of the quality of life index and related groups of factors in the EU Member States substantiated importance of factors of internal environment for quality of life. Strong positive Pearson correlation coefficients ($r = 0.970$) allow asserting that the Index of internal quality of life and the groups of factors expressing it are closely related.

5. Conclusions

Systematization of scientific literature made it possible to identify the main problems of the assessment of quality of life. The researches have proved that treatment of the concept of quality of life varies across both theoretical and empirical studies conducted by different authors. There is a lack of a clear conception of quality of life, which would integrate a wide range of scientific disciplines in the scientific literature at present. Also, there is no unanimous opinion concerning factors determining quality of life and their interrelationship, thus in the present paper a multi-criterion approach is developed, primarily focusing on the economic aspect of quality of life.

Quality of life as a multidimensional concept cannot be completely defined by one or several factors and its reflecting indicators, thus, complex assessment of quality of life is a must. The researches have proved that quality of life measurement by an index helps to solve the problem of a complex measurement of quality of life.

The Quality of Life Index has been constructed by the authors of the present paper via the following stages: forming the Model for Assessment of Quality of Life (i.e., identification of the factors and indicators, and grouping them in one system), normalizing and weighting the indicators, calculating the Index of Quality of Life and assessing validity and adaptability of the I_{QOL} on the examples of the EU countries.

On the basis of the empirical research, in the period of 2005–2013, the following European Union countries had the highest quality of life: Ireland, Sweden, France and Finland. During the research period, a lower quality of life was found in the new EU members – Romania, Bulgaria and Hungary, and three Baltic States (Latvia, Lithuania, and Estonia). In spite of that, the results proved that during the period from 2009 till 2013, I_{QOL} was growing more rapidly in a number of emerging economy countries than in the developed EU member States.

The results, which have been acquired during the theoretical and empirical researches, proved that I_{QOL} may be important for analysis of the level of quality of life in the EU and other countries in the world; for identification of the main economic and social problems arising in the country; for singling out the key areas for improvement from the economic point of view; for development of economic policy programs and for assessment of effectiveness of adopted and implemented decisions of business and political actors.

In recent years, the changing global political and economic situation in many developing countries and economies in transition leads to reconsidering the influence of external environment factors on individual quality of life. An expert evaluation could be performed repeatedly covering all the European Union countries, which constitutes the purpose of our further studies.

References

- Cummins, R. A. (1996). The Domains of Life Satisfaction: An Attempt to Order Chaos. *Social Indicators Research*, 38 (6), 303-328.
- Cummins, R. A. (2000). Objective and Subjective Quality of Life: an Interactive Model. *Social Indicators Research*, 52 (1), 55-72.
- Easterlin, R. A. (2001). Income and Happiness: Towards a Unified Theory. *The Economic Journal*, 111 (7), 465-484.
- Easterlin, R. A. (2003). Building a Better Theory of Wellbeing. *IZA Discussion Paper No. 742*.
- Felce, D., & Perry, J. (1997). Quality of life: The Scope of the Term and its Breadth of Measurement. In R. I. Brown (Ed.), *Quality life for people with disabilities: models research and practice* (pp. 56-70). UK: Stanley Thornes, Ltd.
- Eurostat database*. Annual national accounts (including GDP) 2005–2013 Internet access: <http://ec.europa.eu/eurostat/web/national-accounts/data/main-tables>. [Accessed February, 18, 2015].
- Eurostat database. Population and social conditions, 2015. Internet access: <http://ec.europa.eu/eurostat>. [Accessed March, 5, 2015].
- Freudenberg, M. (2003). *Composite indicators of country performance: a critical assessment*. OECD Publishing, Paris.
- Ginevicius, R., & Podvezko, V. (2009). Evaluating the Changes in Economic and Social Development of Lithuanian Counties by Multiple Criteria Methods. *Technological and Economic Development of Economy*, 15(3), 418-436.
- Giovannini, E., Nardo, M., Saisana, M., Saltelli, A., Tarantola, S., Hoffman, A. (2005). *Handbook of Constructing Composite Indicators: Methodology and User Guide*. OECD Statistics Working Paper, STD/DOC OECD publishing, p. 108.
- Haas, B. K. (1999). A Multidisciplinary Concept Analysis of Quality of Life. *Western Journal of Nursing Research*, 21(6), 728-742.
- Hagerty, M. R., Cummins, R. A., Ferriss, A.L., Land, K., Michalos, A. C., Peterson, M., Sharpe, A., Sirgy, M. J. & Vogel, J. (2001). Quality of Life Indexes for National Policy: Review and Agenda for Research. *Social Indicators Research*, 55(1), 1-96.
- Kenny, M. (2005). *The Economist Intelligence Unit's Quality-of-life Index*. The world in 2005. Internet Access: http://www.economist.com/media/pdf/QUALITY_OF_LIFE.pdf. [Accessed January, 20, 2015].
- Kilijoniene, A., Simanaviciene, Z. et al. (2010). The Evaluation of Social and Economic Development of the Region. *Inzinerine Ekonomika-Engineering Economics*, 21(1), 68-79.
- Quality of Life and Well-being: Measuring the Benefits of Culture and Sport: Literature Review and Think piece (2005). *Scottish Executive Social Research*. Internet Access: <http://www.gov.scot/resource/doc/89281/0021350.pdf>. [Accessed February, 5, 2015].
- Saisana, M., Tarantola, S., Schulze, N., Cherchye, L., Moesen, W., Van Puyenbroeck, T. (2005). *Knowledge Economy Indicators. State-of-the-Art Report on Composite Indicators for the Knowledge-based Economy*. Workpackage 5, 54 p. Internet Access: <https://www.uni-trier.de/fileadmin/fb4/projekte/SurveyStatisticsNet/KEI-WP5-D5.1.pdf>. [Accessed January, 20, 2015].
- Sen, A. (1993). Capability and Well-Being. In M. Nussbaum & A. Sen (Ed.), *The Quality of Life* (pp. 62-67). Oxford: Clarendon Press.
- Snieska, V., & Bruneckiene, J. (2009). Measurement of Lithuanian Regions by Regional Competitiveness Index. *Inzinerine Ekonomika-Engineering Economics* (1), 45-57.
- Stiglitz J. E., Sen A., Fitoussi J.-P. *Report by the Commission on the Measurement of Economic Performance and Social Progress*. Paris: Commission on the Measurement of Economic Performance

and Social Progress, 2010. Internet Access: http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf. [Accessed December, 8, 2014].

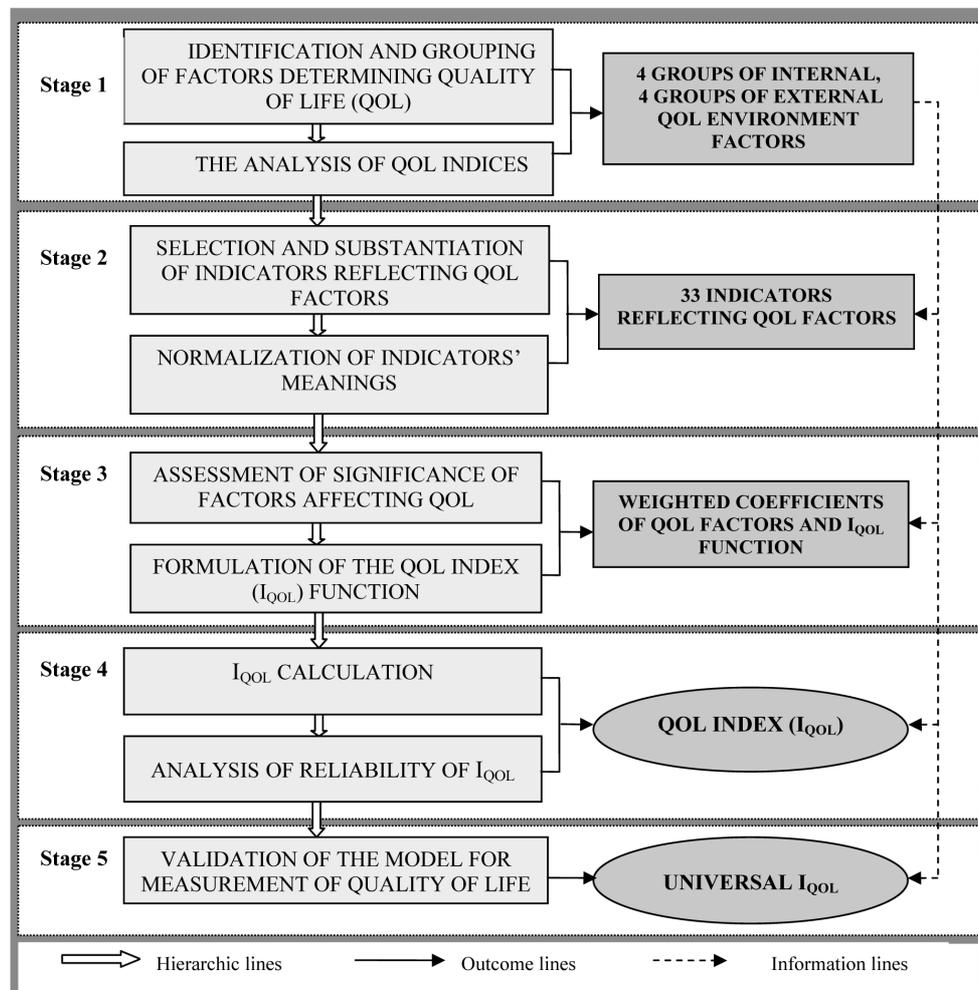
Veenhoven, R. (2005). Apparent Quality of Life in Nations. How Long and Happy People Live. *Social Indicators Research* (71), 61-68.

Veenhoven, R. (2009). Well-Being in Nations and Well-Being of Nations. Is There a Conflict Between Individual and Society? *Social Indicators Research* (91), 5-21.

Veenhoven, R. (2013). The four qualities of life: Ordering concepts and measures of the good life. In Della Fave, A. (ed.). *The Exploration of happiness: Present and future perspectives*. Springer, Dordrecht, Netherlands: Happiness Studies Book Series, Chapter 11: 195-226.

WHOQOL Measuring Quality of Life (1997). World Health Organization. Internet Access: http://www.who.int/mental_health/media/68.pdf. [Accessed April, 19, 2015].

Appendix 1. Logical Layout of the Scientific Research of Quality of Life Measurement



Appendix 2. I_{QOL} of the EU Countries Studied and Its Values in 2005–2013

	2005		2006		2007		2008		2009		2010		2011		2012		2013	
	I _{QOL}	R	I _{QOL}	R	I _{QOL}	R	I _{QOL}	R	I _{QOL}	R	I _{QOL}	R	I _{QOL}	R	I _{QOL}	R	I _{QOL}	R
IRELAND	0.73	1	0.73	1	0.74	1	0.75	1	0.74	1	0.73	1	0.74	1	0.71	1	0.72	1
FINLAND	0.62	4	0.63	4	0.63	4	0.62	4-5	0.61	4	0.62	4	0.63	4	0.63	4	0.64	3-4
SWEDEN	0.70	2	0.71	2	0.69	2	0.69	2	0.66	2	0.67	2	0.68	2	0.68	2	0.68	2
FRANCE	0.65	3	0.64	3	0.65	3	0.65	3	0.62	3	0.64	3	0.65	3	0.64	3	0.64	3-4
GERMANY	0.56	8	0.57	8	0.57	7-8	0.59	7	0.56	7	0.57	7	0.6	5-6	0.6	5-6	0.61	5-6
UNITED KINGDOM	0.61	5	0.62	5	0.61	5-6	0.62	4-5	0.58	5	0.61	5	0.6	5-6	0.6	5-6	0.61	5-6
SPAIN	0.59	6	0.6	6-7	0.57	7-8	0.54	9	0.52	8-9	0.52	8-9-10	0.53	9-10	0.51	9	0.51	9
GREECE	0.51	11	0.51	11	0.51	11	0.52	11	0.5	10	0.48	11	0.47	11	0.45	11	0.44	12-13
SLOVENIA	0.58	7	0.6	6-7	0.61	5-6	0.6	6	0.57	6	0.57	6	0.58	7	0.55	7	0.52	8
SLOVAKIA	0.40	16	0.41	16	0.43	14	0.42	14	0.38	14	0.41	14	0.45	14	0.43	14	0.43	14
CZECH REPUBLIC	0.43	12-13	0.45	12	0.47	12	0.44	13	0.41	12	0.42	13	0.46	12	0.44	12	0.46	11
HUNGARY	0.43	12-13	0.43	13-14-15	0.41	16	0.41	15	0.36	16	0.36	16	0.38	16	0.36	16	0.38	16
MALTA	0.55	9	0.56	9	0.54	10	0.53	10	0.49	11	0.52	8-9-10	0.54	8	0.54	8	0.54	7
CYPRUS	0.52	10	0.54	10	0.55	9	0.56	8	0.52	8-9	0.52	8-9-10	0.53	9-10	0.5	10	0.5	10
LITHUANIA	0.30	19	0.35	18-19	0.35	17	0.33	18	0.33	17	0.32	17	0.35	17	0.34	17	0.33	17
LATVIA	0.34	18	0.35	18-19	0.34	18	0.31	19	0.26	19	0.29	18	0.25	19-20	0.26	20	0.28	18-19
ESTONIA	0.41	15	0.43	13-14-15	0.42	15	0.38	16	0.37	15	0.39	15	0.4	15	0.39	15	0.41	15
POLAND	0.42	14	0.43	13-14-15	0.44	13	0.45	12	0.4	13	0.43	12	0.45	13	0.44	13	0.44	12-13
ROMANIA	0.29	20	0.3	20	0.29	20	0.25	20	0.24	20	0.24	20	0.25	19-20	0.26	19	0.26	20
BULGARIA	0.35	17	0.36	17	0.33	19	0.34	17	0.28	18	0.27	19	0.29	18	0.29	18	0.28	18-19