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INSURANCE DEVELOPMENT AND LIFE QUALITY IN THE EUROPEAN UNION COUNTRIES. AN EMPIRICAL ASSESSMENT

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Mirela Cristea[1], Graţiela Georgiana Noja[2], Doina Drăgoi[3], Leontina Codruţa Andriţoiu[3]

[1]University of Craiova, Faculty of Economics and Business Administration, Craiova, Romania
[2]West University of Timişoara, Faculty of Economics and Business Administration,
East European Center for Research in Economics and Business, Timişoara, Romania
[3]University of Craiova, Doctoral School of Economics,
Faculty of Economics and Business, Romania

ORCID iD:	Mirela Cristea	https://orcid.org/0000-0002-6670-9798
	Graţiela Georgiana Noja	https://orcid.org/0000-0002-9201-3057
	Doina Drăgoi	N/A
	Leontina Codruţa Andriţoiu	N/A

Abstract. *The connection between insurance and economic development has been intensively addressed in the literature, but a comprehensive analysis including the dimensions of human capital/quality of life has been less considered. The general objective of this research is to assess the degree of development of the insurance sector in the interplay with the representative dimensions of quality of life, at the level of the European Union (EU) Member States (MS), and to propose strategies for narrowing the gap between countries. The data encloses representative indicators that reveal the size of the insurance market, on the one hand, and the dimensions of quality of life, on the other hand, at the level of 2019. The research methodology consists of cluster analysis with the Ward method. The main results reveal that, at the level of all EU-27 Member States, the size of the insurance market is interconnected with the quality of life, with significant differences between them, developing countries having modest results compared to developed countries. Thereby, specific strategies and policies for these groups of countries are paramount, in order to enhance the wellbeing by insurance services and coverage.*

Key words: *insurance, quality of life, human development, cluster analysis, European Union countries*

1. INTRODUCTION

The insurance sector represents a paramount field of a country's economy, in terms of the income/turnover that it provides (called gross insurance premiums), the major investments of their assets in diversified areas (for life insurance class), but also the economic and social role played in covering the risks that can affect individuals and companies (the functions of preventing and compensating for damages) (Cristea et al., 2014).

Therefore, insurance enhances the economic growth and sustainable development through the contribution at Gross Domestic Product (GDP) creation, supporting capital markets, with manifold implications in people's social life (Cristea et al., 2009; Hufeld et al., 2017). Insurance encourages innovation, contributes to shaping a resilient society and plays a major role in addressing societal challenges, such as the effects of technological change, cyber risks or changing demographic trends. Insurance can be considered a barometer of the economic and social well-being of a country's population, which contributes to reducing the poverty and government spending, on the line of covering natural disasters (Janzen et al., 2020). In perspective, the insurance market, especially in terms of the life insurance sector, in addition to its traditional role, brings a significant contribution to supporting the pension system, long-term investment and economic growth (OECD, 2020). The connection between insurance and economic development (measured, mainly, by GDP) has been intensively addressed in the literature, for different periods of time, at the level of regions, such as Europe (Haiss & Sümegi, 2008; Peleckienė et al., 2019), countries from the United States of America (USA), Europe and Asia (Mohy ul din et al., 2017), the worldwide level (Chang & Lee, 2012), or specific fields and countries, like agriculture in Serbia (Piljan et al., 2018) or Romania (Cristea et al., 2014).

At the individual level, insurance contributes to improving people's quality of life by tackling the risks that may arise in their lives, by guaranteeing payments in case of insured risk, the risk of mortality and longevity, but also by the security, stability and financial protection offered through insurance agreements (Kaigorodova & Mustafina, 2014). The economic well-being of people is directly related to the insurance market through the products they develop and offer (European Union, 2017). Quality of life represents a multidimensional concept, which, in addition to the economic situation, living conditions and material resources necessary for people's lives, also addresses social aspects of society as a whole, people's lifestyle and perceptions. In addition to the economic issues (earnings), other sectors are also fundamental in determining the quality of life, such as the health care, living conditions, access to education, adequate financial products and the provision of social services (Ayte et al., 2001; Whelan & Russell, 2004).

On this groundwork, our general research objective is to assess the degree of development of the insurance sector in interconnection with the representative dimensions of the quality of life. The analysis is performed by homogeneous groups of countries, at the level of the European Union (EU) Member States (MS). It further aims to propose strategies for the insurance sector promotion, particularly for countries with downsized results. The novelty of our research lies in encompassing the dimensions of quality of life in the assessment of the insurance sector (which also includes human capital), different from previous studies that have focused on the degree of economic development, assessed by GDP. The data encloses representative indicators that reveal the size of the insurance market (namely, the insurance

penetration and insurance density degrees), on the one hand, and indicators that reveal the dimensions of the quality of life (namely, education index and life expectancy index - the components of the human development index, alongside with GDP per capita, earnings, employment rate, poverty and inflation), on the other hand, at the level of 2019. The research methodology consists in applying cluster analysis through the Ward method.

Besides the introduction, the structure of this paper comprises five sections, which follow: the main landmarks in the literature on the interconnections between insurance and the dimensions of quality of life/wellbeing; description of the data used in the research and the methodology applied; detailed presentation of the results obtained and assessment of the research hypothesis; main conclusions and recommendations. In order to substantiate the robustness of the results, at the end of our article, we inserted additional information summarized in the Annex section.

2. LITERATURE REVIEW

The connection between insurance and welfare has been studied in the literature, considering its various dimensions. Thus, according to studies conducted since the '60s by Hammond et al. (1967), it was shown that household income, education and occupation positively influence the demand on the insurance market. It was found that the higher the household income, the lower the investment in the insurance sector. Life insurance is preferred and accessed by middle-income people. On the other hand, high- and low-income families invest in the insurance system, while middle-income families do not (Hammond et al., 1967). Moreover, in this study, the negative relationship between education and the demand for life insurance is highlighted, a fact confirmed also by Beck & Webb (2003). Nevertheless, positive interlinkages between life insurance and education for European (Dragos et al., 2017), South-Asian (Sanjeew et al., 2019) and African countries were revealed when information and communication technology (ICT) was included in the analysis (Asongu, 2020). Thus, expanding the ICT applications will act as a favorable support for life insurance and education. Same results were highlighted for the Central Pomerania (a region between Germany and Poland), when studied the main factors that promote life insurance (Strzelecka et al., 2020).

In the literature, the positive relationship between *employment* and *the insurance market* is recorded (Lenten & Rulli, 2006). *Income* and *life insurance* for South-Asian countries are inversely connected, by the side also of "urbanisation, life expectancy, dependency, and private health expenditure" (Sanjeew et al., 2019, p. 109). *Life expectancy* in relation to the insurance market, in the case of life insurance, is ambiguous due to the composition of the products offered which aim at mortality and savings. Very few studies have found a correlation between these two concepts (Beenstock, 1986; Outreville, 1996). For example, an increased *life expectancy* of insured persons would lead to a longer life insurance payment period, which would mean income for insurance companies and the payment of a larger sum of money when the insured event occurs. *The inflation rate* can negatively influence the demand for health insurance by increasing the price of the insurance policy, which can discourage people from accessing this insurance product (Babbel, 1979).

The benefits and role of insurance in driving growth has long been officially recognized at the United Nations Conference on Trade and Development (UNCTAD, 1964, p. 227), which stated that "a sound national insurance and reinsurance market is an essential characteristic of economic growth". The results in the literature reveal the positive direct link between insurance and economic growth or national income (Chang & Lee, 2012; Cristea et al., 2014;

Dragos et al., 2017; Haiss & Sümegi, 2008; Mohy ul din et al., 2017; Peleckienė et al., 2019; Piljan et al., 2018). What manifests itself differently and influences the results obtained is materialized in the institutional regulatory framework (considering the Worldwide Governance Indicators) specific to insurance markets from one country to another, but also culture and the degree of economic development (Dragos et al., 2017). The recognized role of the insurance stabilizer gives households and companies that use insurance products a considerable reduction in their financial volatility. The insurance market also contributes to reducing and combating poverty, as well as social inclusion (Janzen et al., 2020).

The COVID-19 pandemic has generated a deep recession in the insurance sector and GDP will be significantly influenced by its decline (Babuna et al., 2020; Shennaev & Matiyazova, 2020). However, the insurance system, due to the fiscal and monetary policies adopted, has proved quite resilient, but we must not rule out possible vulnerabilities and uncertainties due to the impact of the Covid-19 crisis.

In conclusion, the results of numerous studies in the relevant literature show that the insurance sector has profound implications in a country's economy and in ensuring the economic well-being of the population.

3. DATA AND RESEARCH METHODOLOGY

In order to analyze the development degree of the insurance market in line with the quality of life in the EU Member States, we selected indicators that reveal the two areas concerned, respectively, representative indicators of the insurance market and representative indicators of the quality of life.

Thus, the selected *indicators that reveal the size of the insurance market* are represented by: *the insurance penetration degree* for total insurance market (*IsrP*) (% of GDP); and *insurance density* for total insurance market *(IsrD)* (USD/capita).

Insurance penetration degree shows the share of *gross written premiums* (which represent insurance turnover) in GDP, over a year (Insurance Europe, 2021). When there is an increase in gross written premiums, *the degree of insurance penetration* could be reduced if GDP were to grow more than in the insurance sector. *The density of insurance for the total market* is calculated by reporting the value of gross written premiums to the number of inhabitants of that country (Insurance Europe, 2021). This indicator is a barometer that indicates *the average expenditure made* by each inhabitant of a country to purchase products of insurance companies (OECD, 2020).

The representative indicators of quality of life are: *the life expectancy index (LE_I)* and *the education index (Ed_I)*, as component elements of the human development index (HDI); *GDP per capita (GDP_cap) (USD); poverty rate (Pov) (%); employment rate for the age segment 20-64 years (Empl_20_64) (%); the net earnings of a couple with two children (ERN) (purchasing power parity, PPP); and inflation rate (Infl) (%).*

Data were collected for 2019 and extracted from the database of the Swiss Re Institute (2020) (in terms of insurance market indicators), United Nations Development Program - UNPD (2021) (for the education index and the life expectancy index, HDI components), World Bank (2021) (for GDP per capita) and Eurostat (European Commission, 2021) (for the poverty rate, the employment rate for the 20-64 age group, the net earnings of a couple with two children and inflation rate). The data were then adjusted by logarithm to ensure their stationarity and adequate comparability across selection.

Regarding the size of the insurance market in 2019 in the EU-27 MS, the most developed insurance markets are in the Nordic countries - Denmark, and Finland, in terms of the share of insurance in GDP (over 10% of GDP) (Fig. 1, left), and Denmark, Ireland and Luxembourg, as regards the insurance density (over 5,200 USD/capita) (Fig. 1, right). The smallest dimensions of the insurance market are recorded in developing countries from Central and Eastern Europe, namely, Romania and Lithuania, both for insurance penetration (below 2% of GDP) (Fig. 1, left), and insurance density (below 200 USD/capita) (Fig. 1, right).
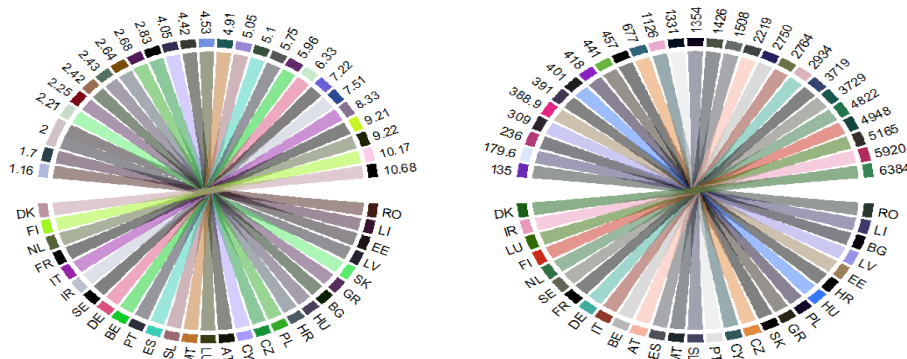

Fig. 1 Indicators of insurance market, EU-27, 2019: insurance penetration degree (left); insurance density (right)
Source: authors' contribution in R, data extracted from Swiss Re Institute database (2020).
Legend: AT – Austria; BE – Belgium; BG – Bulgaria; CY – Cyprus; CZ - Czech Republic; DE – Germany; DK – Denmark; EE – Estonia; ES – Spain; FI – Finland; FR – France; GR – Greece; HR – Croatia; HU – Hungary; IR – Ireland; IT – Italy; LI – Lithuania; LU – Luxembourg; LV – Latvia; MT – Malta; NL – Netherlands; PL – Poland; PT – Portugal; RO – Romania; SK - Slovak Republic; SL – Slovenia

Fig. 2 Life quality indicators, EU-27, 2019: education index (left); life expectancy index (right)
Source: authors' contribution in R, data extracted from UNPD database (2021). *Legend:* AT – Austria; BE – Belgium; BG – Bulgaria; CY – Cyprus; CZ - Czech Republic; DE – Germany; DK – Denmark; EE – Estonia; ES – Spain; FI – Finland; FR – France; GR – Greece; HR – Croatia; HU – Hungary; IR – Ireland; IT – Italy; LI – Lithuania; LU – Luxembourg; LV – Latvia; MT – Malta; NL – Netherlands; PL – Poland; PT – Portugal; RO – Romania; SK - Slovak Republic; SL – Slovenia
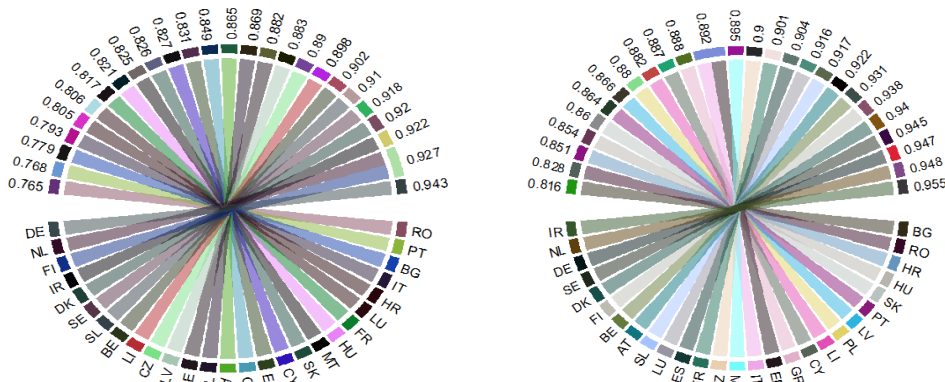
Life quality dimensions, represented by the education index and life expectancy index (Fig. 2), entail high levels in Germany, the Netherlands, Finland and Ireland (over 0.922 index), as regards education (Fig. 2, left), on the one side, and Ireland, the Netherlands, Germany and Sweden (over 0.945 index), as regards the life expectancy index (Fig. 2, right), on the other side. The lowest degree of education and life expectancy, as main components of HDI, were registered in Romania, Portugal and Bulgaria (below 0.779 index), for education index (Fig. 2, left), and Bulgaria, Romania and Croatia (below 0.851 index), for life expectancy index (Fig. 2, right).

The research methodology consists in applying the *cluster analysis* at EU-27 level. Cluster analysis is a standard procedure used in the analysis of multivariate data, as an iterative process of optimization/interactive grouping of parameters (data) that have similar characteristics, those grouped in neighboring clusters with different characteristics, in order to identify the number of groups with similar characteristics (Hanumanth & Prasada, 2013; Tan, Steinbach & Kumar, 2005; Wierzchon & Kłopotek, 2018). The cluster analysis is performed by applying the Ward grouping method on the selected indicators, in order to evaluate the formation of groups (clusters) at the level of EU-27 MS and to make appropriate recommendations / policies for each group of states.

The research hypothesis (H) is: *"Among the EU-27 MS, there are significant differences in terms of the development of the insurance market and the level of quality of life, with developing countries performing modestly compared to developed countries".*

4. RESULTS AND DISCUSSIONS

The correlation matrix of previously described indicators represents the first step performed in the cluster analysis (Fig. 3).
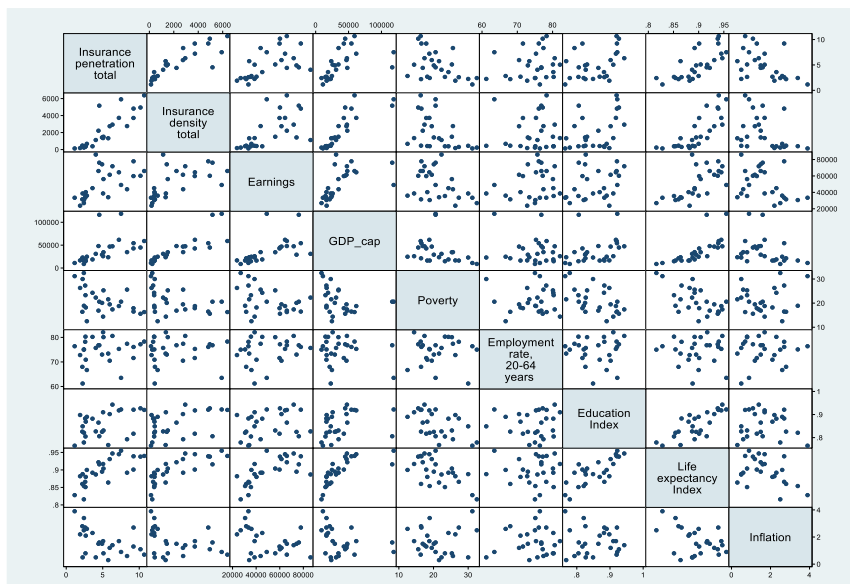

Fig. 3 Correlation matrix for the insurance market and quality of life, EU-27, 2019
Source: authors' contribution in Stata

Cluster analysis applied through the Ward method indicated the formation of an optimal number of 4 clusters (Fig. 4 and Table 1). The optimal number of clusters was obtained by applying the stop rules on the collected data (Calinski-Harabasz and Duda-Hart tests), resulting in pseudo-F statistics indicating the stopped grouping level.
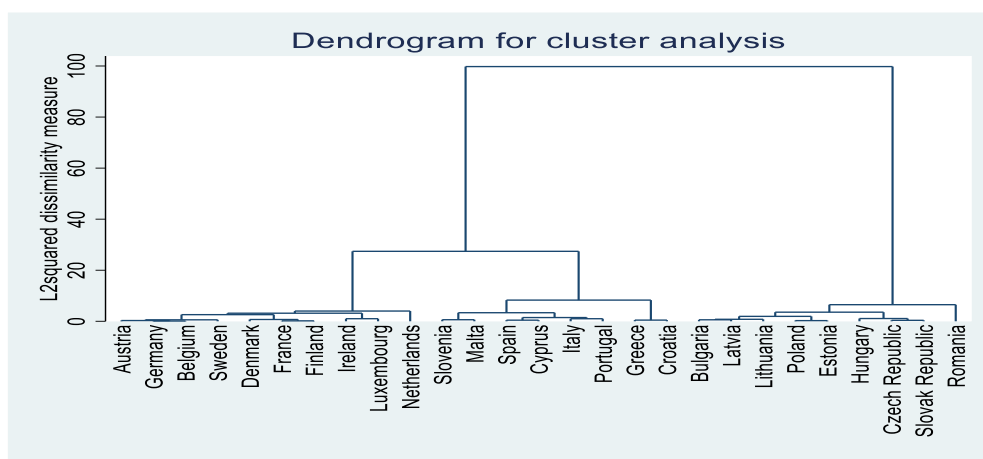

Fig. 4. Dendrogram of cluster analysis, EU-27, 2019
Source: authors' contribution in Stata

Table 1 Clusters associated with the insurance market and quality of life, EU-27, 2019

Clusters (C)	EU Member States	Cluster Modelling – Ward Method *Performance*
C1	Finland, Sweden, Belgium, Germany, France, Luxembourg, Netherlands, Ireland, Austria, Denmark	*High* (particularly in terms of *IsrP, IsrD, GDP_cap, Empl_20_64, ERN, Ed_I, LE_I, Pov*, on the one hand, and *Infl*, on the other hand – low to medium values)
C2	Portugal, Slovenia, Italy, Spain, Cyprus, Malta	*Medium High* (in terms of all indicators, except of inflation rate that is lower to medium)
C3	Croatia, Greece	*Medium Low* (in terms of all indicators, except of *Pov* that is the highest among the 4 clusters, and *Infl* that is the lowest)
C4	Latvia, Slovak Republic, Czech Republic, Bulgaria, Romania, Estonia, Lithuania, Hungary, Poland	*Low* (in terms of all indicators, except of *Education index* that is medium to high among the 4 clusters, and *Infl* that is the highest)

Source: own process of panel data in Stata

The EU MS with the highest development degrees of the insurance market and quality of life in 2019 are enclosed in Cluster 1, being represented by 10 countries from the old EU countries group, mainly, developed countries (Table 1 and Annex). These countries registered the highest development level of the insurance sector (insurance penetration and insurance density degrees), but also the highest level of quality of life, revealed by the GDP per capita, employment rate, earnings, education and life expectancy indexes, on the one hand, and low to medium values for poverty and inflation, on the other hand.

Medium to high levels of insurance related to quality of life are registered within 6 countries of the EU-27 in 2019, old (Portugal, Italy and Spain) and new EU countries (Slovenia, Cyprus and Malta), which were enclosed in Cluster 2 (Table 1 and Annex). Medium to low degrees of insurance development associated to quality of life are evidenced in 2 EU countries, namely Croatia and Greece (Cluster 3), with the highest poverty rate. The EU MS with the lowest development of insurance field in relation to quality of life are the new EU countries, mainly developing countries (Cluster 4), with the lowest GDP per capita and standard of living, revealed by life expectancy index (Bulgaria and Romania), education index (Romania), and insurance market indicators (Romania and Lithuania).

On the same line, similar results were revealed also by Hammond et al. (1967), considering positive associations among insurance and education, but also by Chang and Lee (2012), Haiss and Sümegi (2008), Peleckienė et al. (2019), Piljan et al. (2018), Dragos et al. (2017), when they analyzed the associations between insurance and economic development, alongside with some socio-economic factors like education or household income.

The results show that *our research hypothesis, (H): "Among the EU-27 MS, there are significant differences in terms of the development of the insurance market and the level of quality of life, with developing countries performing modestly compared to developed countries", is fulfilled.*

5. CONCLUSIONS

Based on these results, we can say that in all EU-27 Member States, the size of the insurance market is interconnected with the quality of life, as the literature underpinnings also revealed, considering various socio-economic factors, such as education, income, poverty or economic development degree. At the same time, however, there are significant differences between the EU-27 countries, so that developing states register modest results, compared with the developed ones.

As such, to stimulate the interdependence between insurance and quality of life, we recommend best practice models applied in countries with the highest performance as entailed by the cluster analysis, namely Finland, Sweden, Belgium, Germany, France, Luxembourg, the Netherlands, Ireland, Austria and Denmark. Thus, Ireland and Luxembourg, in addition to the highest level of economic development, highlighted by the GDP per capita, have an innovative financial sector, with a contribution of over 25% to the value added and over 10% of employment (Commission European Union, 2021). As intervention policies in the lower performing states, we recommend: promoting financial education from primary or lower-secondary educational level, oriented towards financial market products, in general, and on the insurance market, in particular; applying strategies to increase the number of years of participation in education of the population, aimed at both the population under 18 and the population over 18, through continuing education programs; high quality medical services, which contribute to increasing life expectancy, in particular the number of healthy years; reducing the poverty rate through government programs to support low-income people; correlating the skills offered through education with the labor market; extending the ICT application that will support the life insurance and education, as Asongu (2020) proved for African nations.

Education has a key role to play in informing the public about the importance, role and use of insurance products, as well as in shaping risk awareness, as suggested by many scholars (Asongu, 2020; Dragos et al., 2017; Hammond et al., 1967; Sanjeew et al., 2019; Strzelecka et al., 2020). Failure to use insurance products and failure to insure risks by the population and companies such as accidents, diseases or natural disasters, would cause shocks in society with serious consequences that may persist over time, on economic growth and human development / quality of life.

The limits of our research encompass the low availability of certain data for various groups of countries and over a longer time span. Future research consists of an extension of the analysis for the insurance sector in interdependence with the human development index, as a composite indicator representative for economic development that includes the human factor and living standards, by groups of countries, developed and developing ones.

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RAZVOJ OSIGURANJA I KVALITET ŽIVOTA
U ZEMLJAMA EVROPSKE UNIJE. EMPIRIJSKA PROCENA

U literaturi se intenzivno govori o vezi između osiguranja i ekonomskog razvoja, ali sveobuhvatna analiza koja uključuje dimenzije ljudskog kapitala / kvaliteta života je manje razmatrana. Opšti cilj ovog istraživanja je da se proceni stepen razvijenosti sektora osiguranja u interakciji sa reprezentativnim dimenzijama kvaliteta života na nivou država članica Evropske unije (EU) i da se predlože strategije za smanjenje dispariteta između zemalja. Podaci prikazuju reprezentativne pokazatelje koji otkrivaju veličinu tržišta osiguranja, s jedne strane, i dimenzije kvaliteta života, s druge strane, na nivou 2019. Metodologija istraživanja sastoji se od klaster analize sa metodom Ward-a. Glavni rezultati otkrivaju da je na nivou svih država članica EU-27 veličina tržišta osiguranja povezana sa kvalitetom života, sa značajnim razlikama među njima, a zemlje u razvoju imaju skromne rezultate u poređenju sa razvijenim zemljama. Stoga su posebne strategije i politike za ove grupe zemalja najvažnije, kako bi se poboljšalo blagostanje uslugama osiguranja i pokrićem.

Ključne reči: *osiguranje, kvalitet života, humani razvoj, klaster analiza, zemlje Evropske unije*

Annex Summary statistics of cluster analysis, EU-27, 2019

Cluster		IsrP	IsrD	log_ERN	log_GDP_cap	log_Pov	log_Empl_20_64	Ed_I	LE_I	Infl
1	N*	10	10	10	10	10	10	10	10	10
	Mean	1.97498	8.303838	11.07859	10.99462	2.886523	14.311013	0.8941	0.9334	1.41
	Sd*	0.3168224	0.3512955	0.1348109	0.376566	0.0986597	0.0687143	0.048112	0.0162289	0.5486347
2	N*	6	6	6	6	6	6	6	6	6
	Mean	1.684614	7.322756	10.86727	10.29367	3.053104	4.342227	0.825666	0.8931667	0.9
	Sd*	0.2414057	0.3106927	0.3687718	0.1557535	0.2107898	0.0471405	0.048032	0.0177698	0.56921
3	N*	2	2	2	2	2	2	2	2	2
	Mean	0.8908546	6.028876	10.52145	9.824335	3.274825	4.249959	0.827	0.8695	0.65
	Sd*	0.1130301	0.0850915	0.0581357	0.3062545	0.1787171	0.1920662	0.031113	0.026163	0.212132
4	N*	9	9	9	9	9	9	9	9	9
	Mean	0.8463849	5.769811	10.40223	9.682647	3.094687	4.298309	0.845889	0.8642222	2.722222
	Sd*	0.3147887	0.5026441	0.1944272	0.3137697	0.3216062	0.0619225	0.049886	0.0282391	0.5868939
Total	N*	27	27	27	27	27	27	27	27	27
	Mean	1.45395	7.072628	10.7649	10.31484	3.021692	4.309192	0.857852	0.8966667	1.677778
	Sd*	0.5880416	1.186637	0.3668212	0.6498761	0.2428899	0.0722801	0.053991	0.0369667	0.9488184

Note: N – number of countries; Sd – standard deviation

Source: authors' research