

## Space-Time Classification Counters of European Continent in the Context of Development of Cultural Globalization

Monika Hadaś-Dyduch

*University of Economics in Katowice, Poland*

*Department of Statistical and Mathematical Methods in Economics*

### Abstract.

The aim of the article is to identify a group of countries characterized by a similar development of cultural globalization over various time spans, i.e. both in the long term and short term. The analysis described in this article is based on the cultural globalization index. The research analysis was based on wavelet analysis, discrete wavelet analysis and non-linear ordering. Non-linear ordering consists, in geometric terms, in projecting objects placed in a multidimensional space of variables onto a plane. It does not allow the objects to be placed in a hierarchy, but only permits definition of objects similar to each of the objects. A discrete wavelet was used for wavelet analysis of the time series studied. In the process of discrete wavelet transformation, the received signal is divided into so-called approximation and detail. Approximation is then subjected to a subsequent division into further approximation and detail, while details are not subject to further divisions. In this way, the signal is presented as the sum of the approximation of the last level and the details from all levels. In the article, globalization is understood as a process of interaction and integration among the people, companies, and governments of different nations, a process driven by international trade and investment and aided by information technology. This process has effects on the environment, on culture, on political systems, on economic development and prosperity, and on human physical well-being in societies around the world.

**Keywords:** dynamic programming, globalization, internationalization, wavelets, cultural globalization

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### 1. Definition of globalization

Globalization is an important phenomenon because, globalization or the trend of growing worldwide interconnectedness has been accompanied by several clashing notions of cultural difference. The awareness of the world "becoming smaller" and cultural difference receding coincides with a growing sensitivity to cultural difference. The increasing salience of cultural difference forms part of a general cultural turn, which involves a wider self-reflexivity of modernity (see more in Pieterse, 2019).

Globalization, as mentioned above, is an ambiguous concept due to the complexity of the factors that shape it. There is no single definition of globalization because it is a multi-dimensional process that allows for extensive analysis. One definition defines globalization as "a long-term process of integrating an increasing number of economies across their borders taking place in the world, thanks to the expansion and intensification of interconnections, resulting in a global economic system with high interdependence and significant repercussions of actions taken in different countries" (Zorska, 1998, 1998a). Another by definition describes globalization as "the growing penetration of markets and the increase in the internationalization of production, distribution, marketing and exchange. Accompanying this process is reducing access to modern technology and more countries and societies. According to (Palczy, 2004) "globalization processes consist in the expansion of financial markets, goods and services in international and intercontinental dimensions. The phenomena of globalization are accompanied by anti-globalist protests, who are opponents of, in particular, cultural homogenization and standardization of values and socio-moral norms. One of the elements of globalization of identity there is religion. Churches representing universalistic religions create a new dimension of transcultural, interracial and international identification. John Paul II, being a zealous advocate for maintaining the cultural separateness of minority groups, an advocate of pluralism, also recognizes the role and significance of the processes of creating global identity systems for global, planetary, species inclusive. However, according to (Dresher, 2006) globalization is conceptualized as a process that erodes national boundaries, integrates national economies, cultures, technologies and governance and produces complex relations of mutual interdependence.

However, according to another source, globalization "is a process of interaction and integration among the people, companies, and governments of different nations, a process driven by international trade and investment and aided by information technology. This process has effects on the environment, on culture, on political systems, on economic development and prosperity, and on human physical well-being in societies around the world" (Levin Institute, [www.globalization101.org](http://www.globalization101.org)).

When describing globalization processes, many theorists point out their specific nature, defined as contradictory or dialectical. Globalization processes not only combine ambivalent features, but also often generate divergent phenomena and tendencies (Kranz-Szurek, 2012). The consequence of this approach must be that it is difficult to determine any attribute and any consequence of globalization that would not give rise to contradictory assessments (Kranz-Szurek, 2012; Wnuk-Lipiński, 2004). T.L. Friedman sums up this thought in a concise way: "if

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you think that there is [good] or just evil in [globalization], then you don't understand it at all" (Friedman, 2006). Figure 1 shows the intensity of globalization in 2017 in individual countries.

*Figure 1: Intensity of globalisation index in 2017 year.*



*Source: Swiss Economic Institute.*

## 2. Cultural globalization

Some researchers look at the phenomenon of globalization with a large dose of skepticism, emphasizing that the sphere in which the impact of globalization processes raises the most of their fears is culture. Dilemmas appearing in this area relate primarily to the course, manifestations and effects of cultural globalization. This fact should not come as a surprise, because it is culture that is the kind of human activity that so significantly determines the specificity of specific social groups (Kranz-Szurek, 2012).

Multiculturalism is defined as: "coexistence in the same space (or in the immediate vicinity without a clear demarcation, or in the case of aspiration to occupy the same space) two or more social groups with different cultural distinctive features: appearance, language, religious denomination, arrangement values that contribute to the mutual perception of difference with various effects. It is also important that the perception of difference takes place in the optics of individuals, small local, peer or neighbor groups" (Golka, 1997).

It is assumed that the most important consequence of cultural globalization is the increased contact of different cultures, thanks to which some cultural elements are mixed, disseminated

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and sometimes made similar. Searching for an answer to the question about the direction and effects of the changes generated by cultural globalization, it is impossible not to mention such phenomena directly related to it, such as: homogenization (similarity, unification of cultural content), heterogenization (increasing diversity and interdependence) and hybridization (mixing cultural content and, consequently, creating new qualities) (Kranz-Szurek, 2012).

According to Saich (2000, p.209) moreover, cultural globalization mostly refers to the domination of U.S. cultural products. Arguably, the United States is the trend-setter in much of the global socio-cultural realm (see: Rosendorf, 2000, p.111). As an additional proxy for cultural proximity we thus include the number of McDonald's restaurants located in a country. For many people, the global spread of McDonald's became a synonym for globalization itself. In a similar vein, we also use the number of Ikea per country (see: Kluver & Fu 2004; Rosendorf, 2000).

### 3. Empirical material

The study was based on the index of cultural globalization was introduced in 2002 (Dreher, published in 2006) and is updated and described in detail in Dreher, Gaston and Martens (2008). The overall index covers the economic, social and political dimensions of globalization. Following Clark (2000), Norris (2000) and Keohane and Nye (2000), it defines globalization to be the process of creating networks of connections among actors at multi-continental distances, mediated through a variety of flows including people, information and ideas, capital and goods. Globalization, according to (Dreher, 2006) is conceptualized as a process that erodes national boundaries, integrates national economies, cultures, technologies and governance and produces complex relations of mutual interdependence.

The cultural globalization index on which the research is based is a component of:

- trade in cultural goods,
- trade in personal services,
- international trademarks,
- McDonald's restaurant,
- IKEA stores

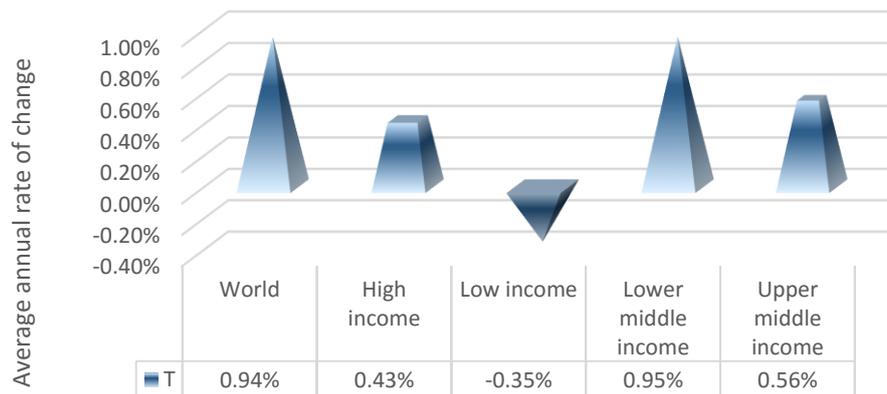
Trade in cultural goods - exports and imports of cultural goods defined as in UNESCO (% of population). Trade in personal services - Exports and imports of personal, cultural and recreational services (% of population). International trademarks - Applications to register a trademark with a national or regional Intellectual Property (IP) office by non residents in percent of all applications. McDonald's restaurant - Number of McDonald's restaurants (% of population). IKEA stores - Number of IKEA stores (% of population).

Cultural globalization is a phenomenon that develops in most countries in the world. Research shows that cultural globalization is increasing by 1.14% on average annually in the world (Figure 2). Figures 3-6 show the evaluation of cultural globalization in the world.

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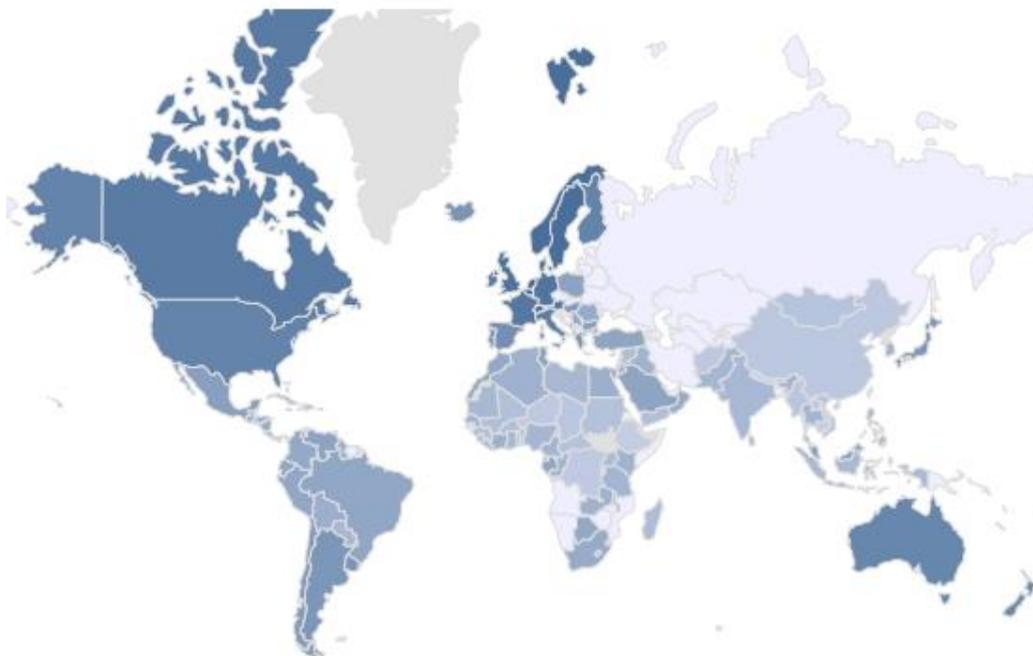
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Figure 2: Average annual rate of change



Source: Own calculations.

Figure 3: Intensity of cultural globalisation index in 1970 year.

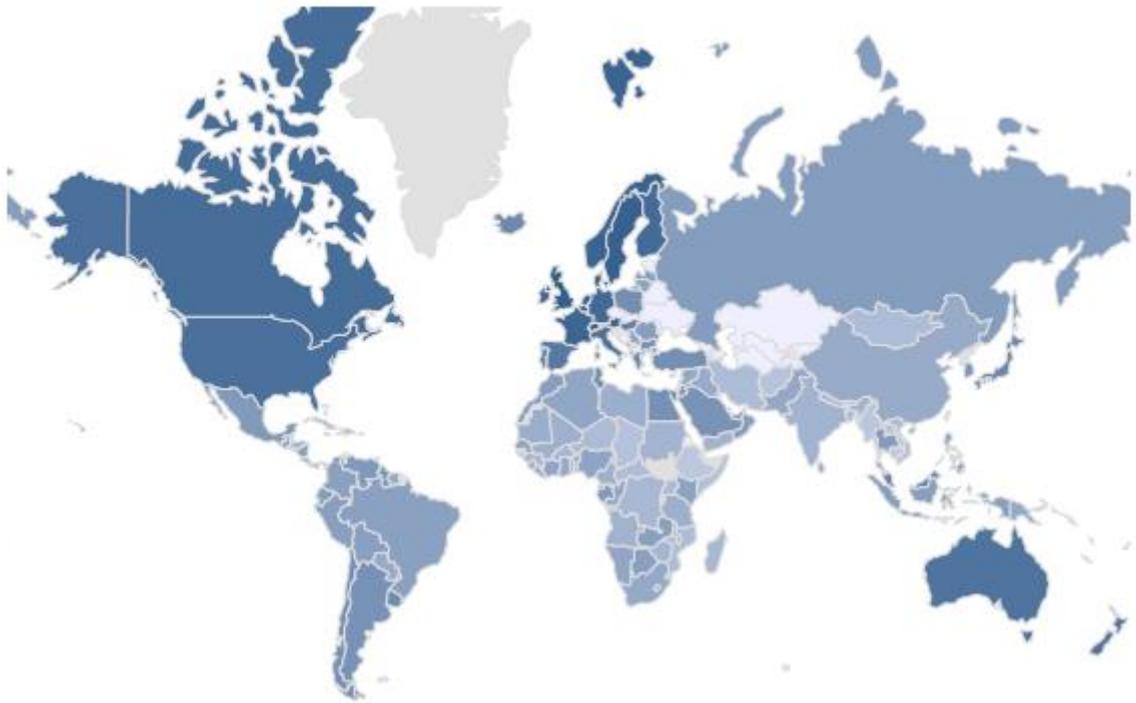


Source: Swiss Economic Institute.

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*Figure 4: Intensity of cultural globalisation index in 1990 year.*

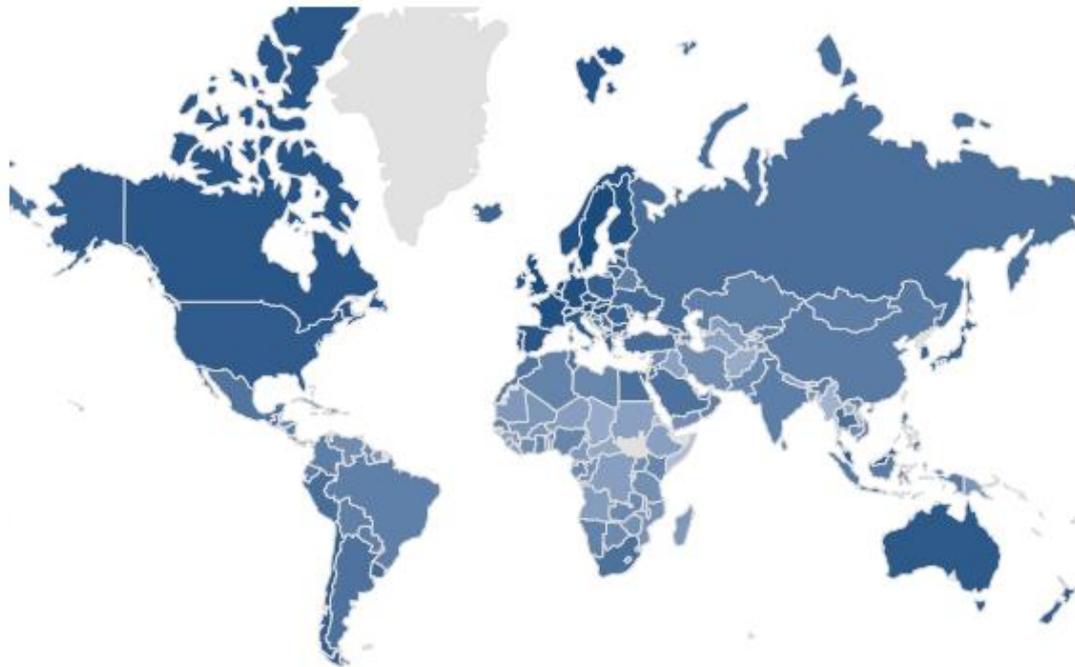


*Source: Swiss Economic Institute.*

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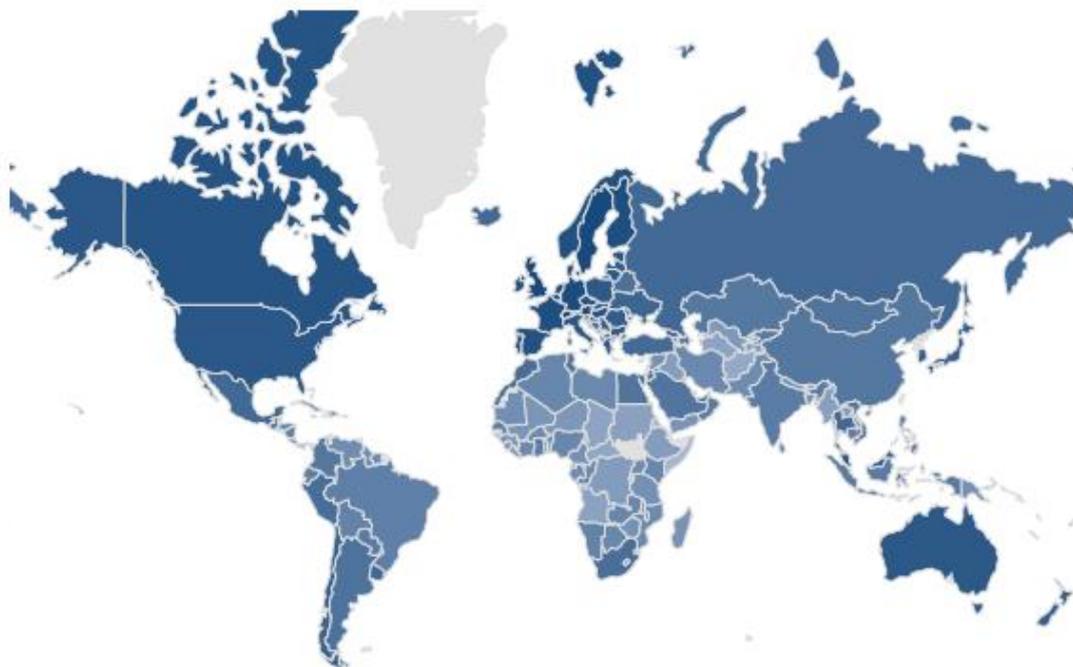
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*Figure 5: Intensity of cultural globalisation index in 2010 year.*



*Source: Swiss Economic Institute.*

*Figure 6: Intensity of cultural globalisation index in 2017 year.*



*Source: Swiss Economic Institute.*

#### **4. Empirical analysis**

The aim of the article is to indicate a group of countries characterized by the underlying development of cultural globalization in various time planes, i.e. both long and short time periods. The study was based on the overall cultural globalization indicator for countries belonging to the European continent. The study (due to the lack of relevant data) did not include such countries as: Kosovo, Macedonia, Moldova, Slovakia, Switzerland, the Vatican and Russia.

##### **4.1 Description of the algorithm**

The research analysis was based on a wavelet analysis with a discrete wavelet (see, among others, Hadaś-Dyduch 2015a, 2015b, 2016a, 2016b, 2016c, 2017) and non-linear ordering. Non-linear ordering consists, from the geometric side, in projecting objects placed in a multidimensional space of variables into a plane. It does not allow to set the hierarchy of objects, but only to define for each of the objects, similar objects (see more in (Hadaś-Dyduch 2019b)).

Wavelets we call function  $\Psi(x) \in L^2(\mathbb{R})$ , such that the system function:

$$B_\Psi = \left\{ 2^{\frac{j}{2}} \Psi(2^j x - k) \right\}; \quad j \in \mathbb{Z}, \quad k \in \mathbb{Z} \quad (1)$$

is an orthonormal basis in the space  $L^2(\mathbb{R})$ . Family  $B_\Psi$  is called wavelet base (see more in (Hadaś-Dyduch, 2019a, 2019b)).

Wavelet analysis and nonlinear ordering were used for the study. The algorithm constructed for this study was subjectively named WWK. The algorithm combines wavelet analysis with nonlinear ordering. Wavelet analysis in the described algorithm allows the decomposition of the series, and then the evaluation of the phenomenon in various time oscillations around the trend. On the other hand, the introduction to the non-linear ordering algorithm allows for classification of series obtained from the wavelet analysis, into clusters according to oscillations around various time trends. Thus, the ranks were first expanded to include a number of observations equal to a multiple of 2. Then the algorithm of a discrete wavelet transform was applied. The obtained coefficients were introduced into the classification algorithm, obtaining on the output clusters of countries with the closest links around the 2-year trend. Then further wavelet decomposition was made, obtaining the coefficients necessary to create clusters containing countries with the closest oscillation around the 4-year trend. The central idea of the wavelet transform analysis in this algorithm is to decompose a signal into different levels of resolution (this process is known as multiresolution). The multiresolution representation provides a simple hierarchical framework for the interpretation of the information in the time series. At different resolutions, the details of a signal usually characterize different physical structures of themselves. At a coarser resolution, these details generally characterize large structures that provide information and with the increase of the resolution finer details are obtained (see (Hadaś-Dyduch, 2019a)).

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### 4.2 Result of empirical analysis

The study was carried out in accordance with the algorithm presented above. The analysis shows that the development of cultural globalization in Poland is the closest to development in such countries as: Italy, Bulgaria, Romania, Spain, France, Greece, Malta, Lithuania, Andorra, Hungary. The least development of cultural globalization in Poland is associated with the development in the following countries of the European continent: Austria, Liechtenstein, Finland, Germany, Iceland, Sweden, Norway, Montenegro, the Czech Republic, Denmark (see Table 1). The study (due to the lack of relevant data) did not include such countries as: Kosovo, Macedonia, Moldova, Slovakia, Switzerland, the Vatican and Russia.

*Table 1: Ranking of similarities to Poland of the countries belonging to the European continent in the context of cultural globalization*

Place in the ranking	2-year trend	4-year trend	8-year trend
1	Lithuania	Bulgaria	Ireland
2	<b>Bulgaria</b>	United Kingdom	<b>Bulgaria</b>
3	Ukraine	Slovenia	Hungary
4	Ireland	Austria	United Kingdom
5	France	Hungary	Malta
6	Hungary	France	Latvia
7	Slovenia	<b>Belgium</b>	<b>Belgium</b>
8	Austria	Netherlands	Estonia
9	United Kingdom	Italy	France
10	Estonia	Germany	Italy
11	Croatia	Ireland	Netherlands
12	Italy	Sweden	Spain
13	Latvia	Finland	Romania
14	Belarus	Portugal	Portugal
15	Germany	Estonia	Austria
16	Norway	Lithuania	Croatia
17	Spain	Romania	Sweden
18	Albania	Latvia	Andorra
19	Romania	Malta	Bosnia and Herzegovina
20	Belgium	Norway	Belarus
21	Serbia	Andorra	Germany
22	Bosnia and Herzegovina	Belarus	Slovenia
23	Sweden	Bosnia and Herzegovina	Norway
24	Greece	<b>Ukraine</b>	<b>Ukraine</b>
25	Netherlands	Spain	Cyprus

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26	Luxembourg	Albania	Finland
27	Portugal	Luxembourg	Serbia
28	Malta	Croatia	Luxembourg
29	Finland	Cyprus	Albania
30	Cyprus	<b>Greece</b>	<b>Greece</b>
31	<b>Denmark</b>	<b>Denmark</b>	Lithuania
32	Czech Republic	Serbia	Iceland
33	Iceland	Czech Republic	Denmark
34	Liechtenstein	Iceland	Czech Republic
35	Andorra	<b>Liechtenstein</b>	<b>Liechtenstein</b>

*Comment: The study (due to the lack of relevant data) did not include such countries as: Kosovo, Macedonia, Moldova, Slovakia, Switzerland, the Vatican and Russia.*

*Source: Own elaboration.*

In the two-year trend, the development of cultural globalization is most similar to Poland in the following countries: Lithuania, Bulgaria, Ukraine, Ireland, France, Hungary, Slovenia, Austria, Great Britain, Estonia. However, the least similar development to Polish development is in the following countries: Luxembourg, Portugal, Malta, Finland, Cyprus, Denmark, the Czech Republic, Iceland, Liechtenstein, Andorra (see Table 1).

Analyzing the 4-year trend, among countries with a similar development trend to Poland in the field of cultural globalization, we can mention: Bulgaria, Great Britain, Slovenia, Austria, Hungary, France, Belgium, the Netherlands, Italy, Germany. On the other hand, the countries in the 4-year trend are the least related to the development of cultural globalization in Poland: Albania, Luxembourg, Croatia, Cyprus, Greece, Denmark, Serbia, the Czech Republic, Iceland, and Liechtenstein (see Table 1).

In the eight-year trend, the development of cultural globalization is most similar to Poland in the following countries: Ireland, Bulgaria, Hungary, Great Britain, Malta, Latvia, Belgium, Estonia, France, Italy. However, it is the least similar in the following countries: Serbia, Luxembourg, Albania, Greece, Lithuania, Iceland, Denmark, Czech Republic, Liechtenstein, Montenegro (see Table 1).

It can be seen that the development of cultural globalization in Poland is similar to the development of cultural globalization in Bulgaria in both the short-term (2-year trend) and long-term (8-year trend). Bulgaria is one of the most similar countries to Poland in terms of cultural globalization. Countries such as Belgium, Ukraine, Greece and Liechtenstein are close to the development of cultural globalization in Poland in the long-term trend, both 4-year and 8-year (see Table 1).

### 5. Conclusion

Globalization is not a new issue. "For thousands of years, people and, later, corporations have been buying from and selling to each other in lands at great distances, such as through the famed Silk Road across Central Asia that connected China and Europe during the Middle Ages. Likewise, for centuries, people and corporations have invested in enterprises in other countries. In fact, many of the features of the current wave of globalization are similar to those prevailing

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before the outbreak of the First World War in 1914. But policy and technological developments of the past few decades have spurred increases in cross-border trade, investment, and migration so large that many observers believe the world has entered a qualitatively new phase in its economic development. Since 1950, for example, the volume of world trade has increased by 20 times, and from just 1997 to 1999 flows of foreign investment nearly doubled, from \$468 billion to \$827 billion. Distinguishing this current wave of globalization from earlier ones, author Thomas Friedman has said that today globalization is “farther, faster, cheaper, and deeper.” (Levin Institute, [www.globalization101.org/](http://www.globalization101.org/))“.

Like every process, including globalization, it has consequences not only for modern society, but also for the next generation. These are both positive and negative consequences. It should be noted that what for some is positive for others can mean disaster, because it depends on man's approach to modern technologies, gender, migration, emigration, terrorism etc. issues. Every citizen is different. It has a different "moral backbone" and other social, ethical and moral values that fundamentally affect the views and acceptance of current events.

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