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## **CHALLENGES OF SOCIAL ACCOUNTING IN THE SPHERE OF THE MEASUREMENT OF NATIONAL INTELLECTUAL CAPITAL (NIC)**

The aim of the paper is to present the problem of measuring intellectual capital in the perspective of social accounting that is used for recognizing economic processes in the macroeconomic scale. The realization of the purpose took place on the basis of the analysis of literature and documents published by international organizations. The conducted research enabled formulation of the assumption that the measurement of intellectual capital is a difficult task and is related to the complex character of this category. So far no one has formed such definition of national intellectual capital that would be universally accepted and would clearly specify its scope. Additionally, there is no agreement as regards the taxonomy of NIC, owing to which the components of intellectual capital specified by particular authors are varied. Despite the indicated difficulties the techniques of social accounting and their applications must be constantly developed so that they enabled the measurement of NIC. Therefore, there are undertaken initiatives that aim at elaborating both methods and techniques that will enable the measurement of NIC. From the perspective of social accounting particular importance is attached to those initiatives that are undertaken by international institutions.

**Keywords:** social accounting, national intellectual capital (NIC), the measurement of NIC.

### **1. INTRODUCTION**

National intellectual capital is the economic category that arouses considerably more interest not only due to its theoretical, but also practical aspect. Apart from financial capital, it decides upon economic prosperity<sup>3</sup>. It is considered as one of the most important factors of the competitiveness of knowledge-based economies<sup>4</sup>. However, intellectual capital is a complex category. There are misgivings regarding the character of intellectual capital –

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<sup>3</sup> N. Bontis, *National intellectual capital index: a United Nations initiative for the Arab region*, "Journal of Intellectual Capital" 2004, Vol. 5 (1), p. 15.

<sup>4</sup> R. Labra, M.P. Sánchez, *National intellectual capital assessment models a literature review*, "Journal of Intellectual Capital" 2013, Vol. 14 (4), p. 584.

“whether it is a separate type of capital or it functions rather on the semantic level and maps the already well known categories of capital, such as human capital”<sup>5</sup>. The complexity results also from the fact that the research conducted in this sphere regards chiefly intellectual capital in microeconomic perspective (of an enterprise). At the same time the macroeconomic aspect of intellectual capital remains overlooked.

Despite the increasing importance of intellectual capital in creating wealth, creating competitive advantage and creating market values in the form of both production and consumption goods there remains the unsolved problem regarding its definition, taxonomy, measurement or reporting.

The most complex scientific area (taking into consideration the macroeconomic dimension of intellectual capital) is the measurement of it. It is determined by the abstract character of this concept, but chiefly by the non-material, invisible internal complexity and non-uniform character. Additionally, it is due to the fact that intellectual capital is a multi-dimensional category, the description of which requires many variables.

The measurement of NIC constitutes one of the most important scientific tasks, which is confirmed by the fact that “the government of each country ought to know both the weak and strong points regarding intellectual capital in order to be capable of shaping its regulatory policy, and as the consequence ensure the realization of appointed targets related to both the development and improvement of social prosperity within the frameworks of particular regional policies”<sup>6</sup>.

The aim of the paper is to present the problem of measuring national intellectual capital in the perspective of social accounting that is used for analyzing economic processes in the macroeconomic scale.

## 2. THE ESSENCE OF SOCIAL ACCOUNTING IN MACROECONOMIC PERSPECTIVE

Presently accounting is considered as legally conditioned information system based on numerical illustration of financial situation and achievements of the economic entity. However, accounting has a broader dimension – namely it is macroeconomic. In this perspective a suitable term is: social accounting<sup>7</sup>. From the social point of view accounting captures economic events irrespective of the real bases. This phenomenon was adequately defined by W. Handel who claimed that “things may exist regardless of whether they were recognized in accounting but they do not exist for the society unless they were recognized in accounting. On the other hand, certain items (events) may not exist in the reality, but may have social importance when they were recognized in accounting [...]. In this way accounting describes (considers and measures) economic reality, whereas at the same time, from the social perspective this description is becoming the economic reality. [...]. Irrespective of the accuracy and precision of measuring the reality accounting defines and specifies the reality in such way that on the basis of the image (reality) created by accounting society makes choices”<sup>8</sup>.

<sup>5</sup> M. Wosiek, *Kapitał intelektualny w rozwoju regionów Polski Wschodniej*, Rzeszów 2012, p. 17.

<sup>6</sup> D. Węziak-Białowolska, *Model kapitału intelektualnego regionu, Koncepcja pomiaru i jej zastosowanie*, Warszawa 2010, p. 11.

<sup>7</sup> There are used also such terms as: national accounting, social accounting system, macro accounting.

<sup>8</sup> C. Deegan, J. Unerman, *Financial Accounting Theory*, London 2006, p. 186.

In the macroeconomic perspective accounting is used for capturing economic processes in the macroeconomic scale<sup>9</sup>. It reflects the way of measuring the effects of economic activity in the scale of the entire economy. According to Richard and Stone "social accounting deals with comprehensive and ordered presentation of facts from economic life in such way that they correspond to those categories that occur in the theory of economics and may be used for economic analysis"<sup>10</sup>.

Social accounting constitutes the extensive system of information on economy within the frameworks of which there is collected data that is later on subjected to classification and aggregation on the basis of various criteria. From the macroeconomic perspective social accounting<sup>11</sup>:

1. Supports the creation of the general image of economic system that enables understanding why it functions and in what way. Social accounts show clearly the rate of growth and possible fluctuations that may be properly specified. They classify and sum up various transactions taking place in economy in a purposeful way;
2. Provides specific information regarding the functioning of economies that are becoming more complex, while the necessity to receive complete and precise information is becoming particularly crucial.
3. Formulates the basic characteristics of the economic surrounding that may change rapidly. Social accounting enables clear and scientific way of analyzing economic fluctuations and forecasting the future level of incomes or the activity level.

Information ensuing from social accounting constitute the basis for analyzing the trends taking place in the general economic background. Additionally, they constitute the basis for comparisons of socio-economic development between various countries. Therefore, the accounts conducted within the frameworks of social accounting ought to provide information enabling the assessment of changes taking place in economy in the future and its present state, which constitutes the basis for the anticipation of the potential directions of changes and the effects of conducting certain policies. Therefore, the range of stored information as well as the criteria of processing it ought to have interactive and dynamic character. They ought to be adjusted to the changing reality<sup>12</sup>.

The increasing importance of intellectual capital in the development of economies or in the creation of competitive advantage reinforces the necessity to quantify intellectual capital within the frameworks of social accounting. It is particularly important with regards to knowledge-based economies where the development depends more seldom on financial or physical capital. There is observed growing importance of human capital, knowledge, scientific achievements and other non-material resources creating intellectual capital. It is visible in the research conducted in this area (table 1).

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<sup>9</sup> Z. Kowalczyk, *Rachunkowość społeczna a polityka ekonomiczna państwa kapitalistycznego*, Warszawa 1967, p. 34.

<sup>10</sup> *Social Accounting of National Income (With Diagram)*, <http://www.economicdiscussion.net/national-income/social-accounting/social-accounting-of-national-income-with-diagram/7637>.

<sup>11</sup> *Ibidem*.

<sup>12</sup> M. Plicha, *Rachunki narodowe. Wybrane problemy i przykłady zastosowań*, Uniwersytet Łódzki, GUS 2007.

Table 1. Economic categories determined by national intellectual capital in both application and theoretical perspective

Economic category	Authors	Examples
<b>Application perspective</b>		
<b>Economic development</b>	Węziak-Białowolska (2010)	The analysis of the linear correlation with selected measures of economic development (employment rate, GDP <i>per capita</i> , sold production of industry per 1 inhabitant).
	Edvinsson Lin (2011)	Analysis of the correlation of NICI from GDP <i>per capita</i> .
	Navarro Ruiz Peña Badea Grigorescu Voinea (2011)	Analysis of the correlation of NICI from GDP <i>per capita</i> ; elaboration of the indicator and ranking of the meter taking into consideration NIKC and GDP.
	Seleim Bontis (2013)	Analysis of the correlation of NIC components (human capital, structural capital, relation capital) with GDP <i>per capita</i> and export of goods and services.
	Navarro Ruiz Peña (2014)	Analysis of the correlation of NICI from GDP <i>per capita</i> .
	Phusavat Comepa Sitko-Lutek Ooi (2012)	Analysis of the correlation of NICI from GDP <i>per capita</i> .
<b>Socio-economic growth</b>	Bontis (2004)	Comparison of the value of NICI with the value of HDI indicator.
<b>Economic growth</b>	Bounfour Stähle (2008)	Analysis of multi-layer relation between the indicators of NIC and the annual increase of GNP.
<b>Theoretical perspective</b>		
<b>Economic development</b>	Seleim Bontis (2013)	„... sustains economic growth and development.”
	Andriessen Stam (2005)	„... sets the direction for the future economic development”
	Rusu-Tanasă (2015)	„... constitutes value for economic development.”
<b>Sustainable development</b>	Ogrean Herciu (2006)	„... Is one of the most important sources of sustainable economic development.”
<b>Prosperity</b>	Bontis (2004)	“...improvement of the future prosperity”
	Edvinsson Lin (2011)	„...important source of welfare”
<b>Wealth</b>	Bontis (2004)	„...potential source of wealth creation”
	Edvinsson Lin (2008/2011)	„... may be used for creating wealth”
	Labra Sánchez (2013)	„... the most important source for creating wealth”
<b>Competitiveness, competitive advantages</b>	Stahle Stahle (2006)	„...source of economic competitiveness”
	Edvinsson (2004)	„...source of competitive advantages and the potential of the future national wealth”
	Andriessen Stam (2008)	“Non-material resources ... offering relative advantage...”

Own elaboration on the basis of: D. Andriessen, C. Stam, *Intellectual capital of the European Union 2008: measuring the Lisbon Strategy for growth and jobs*, “Journal of Knowledge Management”

2008, Vol. 7 (4), p. 490; N. Bontis, *National intellectual capital index: a United Nations initiative for the Arab region*, "Journal of Intellectual Capital" 2004, Vol. 5 (1), p. 14; L. Edvinsson, C. Lin, *National Intellectual Capital: A Comparison of the Nordic Countries*, "Journal of Intellectual Capital" 2008, Vol. 9 (4), p. 526; L. Edvinsson, C. Lin, *National Intellectual Capital: A Comparison of 40 Countries*, Springer Science+BusinessMedia, 2011, p. 253, 258; R. Labra, M.P. Sánchez, *National intellectual capital assessment models a literature review*, "Journal of Intellectual Capital" 2013, Vol. 14 (4), p. 582; J.L.A. Navarro, V.R.L. Ruiz, D.N. Peña, L. Badea, A. Grigorescu, L. Voinea, *Measurement of national non-visible wealth through intellectual capital*, "Romanian Journal of Economic Forecasting", 2011, Vol. 14 (3), p. 204; M. Rusu-Tanasă, *Intellectual capital a strategic factor of socio-economic development of regions and countries*, "Procedia Economics and Finance", 2015, No 27, p. 372; M. Herciu, C. Ogrea, *Wealth, Competitiveness, and Intellectual Capital – Sources for economic Development*, "Procedia Economics and Finance" 2015, Vol. 27, p. 559–560; A. Seleim, N. Bontis, *National intellectual capital and economic performance: Empirical evidence from developing countries*, "Knowledge and Process Management" 2013, Vol. 20 (3), p. 132, 136; P. Ståhle, A. Bounfour, *Understanding dynamics of intellectual capital of nations*, "Journal of Intellectual Capital" 2008, Vol. 9 (2), p. 167; D. Weziak-Białowolska, *Model kapitału intelektualnego regionu, Koncepcja pomiaru i jej zastosowanie*, Warszawa 2010, p. 125.

The presented examples are not satisfactory for the entire spectrum of research<sup>13</sup>, but they indicate the purposefulness of supplementing factors that determine socio-economic development, competitiveness or other economic categories with non-material resources creating intellectual capital, the sources of which ought to have endogenic character in the long-term model of economy.

### 3. THE MEASUREMENT OF NATIONAL INTELLECTUAL CAPITAL – THE ESSENCE OF THE PROBLEM

In order to show the impact of intellectual capital on national economic results there are made attempts to elaborate instruments that will facilitate the measurement of intellectual capital. However, this challenge is difficult - taking into consideration the complex character of intellectual capital. So far there has not been formulated any definition of intellectual capital that would be universally accepted and clearly specified its scope. As the consequence, the concept of national intellectual capital is interpreted in a subjective way. Nevertheless, as regards the definition dimension there may be noticed the compliance of authors in the context of understanding national intellectual capital<sup>14</sup>:

- 1) NIC is invisible, non-material, concealed and sensually elusive;
- 2) its resources are located in human beings, i.e. in country's inhabitants, i.e. in Man. In some definitions they are aggregated into larger units and segmented into certain groups;

<sup>13</sup> The research is conducted also by international organizations, whereas the assessment concerns: knowledge (KAM – World Bank), innovations (GII – INSEAD), competitiveness (GCI – WEF; WCI – International Institute of Management Development), social development (HDI – UNDP), the efficiency of innovations (IUS – EU), prosperity and social aid (SMS – initiative of the government in Denmark) (R. Labra, M.P. Sánchez, *National intellectual capital assessment models a literature review*, "Journal of Intellectual Capital" 2013, Vol. 14 (4), p. 591, 595).

<sup>14</sup> G. Michalczuk, J. Fiedorczuk, *Analysis of conceptualization and taxonomy of division of national intellectual capital (NIC)*, "Entrepreneurship and Management" 2017, No. XVIII (1), p. 216.

- 3) NIC has forward-looking character of the usefulness of intellectual capital (“future growth”, “potential source of generating wealth”);
- 4) the essence of NIC is explained using the expressions referring to the present and future state;
- 5) for defining NIC authors use both static and dynamic expressions.

There is no conformity also with regards to NIC taxonomy. The components of national intellectual capital identified within the frameworks of conducted research are varied. It results from the individual approach of the Authors to the aggregation level, the degree of pattern adaptation or the evolution of models in time perspective. Simultaneously one may observe considerable diversification in the division of NIC. The amount of components oscillates from two (human capital and structural capital) Edvinsson and Malone (1997); Rembe (1999); Pasher, Shachar (2004, 2007) to seven Navarro et al. (*Measurement of national non-visible...*, 2011). Additionally, there are suggested solutions based on multi-level models – Malhotra (2003); Navarro et al. (*An alternative to measure...*, 2011); Phusavat et al. (2012).

The lack of universal definition of intellectual capital and its uniform taxonomy is dictated by its specific properties which were presented in table 2.

Table 2. Basic characteristics of intellectual capital

Properties	Characteristic
<b>The lack of material form</b>	It is impossible to directly notice, capture or define IC by using only the basic senses. What can be observed are only its symptoms.
<b>Limitless availability</b>	IC does not use up, but on the contrary – it becomes more valuable just as it is being used. It may be used many times without causing any loss of its value.
<b>Is not consumed in the course of time</b>	Non-material resources creating intellectual capital are characterized by varied period of their economic usefulness. In many cases the duration of its usage period determines higher value on the market.
<b>Accessibility</b>	Non-material resources creating intellectual capital are easily penetrable, which causes their greater accessibility. This provides the possibility of creating additional benefits because simultaneous usage by many users does not reduce their utility value and also does not require replacement of them by other resources.

Source: own elaboration on the basis of: G. Michalczuk, *Zasoby niematerialne jako czynnik wartości przedsiębiorstwa. Luka informacyjna sprawozdawczości finansowej*, Białystok 2013, p. 79–81.

Apart from the discussed properties intellectual capital is characterized by other characteristics: it is knowledge-based, not fully identifiable and has internally diversified structure. Despite difficulties resulting from its specific character there are made attempts regarding the elaboration of methods and instruments for measuring intellectual capital in the macroeconomic perspective. The purposefulness of measuring intellectual capital in macroeconomic scale was indicated by Malhotra<sup>15</sup> who claims that efficient management of development process may not be based solely on material factors. Additionally, the scientist emphasizes

<sup>15</sup> Y, Malhotra, *Knowledge assets in the global economy: assessment of national intellectual capital*, “Journal of Global Information Management” 2000, Vol. 8 (3), p. 4.

that the measurement of intellectual capital requires planning, elaborating and implementing management systems of knowledge or information and the understanding of the insufficiency of traditional methods of estimating wealth<sup>16</sup>. Another scientist, Bontis, underlines that the creation of the system serving the description, measurement and tracking of national intellectual capital will enable governments more adequate management of non-material resources<sup>17</sup>.

The first research on the measurement of national intellectual capital was conducted by in Sweden in 1996 C. Stenfelt and M. Jarehov and was supervised by L. Edvinsson<sup>18</sup>. It aimed at the quantification of those factors that decide upon the future success of Sweden. Skandia Navigator was used in the research.

Considerable contribution to the research on the measurement of national intellectual capital is also ascribed to: Rembe (1999); Pasher (1999); Pasher and Sachar (2004; 2007); Edvinsson (2004); Malhotra (2003); Bontis (2004); Andriessen and Stam (2005; 2009); Węziak (2007; 2010); Edvinsson and Lin (2008, 2011); Navarro et al. (2011; 2014); Käpylä et al. (2012). However, for the time being the universal methodology regarding the measurement of national intellectual capital has not been elaborated. An interesting aggregation of the methods of measuring NIC was offered by V. Januskaite and L. Uziene (table 3.)

Table 3. The aggregation of methods of measuring national intellectual capital (NIC)

<b>Effect of using the methodology</b>		
Benchmarking NIC	Integrated indicator of competitiveness or innovation	Recommendations of strategic character that constitute the instrument of support in the management process
<b>Examples</b>		
Bounfour (Intellectual capital dynamic value)	UNDP (Human Development Index)	Pasher Shachar (IC report)
Bontis (National Intellectual Capital Index)	WEF (Global Competitiveness Index – GCI)	Schneider (National Knowledge Report – NKR)
Węziak (Intellectual Capital Index)	UE (Innovation Union Scoreboard – IUS)	Käpylä et. al. (National Intellectual Capital Performance)
Lin Edvinsson (National intellectual capital – NICI40)	World Bank (Knowledge Assessment Methodology – KAM)	
Navarro Ruiz Pena (National Index of Knowledge Capital – NIKC)		

Source: own elaboration on the basis of: J.L.A. Navarro, V.R.L. Ruiz, D.N. Peña, *An alternative to measure national intellectual capital adapted from business level*, "African Journal of Business

<sup>16</sup> *Ibidem*, p. 5.

<sup>17</sup> N. Bontis, *National intellectual capital index: a United Nations initiative for the Arab region*, "Journal of Intellectual Capital" 2004, Vol. 5 (1), p. 14.

<sup>18</sup> L. Edvinsson, C. Stenfelt, *Intellectual Capital of Nations – for Future Wealth Creation*, "Journal of Human Resource Costing & Accounting" 1999, Vol. 4 (1).

Management” 2011, Vol. 5 (15), p. 204; V. Januskaite, L. Užiene, *Intellectual Capital Measurements and National Strategy Development: Explaining the Gap*, “Procedia Social and Behavioral Sciences” 2015, No. 213, p. 163.

The first group is “NIC benchmarking”. The main aim of benchmarking research is the operationalization of the national intellectual capital and comparison of the level of some elements of NIC in the international cross-section<sup>19</sup>. Benchmarking tests are made also for the assessment of changes in the value of NIC in time perspective. Second group regards the methods based on measurement thanks to “the integrated indicators of competitiveness and innovation”. Third approach to the measurement of national intellectual capital is based on elaborating information that will be used in the process of management and development of national strategies.

Another division of measuring methods enables their aggregation into two groups<sup>20</sup>:

- 1) methods adapted from the level of enterprises, based chiefly on the tool Skandia Navigator - Rembe (1999), Bossi et al. (2005), Lin and Edvinsson (2008);
- 2) methods being a certain type of analyzing the competitiveness of economies, as the consequence of which there are specified indicators at macroeconomic level – „European Scoreboard” (2000), Atkinson (2002), World Bank (2006).

Additionally, the methods concerning the classification and measuring of intellectual capital may be divided into those<sup>21</sup>:

- 1) being the result of research conducted by the group of scientists and specialists of “academic models”;
- 2) elaborated by international organizations and aiming at the analysis of competitiveness, innovative skills and development at the level of national economies – „international organization models”.

From the perspective of social accounting considerable importance is attached to the initiatives undertaken by international organizations. “Undoubtedly, the merit of international organizations is systematic definition of the way of measuring and listing indicators for each category of non-material resources (...). The activities of these organizations play a crucial role also in setting directions as regards collection of data in the system of public statistics”<sup>22</sup>. The characteristic of methods elaborated by international organizations is presented in table 4.

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<sup>19</sup> H. Salonijs, A. Lonnqvist, *Exploring the policy relevance of national intellectual capital information*, “Journal of Intellectual Capital” 2012, Vol. 13 (3).

<sup>20</sup> J.L.A. Navarro, V.R.L. Ruiz, D.N. Peña, L. Badea, A. Grigorescu, L. Voinea, *Measurement of national non-visible wealth through intellectual capital*, “Romanian Journal of Economic Forecasting” 2011, Vol. 14 (3), p. 200.

<sup>21</sup> R. Labra, M.P. Sánchez, *National intellectual capital assessment models a literature review*, “Journal of Intellectual Capital” 2013, Vol. 14 (4), p. 587.

<sup>22</sup> M. Wosiek, *Kapitał intelektualny w rozwoju regionów Polski Wschodniej*, Rzeszów 2012, p. 40.



Table 4. Characteristic of method related to the measurement of NIC

Method	Characteristic
Knowledge Assessment Methodology (CAM)	Instrument used for the identification of strong and weak points in creating KBE. The indicators elaborated within its frameworks may be used for the measurement of national intellectual capital. They comprise two aggregated indicators: 1. Knowledge Economy Index (KEI) enables the specification of the general level of development aiming towards knowledge-based economy. It constitutes the arithmetic mean of normalized indicators of pillars related to KBE. 2. Knowledge Index enables the measurement of the country's ability to create and adapt knowledge. It constitutes the arithmetic mean of variables regarding education, human resources and ITC innovation system. There are used three variables from each pillar.
Global Innovation Index (INSEAD)	Provides specific data on the innovative character of economies on the global scale. This index aims at capturing the multidimensional character of innovation and providing instruments that may be useful in adjusting policies in the context of promoting long-term increase of production, improving the efficiency and increasing employment rate. GII constitutes the aggregated result obtained from 81 indicators reflecting the phenomena related to the political environment, education, infrastructure or the business environment. The index is based on seven pillars: institutions; human capital and research; infrastructure; market sophistication, business sophistication, results in terms of knowledge and technology, results of creativity.
Global Competitiveness Index (WEF)	Used for analyzing economies in terms of selected factors of competitiveness. The index enables the identification of institutions determining the improvement of efficiency, which, in turn, is the main determinant of long-term increase, essential factor of economic growth and prosperity. GCI ranking constitutes the instrument that facilitates the understanding of complex and multi-dimensional character of the development process. The construction of GCI index is composed of 12 pillars (institutions; infrastructure; macroeconomic surrounding; health and education; higher education and trainings; the effectiveness of the market of goods; the effectiveness of the labor market; the development of the financial market; technological preparedness; the size of the market; the sophistication of the business environment, innovations). In order to identify the stage of economy development there is used, among others, the level of GDP <i>per capita</i> .
World Competitiveness Index (International Institute for Management Development)	Enables the analysis and ranking of countries in terms of the way they manager their competences in order to achieve long-term value. This instrument enables the assessment of economies not only from the perspective of GDP and productivity, but mostly in terms of the political, social and cultural environment taking into consideration the information regarding the infrastructure, institutions and politics. WCI rankings are based on 260 indicators, among which two third come from hard data such as national statistics concerning employment and trade. One third – from the opinion poll (corruption, environmental issues and the standard of living). In the process of calculating WCI there are used more than 340 criteria of competitiveness selected on the basis of integrated research. These criteria are regularly updated. On their basis there is created ranking of factors and later on also the ranking of WCI.

Table 4 (cont.). Characteristic of method related to the measurement of NIC

Method	Characteristic
Human Development Index (UNDP)	Is based on the assumption that it is not economic growth but human capital (people and their possibilities) ought to be the ultimate criteria for the assessment of national development. HDI indicator is composed of three pillars: related to health, education and the standard of living. Health-related dimension is evaluated on the basis of the life expectancy. The measured education-related dimension is the average of the years of education for adults (more than 25 years old) and the expected years of education for children starting the school education. The standard of life dimension is measured on the basis of gross national income per 1 inhabitant. HDI uses the logarithm of income in order to reflect the decreasing importance of income along with the increase of DNB. The results of indexes for three dimensions of HDI are then aggregated to the complex index by using the average.
Innovation Union Scoreboard (UE)	Instrument serving the measurement of the effectiveness of research and development sphere and its ability to generate innovations. The method based on partial indicators on the basis of which there is calculated cumulative index of innovativeness as the weighted average of normalized indicators.
Science, Technology, and Industry Outlook (OECD)	Enables showing in what way the digital transformation affects science, innovations, economy and the way people work and live. The indicator is supposed to support governments in elaborating more efficient policies in the sphere of science, innovations and industry in the quickly changing digital era. The index uses approx. 200 specific indicators in six areas: 1) knowledge economics and digital transformation 2) knowledge, talents and abilities 3) scientific perfection and cooperation 4) innovation in the private sector 5) leadership and competitiveness 6) society and digital transformation.

Source: own elaboration on the basis of: IMD World Competitiveness Center, *Methodology And Principles Of Analysis*, file:///C:/Users/User/Downloads/methodology-and-principles-wcc-2017.pdf, s. 3, 5, 7, 8; OEDC, *OECD Science, Technology and Industry Scoreboard 2017*, <http://www.oecd-ilibrary.org/docserver/download/9217081e.pdf?expires=1519720153&id=id&accname=guest&checksum=D5B07B7C1F6EA8D57C78D67132E1E887>; T. Radjenovic, B. Krstic, *Measuring Intellectual capital of national economies*, "ЕКОНОМИКА" 2017, Vol. 63 (2), p. 38; UNDP <http://hdr.undp.org/en/content/human-development-index-hdi>; *The Global Innovation Index 2017. Innovation Feeding the World*; INSEAD, file:///C:/Users/User/Downloads/gii-full-report-2017.pdf, s. 433, 434–444, 449; WEF, *Methodology and Computation of the Global Competitiveness Index 2017–2018*, <http://www3.weforum.org/docs/GCR2017-2018/04Backmatter/TheGlobalCompetitivenessReport2017–2018AppendixA.pdf>, p. 1–5.

#### 4. CONCLUSION

Social accounting is the basic source of information enabling the conclusion of the entire economic vision. Nevertheless, the paper draws attention to the fact that the presented vision is not complete. It is connected with the increasing importance of non-material resources creating intellectual capital in macroeconomic perspective. Intellectual capital is the effect of the existence of knowledge and its usage, whereas knowledge is the essential element and the basis of its creation. This determines its increasing importance in the creation of wealth of economies, especially the knowledge-based ones. The ability to create knowledge

and to both obtain and process information decides upon the success of in their development and on the achievement of competitive advantages.

In view of the above, the techniques of social accounting and their application must be constantly developed so that they enabled the measurement of NIC. However, this is a difficult task. It is dictated by the fact that intellectual capital in macroeconomic perspective reflects the collection of non-material values possessed by people, enterprises, societies, institutions, in various configurations, intensity and spatial diversification that is difficult to diagnose but considerably shapes the development possibilities of particular countries”<sup>23</sup>.

Despite indicated difficulties there are undertaken initiatives that aim at elaborating methods and instruments enabling the measurement of NIC. From the perspective of social accounting particular importance is attached to the initiatives undertaken by international institutions.

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### WYZWANIA RACHUNKOWOŚCI SPOŁECZNEJ W OBSZARZE POMIARU KAPITAŁU INTELEKTUALNEGO KRAJU (NIC)

Celem artykułu jest przedstawienie problemu pomiaru kapitału intelektualnego kraju w perspektywie rachunkowości społecznej, która wykorzystywana jest do ujmowania procesów gospodarczych w skali makroekonomicznej. Realizacja celu została dokonana w oparciu o analizę literatury oraz dokumentów publikowanych przez organizacje międzynarodowe. Przeprowadzone badania pozwoliły na przyjęcie stwierdzenia, że pomiar kapitału intelektualnego kraju jest zadaniem trudnym i wynika ze złożoności tej kategorii. Pomimo wskazanych trudności techniki rachunkowości społecznej oraz ich zastosowania muszą być ciągle rozwijane, tak aby umożliwiły pomiar NIC. Dlatego też podejmowane są inicjatywy mające na celu wypracowanie metod i narzędzi umożliwiających pomiar NIC. Z perspektywy rachunkowości społecznej szczególne znaczenie mają te podejmowane przez instytucje międzynarodowe.

**Słowa kluczowe:** rachunkowość społeczna, kapitał intelektualny kraju (NIC), pomiar NIC.

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