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# INTELLECTUAL CAPITAL OF SOCIOECONOMIC AREA: MEASURE AND STRUCTURE

*part II. Intellectual capital of a company and intellectual capital value of a given socioeconomic area*

***Summary***
*This paper is the second in the series of three papers devoted to the estimated value of intellectual capital belonging to any socioeconomic area: province, municipality, country, region etc. An idea of the estimated value is based on the assumption that the value of a given socioeconomic area for its residents is determined by income generated due to the presence of a business activity in a given area. The structure of the presented method allows for covering all components of intellectual capital within estimated value regardless whether their existence is realized or not. The paper presents the valuation method of intellectual capital to be found in a given socioeconomic area for the purpose of using this method in the third part of the series in which estimates will be conducted for each individual voivodeship (province) in Poland.*

***Key words****: intellectual capital, region, province, estimated value*

## Introduction

This paper constitutes the second part of the series entitled: *Intellectual capital of a socioeconomic area: measure and structure.* In the first part, after providing definitions, the author presented a method enabling an estimation of amount representing a substitute of a market value of a region. The completeness principle of value was preserved, expressing itself in a completeness of all factors determining a region's value, regardless whether one realizes their existence or not. The argument was conducted assuming the absence of state or self-government activity, hence resulting in zero flows of public or self-

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government finances. This part of paper waives the presumption, what opens the opportunity to choose 'triple structure' of intellectual capital of a given socioeconomic area. The calculation also takes into account the need to rebuild human capital resources – in order to preserve the expected income sequence in a region. The final objective of this paper is the derivation of a formal character of the formula that enables obtaining a substitute of an intellectual capital market value belonging to a given socioeconomic area.

## 1. Intellectual capital value and economic structure estimated value

Once equipped with a method of valuation of a given socioeconomic area, one may attempt at valuation of its intellectual capital. In literature, a company's goodwill for the purpose of capital valuation of listed companies is valued by means of the method of multipliers. Its use is illustrated by formula (5 and 6):

$$\frac{P}{BV} = \frac{capitalisation}{net\ assets} = \frac{capitalisation}{equity} = \frac{current\ share\ price}{equity\ per\ one\ share} \tag{5}$$

Hence:

$$P = \frac{current\ share\ price}{equity\ per\ one\ share} \cdot BV \tag{6}$$

*where:*
***P** – company's market value as an organised whole*
***BV** – company's book value equal to its equity in accounting terms (net assets )*

On that basis, a company's intellectual capital value may be expressed as (7):

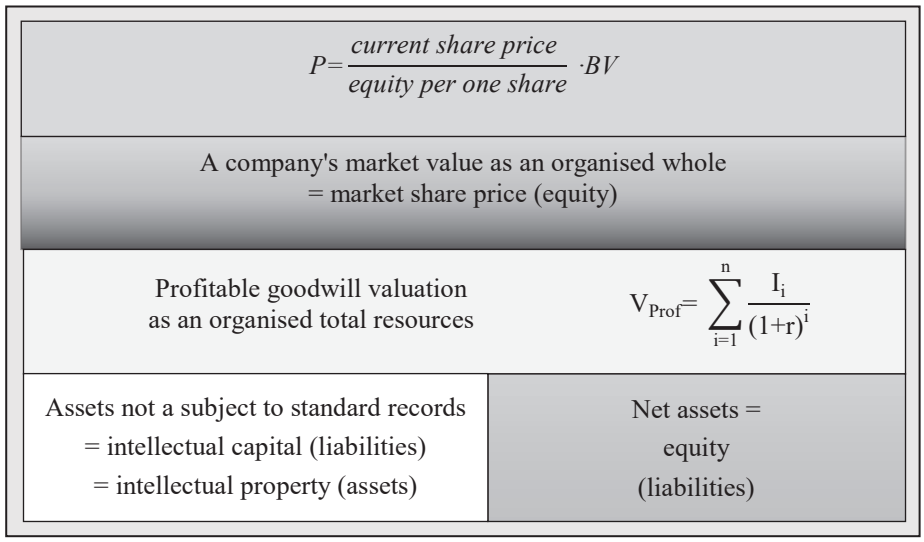
$$IC = \frac{current\ share\ price}{equity\ per\ one\ share} \cdot BV\text{-}BV \tag{7}$$

*where:*
***IC** – intellectual capital value of an investigated company*

The above formula (7) reflects the definition of the intellectual capital at the moment of its finding. This provides the answer to the question – *how much more are investors willing to pay for a company as an organised whole rather than it results from the book valuation of its*

*assets, including the need to repay liabilities*. In other words, one can discover the difference in value between market equity valuation (market share price = capitalisation) and equity value (share capital) disclosed in the accounting books, which according to the definition, is equal to net assets[1] – see Fig. 2.

**Fig. 1. Goodwill as an organised whole and the intellectual capital**




Source: Own description based on literature.

A positive difference between market share price of a given company and net assets indicates the existence of an accessible in a company's resource (intellectual property), not subject to register, which is essential due to the possibility of generating income by a company now and in the future. Thus, the market valuates the share capital higher than it is priced in the accounting books. An equivalent of this resource (intellectual property[2]) on liabilities side, is precisely what is called the intellectual capital.

However, a different approach is possible – through valuation of a company as an organised whole. A company is perceived here as a certain organised economic structure (tangible asset) inter alia consisting of assets enclosed in the balance sheet, having an ability to

[1] Article 3 paragraph1 subparagraph 29 of the Act of 29 September 1994 on Accountancy, Journal of Laws from 1994 No. 121, item 591 as amended.
[2] Cf.: Edvinsson L., Malone M. S. *Kapitał intelektualny*, Warsaw, 2001, p. 40.

generate a defined income sequence for their owner. Then a profitable method of intangible investment valuation is used. The obtained valuation result $V_{Prof}$ informs about right value to defined spread over time income sequence $I_i$, with an assumed risk level $r_r$, which is provided by the ownership of company assets.

Thus generally speaking, it should be noticed that using the profitable method, one may valuate intellectual capital of each company, which taking into account the assumptions of the calculation, corresponds to the difference between the right value, resulting from the ownership of assets to defined income sequence, and the book value of a company's net assets. The result gained is theoretically identical to the intellectual capital value (and its equivalent on the assets side – *intellectual property value*) defined as the difference between market goodwill as an organised whole and its net assets – see Fig. 2.

Assuming that resources accessible in a company were launched in a best possible way to the owner, and there is no better method known to employ them[3], it can be said that a company market value understood as a right to generate a specific income sequence with a given risk level, is equal to the value of available resources (net assets + intellectual property).

The above argument is illustrated in Fig. 2. The difference between goodwill as an organised whole and its assets denotes its assets' resources, from various reasons not subject to standard registry[4], which correspond to *intellectual capital*.

## 2. Intellectual capital of socioeconomic area – definition and structure

Hence for the purpose of this paper one may formulate a substantive definition of resources corresponding to a company's intellectual capital – it is all, *what as a resource*[5] is not subject to a standard value register and at the same time constitutes wealth of a given entity as a company's owner. They are assets which are not subject to a standard registry

[3] See the argument regarding market value and income value in Part I of the series.

[4] Due to various reasons: e.g. lack of possibility of valuation of human capital, client capital or organisational capital. It does not mean that their value is equal to zero, as it was stated by Steven M. H. Wallman who was mentioned in the first part of a series of three papers.

[5] The notion of resource means every kind of potential which can be used to implement a given economic goal or consumption.

(outside the inventory) regardless whether they are material or not. Similarly, one may define resources responsible for intellectual capital of a given area e.g. a region – it represents all, *what as resource,* is not subject to a standard value register and at the same time constitutes wealth of its residents (companies and households functioning in a given area).

Knowing the income value of a given area (e.g. region) $V_{i\ reg}$ (determined by the formula 3 – *part I*), one may take a valuation attempt of accessible intellectual capital. Following the above argument – if one reduces the value $V_{i\ reg}$ by the book value of all net assets $A_{n\ reg}$ involved in economic turnover and at residents' disposal of a given area, the value of intellectual capital resources of that area (e.g. a region) will be obtained.

A similar rule applies here, as in case of a company's intellectual capital valuation: a company's income value as an organised whole is reduced by net assets value subject to records (Fig. 3). As a result, the resource value, not subject to value register is obtained – resource corresponding to a region's intellectual capital (formula 8).

$$VIC_{reg} = V_{i\ reg} - A_{n\ reg} \tag{8}$$

*where:*
$\boldsymbol{VIC_{reg}}$ *– intellectual capital value of a region*
$\boldsymbol{V_{i\ reg}}$ *– income value of a region (substitute of a region market value)*
$\boldsymbol{A_{n\ reg}}$ *– book value of net assets in a region*

Analysing income generated by companies in a region, in order to determine their income value, one can say that they are determined by profit $p_g$ increased by $A_m$ income constituting depreciation coverage – all benefits that can be obtained by an owner and a region of a given company, free of charge and non-refundable. In reality, the owner receives a financial surplus, consisting of net profit and coverage with depreciation income ($p_n + A_m$), however, the difference ($p_g - p_n$) as a tax, and other tax receipts are given to self-government bodies in a region[6]. Therefore, owners' revenues generated by the business sector in a region: ($p_g + A_m$) – gross profit + coverage of depreciation of physical assets in companies' areas. However, from the point of view of companies' owners – residents in a region – the value of company's income is still

[6]In order to simplify the argument, it is assumed that taxes remain in full in a region, and are not redistributed to the country.

determined by financial surplus equal to ($p_n$+ $A_m$). The surplus should be corrected by investment expenditure $I_i$ which should absolutely be incurred in the subsequent *i*- years (replacement investments, net investments), in order to ensure the implementation of the assumed business plan which is a guarantee of the assumed sequence of a company's income $In_i$.

Therefore, a general form of formula of a company's income value is as follows (formula 9):

$$VI_{cc} = \sum_{i=1}^{\infty} \frac{(p_n + A_m)_i^R - I_i}{(1+r)^i} \qquad (9)$$

*where:*

***(pn+ Am)$^R_i$*** *- financial surplus i-this year of a given company operating in a region R*

***$I_i$*** *– replacement investments and net investments, which must be performed by a given company, in order to ensure the implementation of an assumed business plan which is a guarantee of the assumed sequence of a company's income $In_i$*

***r*** *– sum of $r_n$ and $r_r$, meaning return on assets, risk free assets $r_n$, increased by $r_r$, that is the risk premium*

According to the accepted definitions, a region's value is determined by income obtained by its residents, due to localization of business enterprises in a particular socioeconomic area. Thus, they also include income generated by work of households. If one assumes, looking from the perspective of a decision-making household, that a given localization is the best possible of all, then by using profitable goodwill valuation one can arrive at the substitute of the value of the right to the defined sequence of work income which is similar to the market value – the right obtained due to localization of business activity in a given area[7]. At the same time, valuation of human capital of employees will be obtained as a resource, not subject to standard registry (outside inventory) accessible in a given socioeconomic area. Therefore, the second element of valuation of estimated value, which is represented by a region, is *disposable* income[8] of households' work $I^n_H$ - constituting remuneration

[7] In light of the analysis to be found in the previous paper.

[8] That is net salary – salary after deduction of all tax burden and par-fiscal (pension insurance, health insurance, etc.) from the employees' point of view, a region's valuation is determined by net income, just like in case of enterprises.

for services, not subject to registry in companies of human capital resources[9].

Unlike physical capital (machinery, devices, and other fixed assets etc.), human capital is not subject to sale, hence its price cannot be determined on the market. For the same reasons, human capital, unlike physical capital, is not subject to book register as a resource – a component of a company or any other entity's assets.

How can the value of human capital be determined in a given socioeconomic area (e.g.in a region )? In order to answer this question, the analogy to physical capital is applied, which from the point of view of an employee presents work income to be divided into several components. One of them covers expenses for an employee's current living needs, other allows for securing an employee's basic family needs, at the same time from the macroeconomic perspective – continuity of an aggregate accessibility of work in a given area. Another work income element may be allocated to an employee's development, in order to adjust a job offer to the current needs of the market. The mentioned characteristics enable to regard work resource *belonging to a given area* as lasting volume of macroeconomic nature, representing a developing timeless potential.

At this point it must be pointed out that a company may acquire physical capital analogous to human capital (the agreement on providing work service) – that is paying for *a possibility of using physical capital services* e.g. based on a lease contract assuming hire of fixed assets. The operating lease mentioned here, is regarded as a service. A lessor is responsible for listing a given item in the registry of fixed assets and amortization write-offs. Obtained via lease a fixed asset is available to a lessor – a company's owner, however does not constitute his ownership as a part of a company's assets, *does not increase the sum of assets*. The operating lease contract only allows for using a service of production

[9] At this stage of analysis, one may indicate shortcomings of a company's intellectual capital valuation method as the difference between its market value V, and book value BV. It is clear that a company's buyer as an organised whole would not pay more than right value is to a defined income sequence, which is provided by the company's ownership. It should be remembered that employees with better competences (knowledge, skills, social attitude) from a company's point of view, hence representing a higher level of intellectual capital, are better paid. Though, higher salary constitutes larger cost, which in turn limits the owner's income – hence decreases in a company's market value, what considering a company's unchanged book value, and in unreasonable way, falsifies the intellectual capital valuation at its disposal.

factor made available, 'attributing' it temporarily to a given company[10] – similarly, as an employment contract 'attributes' an employee to a company. A company's owner (lessor) bears only the cost of loans (leasing instalment), which for a lessor constitutes income covering its expenditure (amortization) and usually ensures required profit. Equally, an employee has an opportunity to use work service and receives a monthly salary. However, this does not mean that a lessor will not receive any profit within an agreement, as marginal income for the use of a given fixed asset should be higher than marginal cost of its acquisition. The surplus constitutes the presence of a company's intellectual capital enabling effective development of a given component of physical capital.

It should be noticed that from the lessor's point of view a maximal valuation $V_{c\ max}$ of obtaining lease of physical capital, (machinery, devices), understood as a right acquisition to a defined income sequence ($Pnw_i$ +$Am_i$+ $Ccs_i$) over the years, is expressed in the following formula (10):

$$V_{c\ max} = \sum_{i=1}^{n} \frac{Pnw_i + Am_i + Ccs_i}{(1+r)^i} = \sum_{i=1}^{n} \frac{Id_i}{(1+r)^i} \qquad (10)$$

*where:*

$\boldsymbol{V_{c\ max}}$ *- maximal value (upper price limit) of physical capital lease acquisition forwarded by an owner (lessor)*

$\boldsymbol{Pnw_i}$ *– net profit (after tax) of a lessor i-this year*

$\boldsymbol{Am_i}$ *–depreciation cost with lease income i-this year of leased fixed asset*

$\boldsymbol{Ccs_i}$ *– current service and repairs costs and charged to a lessor*

$\boldsymbol{Id_i}$ *– total net income of a lessor i-this year*

It is the price accepted by a supplier of physical capital service (lessor) reaching annual income $Id_i$ of a possibility of using a given fixed asset. If lease, from the market point of view, is the best option of fixed asset development – the valuation meets market valuation[11].

Consequently, employees of a company provide work service within limited time. There is no doubt that similarly to machinery service lease, they are paid over time by a defined income sequence constituting a salary. The income is spent on meeting, *on a demanded level,* a widely understood own and family needs, including self-study and development

[10]In light of current law, operating lease according to the VAT Act is regarded as service delivery - a tax base is constituted by net worth of lease instalment.

[11] See the previous part of the paper.

of other family members. Within the process current household expenses are incurred, enabling a purchase of tangible assets that ensure widely understood restoration of work capacities and day to day existence on a fixed level. The remaining part of the work income may be spent on development of human capital in a given household as education expenditures for family members and assurance of better than ever living conditions.

At this stage of the analysis, it is worth mentioning that exclusion from the estimation of value of human capital a part of income intended to cover current employee maintenance costs would be the same as if in case of physical capital one would try to exclude $Ccs_i$ from lessor's income i.e. this part of income which covers current service and repairs costs of fixed asset, keeping lessor's responsibility to conduct their implementation.

And accordingly, by excluding from intellectual capital value estimate a part of income to be spent on family upkeep, offspring upbringing and education, from the financial point of view one rejects the possibility of renewal of intellectual capital resource located in the region. As far as physical capital is concerned, such assumption corresponds to the exception of depreciation cover $Am_i$ from intellectual capital value estimate (formula 10).

Moreover, exception from the formula of the remaining part of work income usually spent on improvement in the living standards and on development of family members, corresponds to exception of $Pnv_i$ – that is the profit from physical capital value estimate (formula 10). Hence, preservation of all human capital work income components enables its correct valuation: current employees maintenance costs guarantee recreation of ability to work, a part allocated for upbringing, education and offspring development ensures *timeless durability and development of human capital resource in a region as an aggregate* – that is continuity of its availability on the labour market.

In a nutshell, from the point of view of households, the proceedings in human capital valuation are similar to operating lease of fixed asset: in exchange for a possibility of using a service of a given company's resource, an entrepreneur pays a specific price. This price (lease instalment, gross salary) constitutes a cost. For business entities providing services, it is a net income accepted by them.

Therefore – as in case of a fixed asset valuation [formula (10)] – one can estimate human capital resource $V^j_{hc}$, for the need of valuation of

a region intellectual capital, in case of one j-this employee, receiving net annual salary $Sn_i$ over n years[12] [formula (11)]:

$$V^j_{hc} = \sum_{i=1}^{\infty} \frac{Sn^j_i}{(1+r)^i} \tag{11}$$

*where:*

$\boldsymbol{V^j_{hc}}$ *– human capital value represented by j-this employee, valued from a household income point of view*

$\boldsymbol{Sn^j_i}$ *– net salary (household's available income) obtained by j-this employee i-this year*

$\boldsymbol{r}$ *– the discount race including the risk premium*

Summing all discounted net salaries *Sn* in a region a value of human capital in it will be obtained $V^R_{hc}$ [formula (12)]:

$$V^R_{hc} = \sum_{j=1}^{m} V^j_{hc} = \sum_{j=1}^{m} \sum_{i=1}^{\infty} \frac{Sn^j_i}{(1+r)^i} = \sum_{i=1}^{\infty} \frac{(Sn)^R_i}{(1+r)^i} \tag{12}$$

*where:*

$\boldsymbol{Sn^j_i}$ *– net salary (household's available income) obtained by j-this employee i-this year*

$\boldsymbol{(S_n)^R_i}$ *– total net salaries obtained by employees-residents in a region R i-this year*

$\boldsymbol{V^j_{hc}}$ *– human capital value represented by j-this employee valued from a household's income point of view*

$\boldsymbol{r}$ *– the discount race including the risk premium other signs as in a text.*

In the analysis one more fact must be brought to the reader's attention, a part of income of both companies' owners and their employees is redistributed by means of public finances. The transfers constitute financial justification of existence, creation and functioning of resources, constituting intellectual capital of a region *sensu stricte* – that is functioning of self-government units, units financing own activity of public resources, as well as investments that make up the infrastructure of a region.

Assuming that the redistribution of the above mentioned resources takes place solely within a region, it can be accepted that they are a source of value a region represents, *sensu stricte* for its residents as an access to services of public goods resources, not having a market valuation. The services enable the use of public health services, local

[12] With regard to timeless availability of human capital resource – value *n* was substituted by sign of infinity.

roads, free education, pension funds etc. However, provision of the goods cannot take place without public property share - public assets $A_{Publ}$ , subject to standard register.

Therefore, the value of a region for its residents is a sum of companies' owners discounted net income, corrected by investment expenditures, increased by a sum households' discounted net income constituting a work salary, plus a sum of discounted redistributed income by means of local finance. Hence, based on the analysis of the subsection, it can be stated that a region's value for its residents is constituted by a sum of companies' value located in a region, human capital value, and a region's value *sensu stricte,* it is defined by a following formula (13):

$$VI_{Reg} = \sum_{i=1}^{\infty} \frac{(P_n + A_m)_i^R - I_i}{(1+r)^i} + \sum_{i=1}^{\infty} \frac{(S_n)_i^R}{(1+r)^i} + \sum_{i=1}^{\infty} \frac{(GDP_{red\ loc\ fin})_i^R}{(1+r)^i} \qquad (13)$$

*where:*

***VIReg*** *– substitute of a region's income value*

***(GDPred loc fin)Ri*** *– part of gross domestic product, produced and redistributed entirely by means of local finance in a region R i-this year*

***(Sn)Ri*** *– total net salaries obtained by employees-residents in a region R i-this year*

***r*** *– the discount race including the risk premium*

*other signs as above.*

Subtracting in the formula (12) from an adequate values net assets[13], subject to register, involved in a given activity area, one receives:

$$VIC_{reg} = \sum_{i=1}^{\infty} \frac{(P_n + A_m)_i^R - I_i}{(1+r)^i} - A_{n\ cc} + \sum_{i=1}^{\infty} \frac{(I_H^n)_i^R}{(1+r)^i} - A_{n\ H} + \sum_{i=1}^{\infty} \frac{(GDP_{red\ loc\ fin})_i^R}{(1+r)^i} - A_{n\ Publ} \qquad (14)$$

*where:*

$\boldsymbol{A_{n\ cc}}$ *– companies' net assets (book value) in a region R*

$\boldsymbol{A_{nH}}$ *– households' net assets (book value) in a region R*

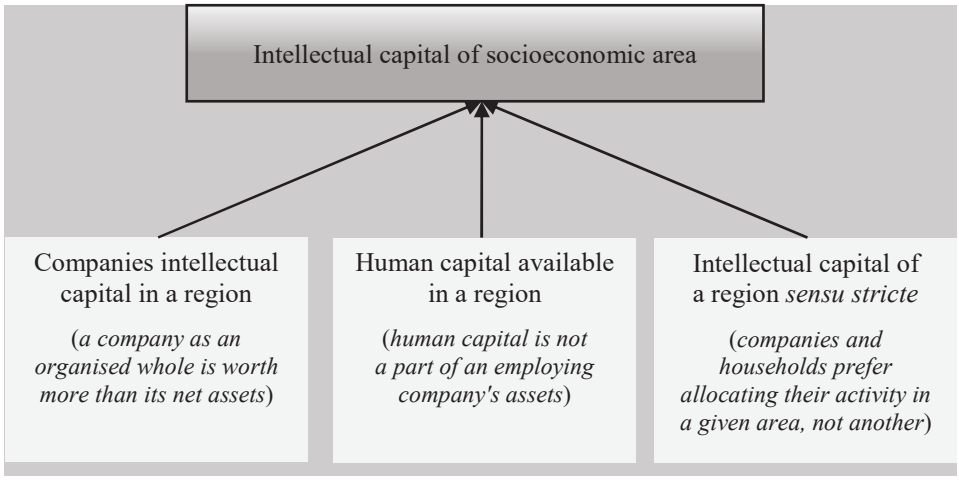
$\boldsymbol{A_{n\ Publ}}$ *– public institutions' net assets (book value) in a region R*

*other signs as above.*

[13] According to the definition, net assets are equal to book value of a given economic structure.

The formula (14) presents a structure of intellectual capital in a region (or any other socioeconomic area) which is demonstrated below in Fig.3.

**Fig. 2. A structure of intellectual capital of a given socioeconomic area**




Source: own description.

Analysing the formula (14) it can be stated that intellectual capital in a region consists of intellectual capital accumulated in companies, increased by intellectual capital located in households[14] and intellectual

[14] In view of the above, human capital available in a region not only increases a company's value as an organised whole, being a part of a company's intellectual capital, but also additionally constitutes a value itself as a household resource. Again, it is analogous to operating lease e.g. machinery. A lessor offers a possibility of using services of a given fixed asset for a specified time. The better application of a given asset is found by a lessor, the greater will be the market value of a company with unchanged remaining parameters, hence larger its intellectual capital. However, it should be noticed that a fixed asset value as a resource, remains at an owner's side – a lessor's. It is the lessor who recognizes on the asset side, a value of fixed asset leased, remaining in close relationship with income generated of lease. Similarly looks the situation concerning services of human capital resource: the better the resource is developed by an employer, the bigger will be an employing company's intellectual capital. However, human capital resource belongs to households that offer work services. Therefore, according to the concept of economic account, if it is possible, the households should record the value of the resource 'on assets side', not an employing company -contrary to a popular belief. Hence, intellectual capital of businesses operating e.g. in a region despite the fact that, it includes the human capital of

capital belonging stricte e.g. to a region as its public face, as a whole, quality and institutions available in a given region, like education, health care, communication infrastructure, work resource, etc.

GDP account shows that GDP is equal to a sum of primary income for services of a specific company available in a given area, therefore based on the formula (13) one may arrive at the following (formula 15):

$$(P_n+A_m)_i^R - I_i + (I_H^n)_i^R + (GDP_{red\ loc\ fin})_i^R = GDP_i^R - I_i \qquad (15)$$

*where:*

***(Pn+ Am)$^R_i$*** *- financial surplus i-this year of a given company operating in a region R*

***$I_i$*** *– replacement and net investments, conducted by a given company in order to ensure the implementation of an assumed business plan, which is a guarantee of the assumed sequence of a company's income*

***$(I^n_H)^R_i$*** *– households' net income in a region R obtained i-this year*

***$(GDP_{red\ loc\ fin})^R_i$*** *– part of gross domestic product , produced and redistributed entirely by means of local finance in a region R i-this year*

***$GDP^R_i$*** *– GDP created i-this year in a region R*

*other signs as above.*

Hence, based on formulas (14) and (15) one may formulate what follows:

$$VIC_{reg} = VI_{reg} - A_{n\ reg} = \sum_{i=1}^{\infty} \frac{GDP_i^R - I_i}{(1+r)^i} - A_{n\ reg} \qquad (16)$$

*where:*

***$VIC_{Reg}$*** *– a region's intellectual capital value*

***$VI_{Reg}$*** *– substitute of a region's income value*

***An $_{reg}$*** *- net assets in a region, a subject to a standard book register equal to $A_{n\ pp} + A_{n\ H} + A_{n\ Publ}$*

***$GDP^R_i$*** *– part of gross domestic product in a region R i-this year*

***$I_i$*** *– replacement and net investments, conducted by a given company in order to ensure the implementation of an assumed business plan, which is a guarantee of the assumed sequence of a company's income*

***r*** *– a sum of $r_n$ and $r_r$ meaning $r_n$ – the discount rate of financial assets, risk- free, increased by $r_r$, that is the risk premium r*

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employees, does not completely illustrate human capital value, as a resource belonging to a given socioeconomic area.

However, in order to establish striving for infinity, a predicted sequence of words $GDP_i^R$, one must assume an actual and close to reality growth of components of the sequence, and the investment level which will trigger this growth, and only then one may proceed with a formula, accepting the income sequence as close to infinity.

Therefore, based on a formula (16) one may state the following:

$$VI_{reg} = \sum_{i=1}^{\infty} \frac{GDP_i^R - I_i}{(1+r)^i} = \sum_{i=1}^{\infty} \frac{GDP_1^R \cdot (1+av.rat_{inc})^{i-1} \cdot (1-av.rat_{in})^{i-1}}{(1+r)^i} \quad (17)$$

*where:*

***$VI_{reg}$*** *– value represented by a given socioeconomic area (e.g. a region) for residents locating their activities in the area from the point of view of their income*

***$GDP^R_i$*** *– part of gross domestic product in a region R i-this year*

***$I_i$*** *– replacement and net investments, conducted by a given company in order to ensure the implementation of an assumed business plan, which is a guarantee of the assumed sequence of a company's income*

***$GDP^R_1$*** *– GDP created in the first year from a date, when intellectual capital valuation, belonging to a given socioeconomic area (e.g. a region) is performed*

***av. $rat_{inc.}$*** *– an average real GDP growth rate in a region R*

***$av.rat_{in}$*** *– an average investment rate in a region R*

***r*** *– discount rate including the risk premium of total income loss in a region*

Generally, one may state that the geometrical sequence with a module q =<1 and an introductory expression $\frac{1}{(1+r)}$ has been acquired.

After application of formula for a sum of the infinite sequence one may say that:

$$VI_{reg} = GDP_1^R \cdot \frac{1}{1+r} \cdot \frac{1}{1-\frac{(1+av.rat_{inc}) \cdot (1-av.rat_{in})}{1+r}} = \frac{GDP_1^R}{r - av.rat_{inc} + av.rat_{inc} \cdot av.rat_{in} + av.rat_{in}} \quad (18)$$

where signs – as in the formula (17)

Hence, summing up intellectual capital value in a region, one may acquire (formula 19):

$$VIC_{reg} = VI_{reg} - A_{n\ reg} = \frac{GDP_1^R}{r - av.rat_{inc} + av.rat_{inc} \cdot av.rat_{in} + av.rat_{in}} - A_{n\ reg} \quad (19)$$

*where:*

***VIC*$_{Reg}$** *– intellectual capital value belonging to a given socioeconomic area (e.g. a region)*

***VI*$_{reg}$** *– value represented by a given socioeconomic area (e.g. a region) for residents locating their activities in the area from the point of view of their income*

***A*$_{n\ reg}$** *– net assets of a given socioeconomic area (e.g. a region) subject to a standard book register equal to* $A_{n\ cc} + A_{n\ H} + A_{n\ Publ}$*; (that is* $A_n cc_p$ *– net assets of companies (book value) in a region R;* $An_{\ H}$ *– households' net assets (book value) in a region R;* $A_{n\ Publ}$ *– public institutions' net assets (book value) in a region R)*

***GDPB*$^{R}_{1}$** *– GDP created in the first year from a date, when intellectual capital valuation, belonging to a given socioeconomic area (e.g. a region R) is performed*

***av.rat*$_{inc.}$** *– an average real GDP growth rate in a region R*

***av.rat.*$_{in}$** *– an average investment rate in a region R*

***r*** *– discount rate including the risk premium of total income loss in a region*

## Conclusions

In conclusion, formula 19 enables a region's (or any other socioeconomic area) intellectual capital valuation in accordance with content-related capacity of this phenomena, in its original and historical form i.e. as a difference between a substitute of a given economic structure market value and a substitute of its book value. In order to arrive at the estimate one must possess only gross domestic product value created in a given region *R*, in the year when an estimate ($GDP_1^R$) is made, an estimate of average real GDP growth rate in the subsequent years $av.rat_{inc}$ and an average investment rate $av.rat._{in}$ in a region, discount rate *r* and net assets value $A_{n\ reg}$.

Thanks to the proposed solution, an estimate of intellectual capital of any socioeconomic area can be made, providing that there is a regular GDP account kept and an investment rate, and assets value are known, or one may define these values based on a data available. The genuineness of the mentioned argument seems to indirectly confirm the relationship, which is difficult to deny, between intellectual capital available in the country and a value of a real GDP of that country.

According to the theory, an important element of the paper is a triple structure of the intellectual capital, emerged in conditions of completeness of investigated components, constituting intellectual capital of a given socioeconomic area. Its value creates companies' intellectual capital operating in a given area, employees' intellectual capital belonging to households active in this area as well as intellectual capital *sensu stricte* of specific area as a potential of outside the inventory assets of self-government units, their multiannual achievements as 'frozen' idea

of performed infrastructural solutions, provided services and in many other areas.

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