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INTELLECTUAL CAPITAL AS THE BASIS OF CONVERGENCE AND DEVELOPMENT IN NEW ECONOMICS

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Abstract

The purpose of this article is to determine the intellectual capital as an essential pre-requisite for sustainable competitive advantage and convergence, both at the micro and macroeconomic level. The article presents some approaches concerning the role of capital for a sustainable long-run economic development. It has been investigated the processes contribute to the manifestation of a trend of convergence (convergence) of the economies of various countries, taking into account the preservation of their national characteristics. It has been analyzed the results from parametric estimation, threshold model estimation and semi-parametric estimation all confirm that economic convergence is pronouncedly conditional on human capital across all measures. The results suggest that to elevate poor regions out of poverty, government policy should first focus on improving the human capital of basic labor. Using intangible resources to create organizational value in terms of convergence presents a significant challenge that has not been studied yet.

Keywords: intellectual capital; competitive advantage; convergence; innovation; economic development; intangible resources; human capital.

Introduction.

Transformations in public life over the past half century have led to radical changes in the organization of modern economic systems. Thus, the dominant form of labor organization was material production, today the priorities have changed, and due to the high scientific and technical level of production and productivity, a small share of employment people in the field of material production provides more and more growing needs of society. In the first place is not routine mechanical work, and the creative activity of the individual, which ensures the comprehensive development of man. The transformation of knowledge and information into the main productive resource has led to a change in attitudes towards man in society, recognition of the impact of its material, cultural and spiritual levels on the development of society.

The current state of the domestic economy is formed on the basis of a combination of the impact of globalization and integration processes and the simultaneous reduction of the level of development of scientific and technical base, the lack of financial resources for the modernization of tangible assets. In this situation, the urgency of attracting information and intellectual resources for the formation of strategic competitive advantages increases. According to scientists, the accumulation and efficient use of intellectual capital is the way to innovative development of the enterprise. Currently, the agricultural sector of the economy is one of

the main system-forming components of the functioning of the economic system of Ukraine. Sustainable development of the agricultural sector is the foundation for the effective functioning of light, food and other related industries.

With significant the influence of crisis phenomena in amplifying the theme of managing the country's agricultural sector is characterized by relative stability in modern conditions is the locomotive of the entire national economy. Doubtless is the fact that the main factor, which forms the effectiveness of the functioning of agricultural sector production is human capital, because it is of human resources, their quantity and especially the quality, depends on the number and quality of manufactured products, the effectiveness of the operation of the enterprise and, ultimately, the level of competitiveness of the whole industry. In other words, the high level of human capital development provides sustainable competitive advantages at both micro - and macro-level functioning of economic systems.

The modern era of the knowledge economy requires the constant generation of new discoveries and the results of scientific research on the basis of an expanded or generating type of reproduction of human potential. The post-industrial stage of development of society to a large extent demonstrates the differences in technological achievements of various national economies, their breakthroughs and lags.

Results and discussions

Economic convergence in the broad sense of the word is a time-stable process of reducing cross-country differences in key economic indicators, as well as convergence of national legal systems and policies. The rapprochement of countries included in economic associations is both one of the goals of the economic integration process and a prerequisite for its success. Three types of economic convergence can be distinguished: real, nominal, and institutional. Real convergence means the convergence of per capita income levels between countries of economic associations. Nominal convergence is a dynamic synchronization of the most important macroeconomic indicators. Institutional convergence involves the convergence of the conditions for conducting economic activity and the level of development of market institutions.

Most people believe that we live in an integrated global world. But, looking at recent history, what really can be said about the nature of this integration. It seems that today the world economy is characterized by three main trends. The first trend is *new convergence*. In a lecture in 1979, the late Nobel Laureate, a late development economist, Sir Arthur Lewis, said: In the last hundred years, the growth rate of production in developing countries has depended on the growth rate of production in developed countries. At high growth rates in developed countries, growth rates are high in developing countries, and when growth rates decline in developed countries, they slow down in developing countries. Is it inevitable is this connection? According to the latest data, in spite of the continuing connections, it is now important to distinguish between long-term trends and cyclical changes. Since about the 1990s, per capita income growth in emerging and developing countries has been steadily increasing and far exceeding that of advanced economies. This is an important structural shift in the dynamics of the global economy. The second main characteristic of the world economy is *cyclical interdependence*. Despite the unfastening of long-term trending growth rates in emerging and developing countries − or their " undocking " − from advanced economies over the past 20 years, this did not lead to undocking of cyclical fluctuations relative to the trend line. The new convergence and increased interdependence coincide with the third trend related to the distribution of income. In many countries, *income inequality* has intensified and, in particular, the share of people earning the highest incomes has risen sharply. In the United States, 1 percent of the highest-income population has nearly tripled in the last three decades, so it now accounts for about 20 percent of total US income. At the same time, as the result of the aforementioned new convergence is decreasing, the distance between developed and developing countries, when they are considered as groups, the incomes of millions of people in the poorest countries of the world have remained almost unchanged for over a century. These two facts have widened the gap between the richest and poorest people in the world, despite the general convergence of average incomes [2].

In its simplest form, neoclassical economic growth theory assumes diminishing marginal returns to capital (Solow, 1956), implying that poor countries will grow faster than rich ones, that capital will flow from rich countries to poor countries, and per-capita incomes will converge to the same level (Barro, 1991). However, income inequality among nations persists; and there is little evidence of absolute convergence. Richer implications follow from development of endogenous growth theory grounded in the work of Arrow (1962) and augmented with the introduction of the critical role of human capital by second generation growth theory pioneers, of which a partial list includes Lucas (1988), Prescott (1998), and Mankiw, Romer and Weil (1992).

One of the most common neoclassical models of economic growth that is being taught in universities is the Solow-Swan model, which was developed by Solow R. and Swan R. independently. In 1965 the model was extended by Cass D. and Koopmans Tj. with the addition of consumer's optimization analysis. Its goal is the explanation of economic growth in a long-term horizon by taking into account notions like productivity fluctuations (technological progress), accumulation of capital and labor growth. The time resistance of a model, which is introduced in a scientific field, is being tested by the agreement of its mathematical future predictions with data, acquired by real world. A prediction, which is worth reference, is called convergence and epigrammatically refers to the tendency of poor countries' income level become the same with those that are rich. Despite the beauty and charm of theoretical models, empirical data play a crucial role in research. The more clarified the empirical finding (which is result of the procession of data mentioned above) is, the better it gets understood and completed by other scholars. This simplified version of information is called "stylized fact".

Currently, there is an interpenetration of scientific, educational and business processes, the convergence of the respective systems. Educational-scientific-industrial complexes formed on the basis of research universities determine the main direction of transformation of knowledge into the final products of industrial enterprises. The role of the state is to provide favorable conditions for the development of intellectual capital and to support innovative systems at the macro, meso and micro levels.

The simplest model that describes the interaction of elements of a national innovation system shows that the role of the state is to facilitate the production of fundamental knowledge (in academic institutions, universities and research institutes), a set of technologies of a strategic nature (especially critical for the country's security), as well as in creating infrastructure and favorable institutional conditions for the activities of non-state enterprises [3].

There are such types of convergence as:

- absolute convergence (unconditional convergence), when poor countries grow faster than rich ones, regardless of the nature of the economy, the difference in per capita income levels gradually decreases;

- sigma-convergence (σ-convergence), when over time there is a decrease in the variance of the level of per capita income between countries;

- beta convergence (β-convergence), when relatively poor countries grow faster than rich countries;

- conditional convergence, poor countries grow faster than rich, ceteris paribus (subject to similar structural parameters and production functions), i.e., with the samesteady state. If the stable states are different, then conditional convergence means that the country grows faster when it is further from its own stable state.

The term "convergence" begins to be used in the analysis of international economic integration. The development of new forms of intercountry intrasectoral division of labor, as well as the expansion of the global market contributes to the interdependence of the economies of different countries. The creation of a unified financial, informational, telecommunication cultural and economic space.

These processes contribute to the manifestation of a trend of convergence (convergence) of the economies of various countries, taking into account the preservation of their national characteristics. A vivid manifestation of convergence is characteristic of regional integration, as an example, the formation of the Eurozone within the EU. Transition of its countries to a single currency - euro became possible as a result of the convergence of the economies of these countries on the main macroeconomic indicators [6].

It's obvious that the concept of convergence was a central element of economic policy in Europe, and its evaluation is the subject of close public and scientific attention. At the global level, economic convergence is seen as one of the main guidelines for potential EU candidate countries, as a key parameter for their development. At the regional level, a wide range of differences in GDP is also considered undesirable, which leads to EU policies aimed at reducing income inequality, increasing the competitiveness of territories and promoting job creation.

Consequently, the involvement of new participants in interaction through convergence based on smart solutions of the digital economy expands the boundaries of the synergetic effect. In quantitative terms, the synergy of convergence as the dependence of revenue growth on the number of stakeholders integrated by smart digital services [5].

If the growth of an economy depended only on the deepening of human capital and physical capital, then the growth rate of that economy would be expected to slow down over the long run because of diminishing marginal returns. However, there is another crucial factor in the aggregate production function: technology. The development of new technology can provide a way for an economy to sidestep the diminishing marginal returns of capital deepening. Figure 1 shows how. The horizontal axis of the figure measures the amount of capital deepening, which on this figure is an overall measure that includes deepening of both physical and human capital. The amount of human and physical capital per worker increases as you move from left to right, from C1 to C2 to C3. The vertical axis of the diagram measures per capita output. Start by considering the lowest line in this diagram, labeled Technology 1. Along this aggregate production function, the level of technology is being held constant, so the line shows only the relationship between capital deepening and output. As capital deepens from C1 to C2 to C3 and the economy moves from R to U to W, per capita output does increase—but the way in which the line starts out steeper on the left but then flattens as it moves to the right shows the diminishing marginal returns, as additional marginal amounts of capital deepening increase output by ever-smaller amounts. The shape of the aggregate production line (Technology 1) shows that the ability of capital deepening, by itself, to generate sustained economic growth is limited, since diminishing returns will eventually set in.
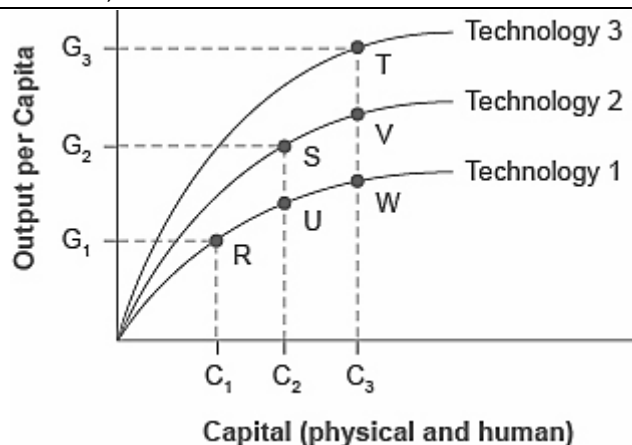
Figure 1. Capital Deepening and New Technology

The graph shows three upward arching lines that each represent a different technology. Improvements in technology lead to greater output per capita and deepened physical and human capital.

Imagine that the economy starts at point R, with the level of physical and human capital C1 and the output per capita at G1. If the economy relies only on capital deepening, while remaining at the technology level shown by the Technology 1 line, then it would face diminishing marginal returns as it moved from point R to point U to point W. However, now imagine that capital deepening is combined with improvements in technology. Then, as capital deepens from C1 to C2, technology improves from Technology 1 to Technology 2, and the economy moves from R to S. Similarly, as capital deepens from C2 to C3, technology increases from Technology 2 to Technology 3, and the economy moves from S to T. With improvements in technology, there is no longer any reason that economic growth must necessarily slow down.

Now, bring improvements in technology into the picture. Improved technology means that with a given set of inputs, more output is possible. The production function labeled Technology 1 in the figure is based on one level of technology, but Technology 2 is based on an improved level of technology, so for every level of capital deepening on the horizontal axis, it produces a higher level of output on the vertical axis. In turn, production function Technology 3 represents a still higher level of technology, so that for every level of inputs on the horizontal axis, it produces a higher level of output on the vertical axis than either of the other two aggregate production functions.

Most healthy, growing economies are deepening their human and physical capital and increasing technology at the same time. As a result, the economy can move from a choice like point R on the Technology 1 aggregate production line to a point like S on Technology 2 and a point like T on the still higher aggregate production line (Technology 3). With the combination of technology and capital deepening, the rise in GDP per capita in high-income countries does not need to fade away because of diminishing returns. The gains from technology can offset the diminishing returns involved with capital deepening.

Will technological improvements themselves run into diminishing returns over time? That is, will it become continually harder and more costly to discover new technological improvements? Perhaps someday, but, at least over the last two centuries since the Industrial Revolution, improvements in technology have not run into diminishing marginal returns. Modern inventions, like the Internet or discoveries in genetics or materials science, do not seem to provide smaller gains to output than earlier inventions like the steam engine or the railroad. One reason that technological ideas do not seem to run into diminishing returns is that the ideas of new technology can often be widely applied at a marginal cost that is very low or even zero. A specific additional machine, or an additional year of education, must be used by a specific worker or group of workers. A new technology or invention can be used by many workers across the economy at very low marginal cost.

The argument that it is easier for a low-income country to copy and adapt existing technology than it is for a high-income country to invent new technology is not necessarily true, either. When it comes to adapting and using new technology, a society's performance is not necessarily guaranteed, but is the result of whether the economic, educational, and public policy institutions of the country are supportive. In theory, perhaps, low-income countries have many opportunities to copy and adapt technology, but if they lack the appropriate supportive economic infrastructure and institutions, the theoretical possibility that backwardness might have certain advantages is of little practical relevance.

While many articles were analysed and the research methods were somehow more innovative throughout years, we can say that the convergence debate is still not settled. To have a better overview about the findings, Table 4 with the various methods and results was constructed below. The empirical findings in this article differ between each other. This is mainly due to different samples that are used, not only with respect to countries, but also to the peri-ods. While no one argues, that the absolute beta convergence concept all over the world is not taking place, we see differences in the observations between some countries' groups. To sum it up, the more homogenous a country group is, the more likely we can find the conditional, absolute beta and even the sigma convergence hypothesis to be true. We can just think about OECD, EU, US or regions of

countries where the convergence can be observed. It is also more likely to find the conditional beta convergence, than the absolute or the sigma. Furthermore, the conditional convergence speed turns many times to be faster, than the absolute [4].

The results from parametric estimation, threshold model estimation and semi-parametric estimation all confirm that economic convergence is pronouncedly conditional on human capital across all measures. We find that the positive "benefit of being backward" due to lower initial income is almost trumped by the negative direct growth impact of insufficient human capital. The results suggest that to elevate poor regions out of poverty, government policy should first focus on improving the human capital of basic labor, followed by promoting senior high-school and college graduation to enhance complementarity with high-technology industries. China has introduced several physical-capital-oriented policies in an attempt to reduce regional economic inequality. Our results show that human capital is a critical complement to such policies [8].

When countries with lower levels of GDP per capita catch up to countries with higher levels of GDP per capita, the process is called convergence. Convergence can occur even when both high- and low-income countries increase investment in physical and human capital with the objective of growing GDP. This is because the impact of new investment in physical and human capital on a low-income country may result in huge gains as new skills or equipment are combined with the labor force. In higher-income countries, however, a level of investment equal to that of the low income country is not likely to have as big an impact, because the more developed country most likely has high levels of capital investment. Therefore, the marginal gain from this additional investment tends to be successively less and less. Higher income countries are more likely to have diminishing returns to their investments and must continually invent new technologies; this allows lower-income economies to have a chance for convergent growth. However, many high-income economies have developed economic and political institutions that provide a healthy economic climate for an ongoing stream of technological innovations. Continuous technological innovation can counterbalance diminishing returns to investments in human and physical capital.

The different phases of economic cycles toss economies around the world. However, it's interesting to see that these top economies don't budge easily from the positions they hold. When compared to the top 20 economies of 1980, 17 are still present on the list, which means only three new entrants.

In addition to the key players remaining almost the same, this analysis reveals these economies are the engine of growth, commanding a majority of the global wealth. The nominal GDP of the top 10 economies adds up to about 66% of the world's economy, while the top 20 economies contribute almost 79%.[1] The remaining 173 countries together constitute less than one-fourth to the world's economy.

The results of empirical studies indicate that during 1995–2011 convergence processes were observed in the world - inequality was reduced. The calculation of the regression equations showed that globalization factors contribute to the convergence of the countries of the world in terms of development. However, this analysis only indicates the convergence of global averages, not taking into account the growing inequality within countries. We can talk about convergence between groups of countries amid growing inequality within countries. Despite the crisis, economic turbulence and uncertainty in the global economy, the condition and number of ultra-rich people around the world is growing, while the incomes of millions of people in the poorest countries of the world have remained almost unchanged for over a century. These two facts have widened the gap between the richest and poorest people in the world, despite the general convergence of average incomes. As A. Buzgalin points out, these manifestations of globalization require a new policy oriented towards the equal provision of social priorities, the rejection of militarism, financial speculation, etc.

Extremely interesting in line with this study is the use of the work of Chinese scientists Chen Jianbin, Guo Yanli and Xu Kaibo (Business College of Beijing Union University). the authors consider the possibilities of increasing competitiveness through the prism of the convergence of social and intellectual capital of the enterprise through effective knowledge management. In particular, they believe that intellectual capital is just that a capital asset consisting of intellectual material that transforms raw materials (might be physical or intangible) and makes them more valuable. To be considered intellectual capital, knowledge must be an asset able to be used to create wealth. Thus, intellectual capital includes the talents and skills of individuals and groups; technological and social networks and the software and culture that connect them; and intellectual property such as patents, copyrights, methods, procedures, archives, etc. Thus, Knowledge assets, they proposed, could be found in three places: the competencies of a company's people, its internal structure (patents, models, computer and administrative systems), and its external structure (brands, reputation, relationships with customers and suppliers). After some thinking by other scholars, the pieces are now usually called human capital, structural (or organizational) capital, and customer (or relationship) capital. Currently, the concept of intellectual capital and its components, the relationship with enterprise performance are stress research points. Researches had shown that, intellectual capital positively affect enterprise performance, but intensity differently among its components. Further more, human capital can create wealth only when combining with structural capital. When some scientists introduced relationship capital into intellectual capital category, the relationship of intellectual capital and enterprise performance had been studied. It demonstrated that capitals listed in descending order of importance are relationship capital, human capital and structural capital. On the other hand, divided intellectual capital into Explicit knowledge assets and tacit knowledge assets base on the convenience of knowledge representation and transfer. In outsourcing, service provider firms can capture business knowledge from client firms, with which they not only can complete outsourcing project

on time and with highly quality, but also benefit their development in the future. In the outsourcing process, team member aggregate business and new IT knowledge, internalize them as tacit capital, as well as repository of module, rules and knowledge updated as explicit knowledge capital. So, to be convenient, dichotomy of intellectual capital with tacit and explicit knowledge assets is adopted in this paper Intellectual capital is created assets of intellectual activities. KC is a process to create knowledge, in which knowledge worker promoted their ability, new knowledge had been produced and extended, business process and culture had been improved, relationship with customers had been strengthened. All of these are about the add-value of intellectual capital. From literature up to now, the relationship of KC and intellectual capital has not been aroused by theory study or industry practicing. It is essential to deepen research perspective into the promotion mechanism of intellectual capital by KC in different ways. In addition, because of the characteristic of knowledge-intensive in outsourcing, the accumulation and add-value of intellectual capital caused by KC, especially for tacit knowledge asset, are notable and effective.

Owing to the typical knowledge-intensive team of outsourcing, project success mostly depends on their knowledge capabilities and effectiveness of knowledge transfer among team members. Because of these difficult or dilemma of outsourcing teams, it is very important for them to know who know what, who know who to cooperate effectively. With such understanding, the characteristic exact/just and add-value of KC are same as the effective situation of who know what, who know who in their nature mean, and they are determined mostly by interplay of social capital and intellectual capital. The efficiency of information transfer, which determined by timeliness and accuracy of information flow, is a key factor to advancing system degree of order. Similarly, KC is the order parameter of knowledge system in which contains very-large scale mini-transfer activities, then the timeliness and accuracy of knowledge cooperation determine the macro statue of knowledge system. In a stable enterprise knowledge system, timeliness and accuracy of knowledge cooperation the two cannot have both. In a separate knowledge transfer process, one variable increase always at another variable decrease cost. Increase path and layer of knowledge transfer can effectively improve accuracy, but increase difficulty of searching path and delayed knowledge flow, as well as improving timeliness of knowledge transfer means accuracy cut down. Accordingly, in order to evaluation the order degree of enterprise knowledge system scientifically, this two-factor should be taken into account simultaneously.

Knowledge activities always adhered into a special social network. Knowledge acquisition and sharing can't do without activities among individuals. Social capital is realistic and potential resources embed in relationship network possessed by individual or social unit, and these resources certainly will affect knowledge activities based on individual interaction. Studies have shown that social capitals have significant positive influence on knowledge acqusition/sharing in an enterprise. Conversely, knowledge activities enhance relations of individuals, get more trust from each other, and put forward the shared recognition. Thus it can conclude that intellectual capital have significant positive affection on social capital. The efficiency of knowledge cooperation commonly determined by timeliness and accuracy of knowledge flows. Intellectual capitals provide quality and quantity of knowledge object, and social capitals provide path and layer of knowledge flows, either of them affects knowledge workers to locate and find right knowledge in limited times, thus affect timeliness and accuracy of knowledge transfer. For an enterprise, at its different phase of knowledge system developing, intellectual and social capital have various influences on knowledge cooperation efficiency. Just as a learning curve, with increasing of intellectual and social capital, timeliness and accuracy of knowledge transfer goes better; and when this two-capital increased to a certain level, the cost of knowledge searching/identifying increased so fast that knowledge cooperation efficiency will goes bad [1].

The success of the organization is determined not only by the available resources, but, above all, by its intellectual ability. This ability reflects the peculiar properties of a particular organization, which are a condition for the success of solving certain tasks (problems) of its activity. Based on the approaches of psychology, four types of intellectual organizational abilities can be distinguished: convergent, divergent (creativity), learning ability and cognitive styles. Convergent capabilities reflect the effectiveness of information processing to obtain the right decisions in accordance with the requirements of the situation. Converged capabilities provide adaptive organizational capabilities. The abilities under consideration are expressed in three properties of organizational intelligence: 1. Level properties of intelligence associated with the achieved level of cognitive functions of the organization, i.e. awareness in a particular subject area, database, stock of knowledge. By using the Cattell classification, it is possible to distinguish crystallized organizational intelligence, which is the result of education, learning and various cultural influences, as well as fluid intelligence, which reflects the organization's ability to quickly and accurately process current information. 2. The combinatorial properties of organizational intelligence reflects the ability to identify relationships, relationships and patterns, a hundred allows you to combine various elements, knowledge, situations and thereby provides the possibility of analyzing reality and synthesizing new solutions. 3. The procedural properties of the intelligence of the organization are expressed in the nature of the dynamic processing of information, in the strategy of intellectual activity. However, the convergent abilities of the organization do not allow to really predict its possible intellectual successes in real conditions

Divergent abilities (creativity) reflect the organization's ability to generate diverse, non-standard, equally correct decisions in uncertain environmental conditions. As a criteria for the organization's creativ-

ity, one can consider a set of certain properties of intellectual activity, which apply to the organization with specific content: intellectual productivity, i.e. . the number of ideas formed by the organization for a certain period of time; originality, ability to create fundamentally new, patentable ideas, know-how, etc .; ability to work in case of unexpected development of a situation and even to specially create such situations. At the same time, creativity should not be inadequate, fantastic, not feasible, which can lead to loss of funds and image of the organization.

Learning is an equally important type of organization's intellectual ability. With a broad interpretation, learning is the general ability of an organization to learn new knowledge and ways of working. In a narrower sense, learning reflects the increase in the effectiveness of the organization's intellectual activity under the influence of certain educational influences. Of interest is the approach of Chris Arjiris [3], which showed that the ability to organizational learning ensures the success of the organization to accumulate experience and use it effectively, to detect and correct errors in a timely manner. Such organizations more efficiently perceive, analyze and use a variety of information, including in innovative activities. In modern conditions, such a type of organization's intellectual ability as its cognitive styles, which reflect the individual characteristics of the organization's intellectual activity and are expressed in four types of style properties of intelligence: information coding styles, cognitive styles, intellectual styles, epistemological styles, is becoming increasingly important. Using the development of psychologists, consider the content of these styles in relation to organizational intelligence [7].

Intangible resources and intellectual capital are essential pre-requisites for sustainable competitive advantage and long-run development. Management of intangible resources and management of intellectual capital are essential for competitiveness and convergence, both at the micro and macroeconomic level. The new economy requires new methods of measurement of both tangibles and intangibles. Well-designed indicators based on a coherent theoretical framework are like the words and the syntax of a language. It might help open-minded managers understand how the relationships between people look like and how profit can be made in their company. Using intangible resources to create organizational value presents a significant challenge that has not yet been studied and published sufficiently in the literature.

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