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Investments in human capital – knowledge and education as factors of sustainable development

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Abstract: Development of products and services that create new value is achieved through human capital based on knowledge, skills and intellectual property which should be aimed towards innovations. In that manner, constant need for training and development of employees through impact on their knowledge, skills and abilities is stressed. Investments in knowledge and education are investments in the future, which, however, as factors affect the generation of rapid changes. For construction of human capital, it is required to define permanent strategy for the needs of sustainable development. Thus, there is a wide range of issues related to human capital and sustainability, with emphasis on relations among employment, health, education, economy, sustainable development, social protection and environmental protection. In accordance with previously mentioned factors, the aim of this paper is the review of the possibilities for affecting and improving the relations between human capital and sustainability as an example of a more comprehensive access to sustainable future.

Keywords: human capital, knowledge and education, sustainable development
JEL classification: I25, Q56

Улагање у људски капитал– знање и образовање као фактори одрживог развоја

Сажетак: Кроз људски капитал заснован на знању, умећу, вештинама и интелектуалној својини, који треба усмеравати ка иновацијама, остварује се развој производа и услуга које стварају нову вредност. На тај начин се истиче стална потреба за обуком и развојем запослених кроз утицај на њихово знање, вештине и способности. Улагање у знање и образовање је улагање у будућност, који, пак, као фактори утичу на генерисање брзих промена. За изградњу људског капитала, потребно је дефинисати трајну стратегију за потребе одрживог развоја. Тако постоји широк спектар питања везаних за људски капитал и одрживост, са акцентом на везе између запошљавања, здравства, образовања, привреде, одрживог развоја, социјалне заштите и екологије. У складу са претходно наведеним факторима, циљ овог рада је преглед могућности утицаја и напретка везе између људског капитала и одрживости, као пример свеобухватнијег приступа ка одрживој будућности.

Кључне речи: људски капитал, знање и образовање, одрживи развој
JEL класификација: I25, Q56

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1. Introduction

Having in mind the dynamic development of information and communication technologies, today's world is characterized by innovations in all fields. As Vukicević & Milosević (2012) state, with the expansion of innovations, particularly in sector of information technologies, interaction between this sector and sustainable development becomes much more significant. One of the studies about examination of innovations and their dimensions is the study by Johannessen, Olsen & Lumpkin (2001), which speaks about examining the three dimensions of innovations by asking the questions: what is new, how is it new and to whom is it new. Through these questions, we define the value that innovations bring forth, degree to which innovation contributes and different aspects that innovations can affect.

According to Knezević, Marković & Stanković (2013), sustainable and responsible investment (SRI) represents the approach of investment that considers long-term economic, environmental and social risks and possibilities that global economy and ethical priorities of investors are facing with.

Knowledge is a crucial factor of competitive advantage and as such it is the basis for profit making. As Petrović, Sinder, Cirović & Milenković (2012) point out, the role of high education has a special contribution in education for sustainable development. Therefore, the authors stress the significance of developing new approaches in understanding and improving the level of environmental awareness, environmental knowledge and comprehension of environmental issues of problems of sustainability.

Having in mind the significance and current importance of studying knowledge and education through investments in human capital, this paper explores the concepts of knowledge and education as factors of sustainable development.

2. Knowledge as a factor of competitive advantage

Today, the highest value of property are people, i.e. their capital based on knowledge, skills and intellectual property. In that aspect, human capital should be aimed towards innovations and thus develop products and services that create new value.

There are two main forms of knowledge: the first is *explicit*, objective, formal, open and this is knowledge in the form of skills, data, scientific knowledge, manuals, etc. this knowledge can easily be transferred, accepted and remembered, as well as changed. The second form is so-called *implicit*, tacit, invisible, subjective, hidden and it is difficult to transfer. Implicit knowledge is crucial for the creation of new knowledge in an organization. Investments in human resources have a decisive impact on sustainability. Education policy is only a part of the strategy of investing in human resources. Studies of key factors of the growth of the most developed countries from the second half of XX century have convincingly shown that there was a significant change in their structure and thus classic material factors such as work and capital have decreased their share in value of factors engaged, but not because of scarcity, but due to the fact that non-material factors such as knowledge, scientific studies, information etc. have provided by far the greater contribution to economic growth and development (Dragutinović, Filipović & Cvetanović, 2005).

Intellectual capital consists of human capital, structural capital and external capital. Human capital is a set of knowledge, skills, experiences, intuition and attitudes of labour. Structural capital consists of a wide range of patents, models and computer and administrative systems. Structural capital of the company is actually a system, structure,

strategy and culture. External capital represents overall relations of organization and network of contributors (suppliers, buyers), their satisfaction and loyalty to enterprise.

Companies are under constant challenge of changes. Investing in knowledge and skills is the only manner to respond to the challenge. Knowledge is the basis for innovations, and they help companies to develop in accordance with changes of business environment. In their path of growth and improvement of conditions, innovations and corporative entrepreneurship have a special role. Innovations are the combination of ideals and information that bring positive changes. They include a set of scientific, technological, organizational, financial and commercial activities. *For the creation of competitive advantage, **knowledge** as basis and **innovations** as driving force are of vital importance.*

Nobel laureate James Tobin pointed, in the 1970's, to the contribution of "classic" factors to economic development, such as labour and capital, which at that time was 12%, and knowledge as the factor of productivity contributed over 80%. This tendency was even more expressed in Japan, where more than 95% of growth came based on knowledge, and only 5% from the performance of other factors (Đukic, 2011).

Traditional economic theory and practice are based on material basis through land, equipment and money and a market directed on efficient distribution of labour and capital. Today, more than 50% of gross domestic product (GDP) in developed economies is based on knowledge, i.e. on intellectual property and professionalism of people. On the example of USA, we can observe the role and significance of knowledge and human capital. Services in USA make up 76% of GDP. The foundation of services (software, health protection, communications, education, etc.) are intellectual and information processes that create the greatest part of value for companies. In manufacture, the greatest contribution to value creation comes from research and development, process designing, product creation, logistics, marketing or technological innovation.

In the era of machines, products and equipment were in the centre of attention. Today, in the era of information technology, knowledge is in the centre of attention and value is created from knowledge, skills, intellectual property and ability. All of this is contained in people and it can be said that economy today is actually the economy of knowledge, because wealth is created precisely by efficient knowledge management. Investing in the company means gathering of talents, abilities, skills and ideas, which is intellectual capital and not physical and financial resources. Having in mind previously mentioned facts that speak about the significance of intellectual capital, we shall also deal with its accounting treatment in order to adequately explain the characteristics of this field and existing situation in the Republic of Serbia.

Today, there are significant evolution changes that go to the direction of creating a more contemporary enterprise in compliance with changes initiated by internationalization of business, development of information technologies and particularly competitive economic environment. Although there are many opinions that human factor is the most significant "capital" , still it cannot be presented in accounting records as an asset (or capital) of enterprise (Mamir-Sačer & Žager, 2008).

Project EVLIA (full name: "Making good ideas a reality through using intellectual property for funding SMEs (small and medium enterprises) in South-eastern Europe"), which is implemented since 1.November 2012 and its goal is development and adoption of methodologies and parameters for economic and financial evaluation of innovative ideas and non-material property of enterprises and/or organizations. This methodology would later be used when making decisions regarding the approval of funds from banks, financial institutions, funds and/or other alternative sources of financing SMEs. By this project, intellectual goods, i.e. *intellectual capital* as a part of non-material property of an enterprise, is defined as a part of a wider range of immobilities that contributes to the

creation of market based on knowledge and process of knowledge creation, both on micro and macro level.

Non-material investments are the assets that have neither physical nor financial incarnation, and they are also mentioned as knowledge or intellectual capital. Greater part of the focus on immobilities is on research and development of crucial staff and software. However, range of non-material assets is getting significantly wider. Thus classification of the group of non-material investments is divided: computerized data (such as software and databases); innovative assets (such as copyright, design, hallmark) and economic competence (including values of brand, specificity of human capital, networks that connect people and institutions, organizational knowledge that leads to the increase of enterprise's efficiency and aspects of propaganda and marketing) (OECD, 2011).

3. Culture inclined to knowledge or "learning organization"

Knowledge, skills and abilities of employees are not provided always. Training and development must be performed at all organization levels because, most frequently, due to constant progress and change of technology, one part of knowledge becomes obsolete. If the goal is high growth and high quality, then training is an important part of the equation of success. Training is not only the responsibility of the sector for human resources, but it also requires active role of managers at all levels of organization. Good example is the company "General Electric" that engages 200 lecturers, 30 clerks, 30 human resources managers and many young managers to actively participate each year in training program for professional orientation. Topics are competition, winning in global market, as well as evaluation of the most important values in relation to the values of the company. Training encourages the employees to confront their own values. Significant element of human capital development is transfer of unique and specialized knowledge. One of the possibilities of the training is that managers analyze and observe the activities of other companies and transfer the acquired knowledge to their company. Within the company, significant role represents the transfer of own knowledge to someone else, as well as acquisition of so-called "tacit" knowledge from other workers.

Companies perform the training on the spot, organize the training at work or out of it (e.g. cooperation with universities), monitor individual progress of the employee and improve the exchange of explicit and "tacit" knowledge. It is important that employees practically use the knowledge acquired, to share them with others in the company and jointly work on achievement of company's goals and thus create new value. For that reason, there are evaluation systems. The most common are "from top to bottom" and many organizations use evaluation system from all aspects and feedback system. There is also a need to monitor "more subtle" characteristics such as communication skills and social virtues, personal values, beliefs and attitudes. For managers, it is important to achieve top results, but not at the expense of employees, but through development of essential values of company in the long run.

Culture inclined to knowledge is one of the most significant factors for the success of organization and it is difficult to create it if it does not exist already. Organizational culture is required to have a several components in relation to knowledge:

- People have a positive orientation towards knowledge: employees are smart, inquisitive, eager and free to explore, have managers that encourage them to create and use the knowledge;
- People are motivated to share knowledge and do not fear that they will lose their job;

- Knowledge management is in accordance with existing organizational structure;

Culture with positive orientation towards knowledge is the one that highly evaluates learning at the job and out of it, in which experience, professionalism and rapid innovation are evaluated. The company attracts and employs people who strengthen positive orientation.

Concept of "learning organization" is one of main characteristics of present moment, in which changes occur continuously in all life aspects, particularly economy (Sange, 2001). Changes are crucial for survival and main feature of development. They should be constant and numerous in all segments of an organization. In addition to changes, second important feature of this period is that this is the era of services. Services in developed countries make more than 60% of overall income, and number of employees in this sector is higher than 70%. For a learning organization, these trends are particularly important, because services and its attributes: reliability, politeness, communication, manners, etc. largely depend on training.

Knowledge is a factor that generates rapid changes. Changes are the condition for survival and it can be concluded that learning and training are actually the issues of survival. For these reasons, contemporary management systems are based on changes, knowledge and constant learning. We can say that training is common denominator of all management systems, and thus it represents an important framework of integrated management system.

New program, new market, new products, new suppliers, new technologies or new ways of funding require the training of employees. The aim is for the employees to be trained, to have knowledge and skills, which with experience should provide meeting the requirements, needs and expectations of users, as well as to have the awareness of the consequences that occur for organization, employees and individuals, if they are not met. Training of employees as individuals, teams and overall organization is a path towards learning organization. Learning organization is based on following assumptions:

- That knowledge is the most important capital of an organization, i.e. its significant competitive advantage,
- That knowledge as capital of an organization represents the knowledge of all employees,
- That it is continuously changed and developed through organizational learning.

Organizational learning is actually collection, expansion and use of knowledge in an organization. Organizational learning can be understood as the process of creation, development and skills in an organization. Creation of exceptional skills and knowledge in an organization represents the core of ability, which creates competitive advantage. (Dimitrovski, 2010). Essentially, in these processes there is a change of one knowledge form into the other. Process where individual knowledge becomes organizational is actually organizational learning. It is important to say that organizational learning is only one form of organizational changes, more precisely the change that creates and uses new knowledge in an organization.

4. Investment in education as factor of sustainable development

For construction of human capital, i.e. people with real skills, knowledge, responsibilities, state of mind, attitude and motivations, it is required to define permanent strategy for the needs of sustainable development. It is a manner to provide for the people with knowledge, skills, attitudes and motivation the reduction of harmful impact of society on environment and protect and preserve the planet for future generations. Key issue in creation of critical mass of required human capital is

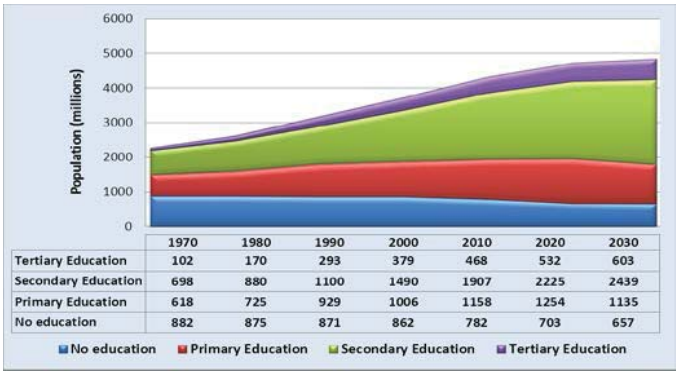
strengthening the role of education and particularly the education for sustainable development, by using multidisciplinary approach, (Ajibade, 2013) and providing the training for various groups of interested parties, including students and experts, particularly those specialized in the field of political sciences, economy, environment and agriculture. The echo of educational component for sustainable development at World Summit in Rio de Janeiro, in Brazil, was crucial for this issue. Chapter 36 of Agenda 21 says, „Education, including formal education, public awareness and training should be reorganized as a process by which people and societies can reach their full potential. Education is crucial for the promotion of sustainable development and improvement of the capacities of people to deal with environmental and development issues."(Melnychuk, Pidlisnyuk & Stefanovska, 2003).

Education is an instrument for development of human resources for the optimization of productivity, encouraging technical progress and promoting social conditions suitable for social and economic changes. The aim is to use all capital forms, including human capital, in order to reach rapid, more righteous economic growth with elimination and avoidance of bad impacts on environment – stressing the significance of education for sustainable development. After all, education is basic human right.

The very process of organizational learning creates one special value and that is *human capital*. Learning organization is actually developed and changed and it represents an innovative organization. Special organization culture is also created and acquired human capital provides a new form of interpersonal relations. Such an organization contains strong support for development. New values create better competitive position. Core of competitiveness as a source of competitive advantage is possessing and using exceptional abilities, skills and knowledge with the use of technology. Entire process of organizational learning is permanent, lifelong. Excellence is only the basis for new undertakings and creation of a new core of competence. In that manner, learning organization is created. According to Cotler, "ability to learn faster than our competitors might be our only sustainable competitive weapon".

Education is investment in the future. Figure 1 presents a projection of working-age population older than 15 for 120 countries according to education for the period 1970-2030, based on mildly moderate optimistic scenario. In addition, it shows that past decade had greater progress in education. During 1940's, number of people with no education or only primary education remained unchanged, while secondary and higher education was increased almost four times. Population with primary education or with no education reached its peak during 2010 and that number should decrease over the time.

Figure 1: Work-age population. (15 +) for 120 countries according to education 1970-2030.



	1970	1980	1990	2000	2010	2020	2030
Tertiary Education	102	170	293	379	468	532	603
Secondary Education	698	880	1100	1490	1907	2225	2439
Primary Education	618	725	929	1006	1158	1254	1135
No education	882	875	871	862	782	703	657

Source: (World Population Program)

There are also proposals by the experts, in the sense that ultimate goal is education for sustainable development, which should be achievable in order for the principles of sustainable development to become a constituent part of every man's life, efficiently using the combination of the following traditional instruments:

- Dialogue: creation of comprehension and constant dialogue between authorities, business organizations, other important actors of a group;
- Education: development and creation of new knowledge, skills and habits for encouraging the practice of sustainable development in business, economy, and daily life;
- Information: providing wide approach to information for the public regarding types of questions related to sustainable development, state of environment along with information regarding the manner of sustainability;
- Marketing: change of human behaviour supporting the decision of sustainable development, approach to knowledge and data.

Efficiency of education for sustainable development will depend on combination of the following factors: legitimacy through curriculum; new manner of learning; staff competence; institutional development; partnership and finances. Accordingly, construction of human capital for sustainable development will require the reform of education system, particularly at university level and therefore university has a rather critical role in promotion and implementation of sustainable development.

4.1 Role of university in creation of human capital for sustainable development

While the university is expected to play a rather specific role in promotion of sustainable development through its traditional functions, teaching, studies and spreading of knowledge, there is an increasing consensus that existing paradigms do not correspond to adequate long-term needs of sustainable development. For that reason, it is required for the universities to fill in the gaps by updating the strategies and procedures in order to provide requirements for progressive adaptation to physical changes, historical and social conditions, for the purpose of more active role in shaping of even more sustainable future. In that sense, universities should deal with the following activities:

- Implementation of research on sustainable development,
- Inclusion of aspects of sustainable development into existing university courses and programs,
- Implementation of programs and projects together with local communities,
- Development of new approaches and solutions,
- Creation of the awareness of sustainable development,
- Engagement together with sectors such as industry and commerce, as well as cooperation with local communities,
- Strengthening of regional and international cooperation and exchange,
- Acquisition of new methods and their application,
- Serving as role model for sustainable development,
- Establishment of partnership and networks.

5. Relation of human capital and sustainable development

There is a wide range of issues related to human capital and sustainability, with emphasis on relations between employment, health, education, economy, sustainable development, social protection and environmental protection. Examining individually, each of these issues is complex enough. The authors claim that solution for these complex challenges is possible if human choice and development of human awareness, and not only technology, politics, economy or any other factor, which is central focus and a lever for the change. However, short review of possibilities for significant progress in the next few decades can serve as an example of overall approach to sustainable future.

It is required to examine interpersonal relation of a several key determinants of sustainability – population, employment, education, health, social equality, social stability and energy consumption, in the context of gradual and progressive evolution of awareness towards mental phase. It is assumed that expectations will be in the direction of increasing standard of living and that they will continue to grow on global level, but is there any space available for the encounter of aspirations of still growing world population?

Global society does not own the ability to create possibilities for employment of all those who look for a job and to achieve full employment, under the condition that central significance of employment is recognized as basic human right. Main carrier of social development today is opening of new workplaces, and not economic policy (Schlaus & Jacobs, 2011). Namely, public stimulation programs, manipulation of money supply and interest rate sure cannot have short-term effect, but growth and development of society is the basis, which serves both as basis and context for economic growth. Full employment can be achieved on widely based socially strategy that accelerates social development, including measures that improve the quality and quantity of education and training, promotion of entrepreneurship and self-employment, increase of communication and transport speed, encourage the research and innovations and better use the power of social organization.

Of all these measures, education and training are the most important and for generation of employment and facilitation of the evolution of social awareness and culture at more mental and environmentally aware basis and less materialistic basis.

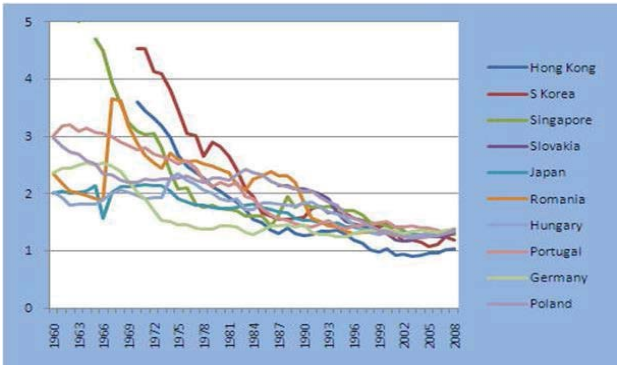
Development of capacities with low-cost manufacturers with high manufacturing of goods and services' volume in economy and creation of manufacture with higher value with lower energy inputs largely depends on the quality of human resources that are at disposal and social support for innovations. Similarly, transfer to more environmentally aware lifestyles that Elgin points to refers to education and evolution of more mentally aware society (U.S Energy Information Administration, 2010).

Population provides the most reliable insight into a long-term relationship between human capital and sustainability. The size of human population is determined by the demand for food, water, forest products, ocean fishing, energy and other non-renewable resources and it affects the climate of the planet Earth. Quality or awareness of people that determines their creativity, ability for inventions and technological innovations, employment, birth-rate and lifetime, capacity for management and peaceful coexistence, moderation of the materials of lifestyle, awareness of the environment and responsible activity is a qualitative development of human resources and it represents a key of sustainability. Recent studies of Wolfgang Lutz and his co-workers bring new evidences that support a direct relationship between the quality of human capital (measured by education level) and birth-rate. These studies conclude that raising general education level of population in the world is one of the most powerful and most efficient means for

the control of population and improvement of sustainability of human settlements. When world population in 2050 was projected based on several different education scenarios, it was discovered that higher education levels will decrease the population growth for one billion in the following four decades.

While long-term population projections are subject to extreme insecurity, education will undoubtedly have a deep impact on demographic trends (World Bank, 2010). More than a half of world population has birth-rate below the level of replacement of two survived children per a woman. Figure 2 presents ten countries with the lowest birth-rate. Birth-rate in Eastern Asia is by 50% below the replacement level. Majority of European countries are slightly below the replacement level.

Figure 2: Ten countries with the lowest fertility rate (births per a woman) 1960-2008.



Source: (World Bank)

Stochastic projections of the world population show 80-85% chances that world population will reach its peak and then start to drop before the end of 21st century. The other studies represent a project according to which if global birth-rate drops to the level that already prevails in Europe in the last 10 years, then global population could be within the range from 3,5 to 4,4 billion in 2200. and 1,1 to 1,7 billion in 2300. This leads Lutz to the conclusion that education is probably the most important run-on of strengthening for facing and adapting to dangerous consequences of climate changes. Regardless whether these projections are understood, they illustrate to what extent the future of sustainability depends on the size of population, which in return depends on education level and human choice. Development and evolution of human awareness will be the ultimate determinant of the sustainability of human capital and life on Earth.

6. Conclusion

Human capital should be aimed towards innovations and thus develop products and services that create new value. Through investments in explicit and implicit knowledge, possibilities for development are created and thus we affect the sustainability. In addition, we should have in mind that knowledge, skills and abilities of the employees are not permanently given and that through permanent training and development we must affect the improvement of organization, primarily through the impact on human capital. There are numerous companies that invest a lot of money by investing in training and development of managers at all organization levels. Thus one of numerous

possibilities of training is the observation of activities of other companies and transfer of acquired knowledge to own company.

Concept of "learning organization" is one of the main characteristics of present time, in which changes occur constantly in all life spheres, which are, however, the condition for survival and main characteristic of development. In addition to changes, other significant characteristic of this age is that it is the age of services and for learning organization it is particularly important because services and its attributes largely depend on training. Knowledge is a factor that generates rapid changes and changes are a condition for survival. From this we can conclude that learning and training is actually the issue of survival and therefore modern management systems are based on changes, knowledge and constant learning.

Key issue in investing in human capital development is strengthening of the role of education and particularly education for sustainable development. Thus one of the proposals of the experts is the use of instruments combination in the aspect of dialogue, education, information and marketing in order for the principles of sustainable development to become an integral part of each man's life. The role of university is rather specific in promotion of sustainable development through its traditional functions – teaching, research and spreading of knowledge. But, on the other hand, there is an increasing consensus that existing paradigms do not correspond to adequate long-term needs of sustainable development, due to which it is required for them to be adapted to appropriate requirements for the purpose of more active role in shaping sustainable future.

It is required to examine mutual relations of a few key determinants of sustainability – population, employment, education, health care, social equality and energy consumption. Population provides the most reliable insight into a long-term relationship between human capital and sustainability, particularly through a qualitative development of human resources, which actually is the key of sustainability.

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