THE IMPACT OF THE DIGITAL SOCIETY ON HUMAN CAPITAL

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Abstract
Nowadays, we live in a society that is constantly changing, based on globalization and a better capitalization of human capital. Human transformation and human capital management, together with product and business development, is a key priority for organizations, a lasting advantage that increases their efficiency. This article analyzes the influence of human capital on the development of digital society, and it highlights its contribution to business performance.
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1. Introduction

The Society of Knowledge, first mentioned by Peter Drucker in 1969, can not exist without human capital, because knowledge is the result of the learning of people, the information they have acquired, the management of this information, and the experience that digital technology provides today. The results highlight the importance of human capital for innovative performance and also the value of intellectual capital as a competitive advantage.

The implications of human capital for social and digital technologies today affect practically everyone. We live in a changing society based on continuous development and that greatly capitalizes on human capital. Regardless of the type of organization they work for, the profession or the stage of their careers, the human capital is the one that has implications for the evolution of the enterprises and especially for the increase of their efficiency.

The knowledge strategy provides a secure advantage for improving performance, increasing productivity and creativity, and facilitating innovation in innovative, high-tech enterprises.

This research is motivated by the need to determine the critical determinant effect, namely human capital, to enable organizations to overcome inhibitory factors and to adopt information and communication technology. Given that an economy is not sufficient to have technology, people need to stay to make the most of these technologies.

Investments in research, development and education represent one of the central objectives of the European Union, these being essential for the growth and development of a knowledge-based economy. The goal is to have a smart, sustainable and favorable economy that offers high levels of employment, productivity and social cohesion.

In today's companies, specialized ICT skills are essential for the efficient use of ICT in e-business processes and commercial transactions (e-commerce).

2. Literature review

The challenges faced by organizations throughout the whole business life require education, experience and motivation of people to engage in business strategies that will lead to business performance (Pena, 2002). In this context, it is not surprising that one of the most valuable assets in an organization is the human capital.

Gary Stanley Becker received the 1992 Economy's Nobel Prize for his research on human capital and its role in economic growth. Becker (1964) demonstrated that investments in human capital is reflected in the highest increases in labor productivity and hence in a significant contribution to boosting GDP.

During the time, many researchers analyzed the field of human capital and its implication over the organization's performances. Green (1993) demonstrated that the lack of training of employees is related to low competitiveness. Collis and Montgomery (1995) explain how the organization's resources lead to its performance, highlighting the importance of human capital to generate competitive advantage. Mata et all. (1995) and Ganotakis (2012) have used the Resource Based Theory (RBT) to demonstrate that human capital is a source of sustainable competitive advantage for entrepreneurial firms.

In the last decades, the boost of Information and Communication Technologies (ICT) had effects in all the fields of life and economy. Aldea et al. (2018) and Rostam et al. (2018) mentioned in a modern economy, it's impossible to use a product or service without a computer. Almost all organizations use computers and the Internet for running their business. The human capital needs specific skills in the field of computer science and communication to develop, adopt, support and use ITC systems related to enterprise resource planning, supply management, the management of relationships with customers and suppliers, the use of their cloud computing services, web solutions and e-commerce.

Data on ICT use by businesses in countries around the world illustrate an increasing trend. The results of a survey conducted in 2016 in the European Union show that 92 % of enterprises in the European Union use of a fixed broadband connection to access the Internet (EUROSTAT, 2017).

Dewan and Kraemer (2000) analyzing the return from IT investments at national level for 36 countries found significant differences between developed and developing countries. They explained that other complementary assets, among which human capital is an important one, are prerequisites for IT investments to be productive. This important

asset, how people use, support and extend the technology to new uses, is compulsory to gain from IT use.

In this context, the impact of ICT on human development has been analyzed by many authors during the time. Bankole et al. (2011) investigated the relationships between different dimensions of ICT investments: hardware, software, internal spending and telecommunication investment; and human development indicators: GDP per capita for the standard of living, literacy and school enrolments for education, life expectancy for health; in 51 countries.

The previous mentioned research present the influence of ITC over human capital at organization level. In the following are presented some analyses effectuated at the country level. This research represents a descriptive analysis of some composite indices for assessing ICT development and human capital and has a special importance on the economic activity from the private or state environment.

3. Composite indices to assess ICT development and human capital

In the frame of international organizations, like World Bank and United Nations, were developed various indices to assess the level of development of ITC and the human capital among the countries, highlighting the disparities among them. In the following are presented some of them:

The Technology Achievement Index (TAI) is an instrument used to measure how well performs a country in creating and diffusing technology, based on the evaluation of four dimensions (TAI, n.d.):

- creation of new technologies: The ability to innovate is measured by two indicators (Desai, 2002): the number of patents granted to residents per capita - as a measure of the level of innovation activity and the receipts of royalty and license fees from abroad per capita - as a measure of how past innovations that are still useful.
- diffusion of old innovation: The capacity to diffuse old innovation is measured by the use of two indicators (Desai, 2002): phones subscriptions and electricity consumption, indicators relevant for the participation in the new technology revolution.
- diffusion and adoption of recent innovation: The capacity to diffuse and adopt new innovation is measured by other two indicators (Desai, 2002): Internet users per capita - as a measure of Internet usage and share of high-technology exports - as a measure of sustained exports in the high technology sector.
- building human skills: The users of new technologies need to possess specialized skills. The capacity to build such skills is measured by (Desai, 2002): the mean years of schooling, reflecting the quality of education and the percentage of students in tertiary education enrolled in science, engineering, manufacturing and construction programs, reflecting the effort to develop advanced skills in science and mathematics.

For each country, is calculated a composite indicator, the Technology Achievement Index Based on the TAI score, the countries fall into one of four categories (Desai, 2002):

- leaders (TAI > 0.425)
- potential leaders (0.350 ≤ TAI ≤ 0.424)
- dynamic adopters (0.200 ≤ TAI ≤ 0.349)
- marginalized (TAI<0.200)

For the 2015 edition of the index the results are (TAI, 2015):

- leaders: United States (0.630), Japan (0.532), Korea (0.524), Germany (0.465), Switzerland (0.461), Malaysia (0.454), France (0.449), Trinidad (0.445), China (0.443), Netherlands (0.441), Singapore (0.440), Iceland (0.437), Sweden (0.435), Norway (0.434, Hong Kong (0.429), Australia (0.425). These countries obtained high results in all dimensions of technology achievement.
- potential leaders: Oman (0.422), Austria (0.422), UAE (0.412), Luxembourg (0.412), Kazakhstan (0.410), Finland (0.408), UK (0.407), Denmark (0.407), Qatar (0.407), Ireland (0.402), Vietnam (0.401), Belgium (0.400), Czech (0.396), New Zealand (0.395), Israel (0.389), Chile (0.383), Bahrain (0.383), Latvia (0.376), Slovenia (0.373), Spain (0.373), Slovak Rep. (0.370), Russia (0.370), Belarus (0.370), Uruguay (0.368), Hungary (0.364), Kuwait (0.360), Greece (0.359), Canada (0.358), Portugal (0.357), Poland (0.356), Costa Rica (0.356), Italy (0.355), Lithuania (0.355), Ukraine (0.352), South Africa (0.351). The countries in this category haven't obtained good scores in one or two of the pillars concerning the creation and diffusion of innovation. The development level of human skills is comparable with those of leaders' countries (Desai, 2002).
- dynamic adopters: Argentina (0.342), Croatia (0.341), Ecuador (0.338), Venezuela (0.336), Bulgaria (0.336), Philippines (0.333), Lebanon (0.333), Romania (0.327), Mexico (0.323), Azerbaijan (0.316), Cyprus (0.313), Serbia (0.313), Thailand (0.311), Kenya (0.305), Saudi Arabia (0.305), Panama (0.304), Cuba (0.297), Colombia (0.294), Tunisia (0.290), Macao SAR (0.287), Brazil(0.278), Algeria (0.271), Jordan (0.269), India (0.259), Morocco (0.248), Turkey (0.247), El Salvador (0.244), Sri Lanka (0.235), Puerto Rico (0.232), Dominican (0.232), Iran (0.226), Egypt (0.221), Peru (0.220), Uzbekistan (0.219), Indonesia (0.215). The high technology industries in these countries are well developed, the peoples have high human skills, but the diffusion of innovation is slow and many times incomplete (HDR, 2001).
- marginalized: Syria (0.193), Libya (0.189), Guatemala (0.181), Cameroon (0.141), Pakistan (0.141), Iraq (0.139), Coted'Ivoire (0.139), Bangladesh (0.136), Nigeria (0.135), Sudan (0.130), Ethiopia (0.098), Yemen (0.080), Tanzania

(0.079), Congo (0.065). These countries are far behind in terms of technology usage and diffusion of innovation.

Assessment of skills is an essential component of the index. The knowledge society is a complex phenomenon that has a major and omnipresent impact on all aspects of human activity. Both creators and new technology users need skills. Millions of jobs in all sectors such as transport, production and commerce are likely to be automated. Current technology requires expertise from the human capital to master the constant flow of innovations. Every skilled human capital country is needed to attract and add new technologies.

4. The ICT Development Index

The ICT Development Index (IDI) is another composite indicator designed to assess the level and the trend of ICT development in developed and developing countries. IDI is made up of 11 indicators, grouped into three components:

- ICT use: The indicators in this category are: the intensity and use of ICT the percentage of people using the Internet, fixed tape subscriptions per 100 inhabitants, mobile broadband subscriptions per 100 inhabitants \
- ICT access: In this category are included five infrastructure and access indicators: fixed-telephone subscriptions, mobile-cellular telephone subscriptions, international Internet bandwidth per Internet user, households with a computer, and households with Internet access;
- ICT Skills: Here are included indicators related to human performances: adult literacy, gross secondary enrolment, and gross tertiary enrolment (International Telecommunication Union, 2020);

The results show that most states have improved their performance. Denmark, the Netherlands and Sweden recorded the highest values, which means that they have the most significant development of the ICT sector. On the opposite side, with the lowest values are Romania, Bulgaria and Poland. In addition, despite the high number of ICT graduates, these countries do not perform in terms of basic or advanced digital skills of individuals, being found consistently at the lower end of the digital competitiveness scale from the perspective of human capital over 2014-2017:

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5. The Human Development Index

The Human development index (HDI) is a composite index developed on the base of three dimensions of human development: life expectancy, access to knowledge and a standard of living. (http://hdr.undp.org/en)

HDI provides an overall picture of the level of human development in all analyzed states, a global appreciation of their progress. It could be used to facilitate a better understanding of the impact of human capital on digitization, highlighting the different strategies that have been pursued the achievement of human well-being. The values of the HDI index allow the characterization of the evolution of human development and the comparison of the experience of different countries or regions in the field of economic and social progress.

The values for HDI index for the top 50 countries in 2015 are: Norway (0.949), Australia (0.939), Switzerland (0.939), Germany (0.926), Denmark (0.925), Singapore (0.925), Netherlands (0.924), Ireland (0.923), Iceland (0.921), Canada (0.920), United States (0.920), Hong Kong China (0.917), New Zealand (0.915), Sweden (0.913), Liechtenstein (0.912), United Kingdom (0.910), Japan (0.903), Korea (0.9010, Israel (0.899), Luxembourg (0.898), France (0.897), Belgium (0.896), Finland (0.895), Austria (0.893), Slovenia (0.890), Italy (0.887), Spain (0.884), Czech Republic (0.878), Greece (0.866), Brunei Darussalam (0.865), Estonia (0.865), Andorra (0.858), Cyprus (0.856). Malta (0.856), Qatar (0.856), Poland (0.855), Lithuania (0.848), Chile (0.847), Saudi Arabia (0.847), Slovakia (0.845), Portugal (0.843), United Arab Emirates (0.840), Hungary (0.836), Latvia (0.830), Argentina (0.827), Croatia (0.827), Bahrain (0.824), Montenegro (0.807), Russian Federation (0.804), Romania (0.802). We can see that the first 18 countries have an indicator of over 0.9 and the others over 0.8. Norway, Australia and Switzerland are in the top with very close values.

Based on the index values, countries were divided into:

- very high human development
- high human development
- medium human development
- low human development

This index highlights the fact that human capital and their abilities are essential criteria for assessing the development of a country. The results show a clear division of northeast countries and Southeast countries. This index is criticized because it does not include technological development and focuses only on performance and national classification. It is also criticized in terms of data errors in basic health, education and income statistics used in HDI.

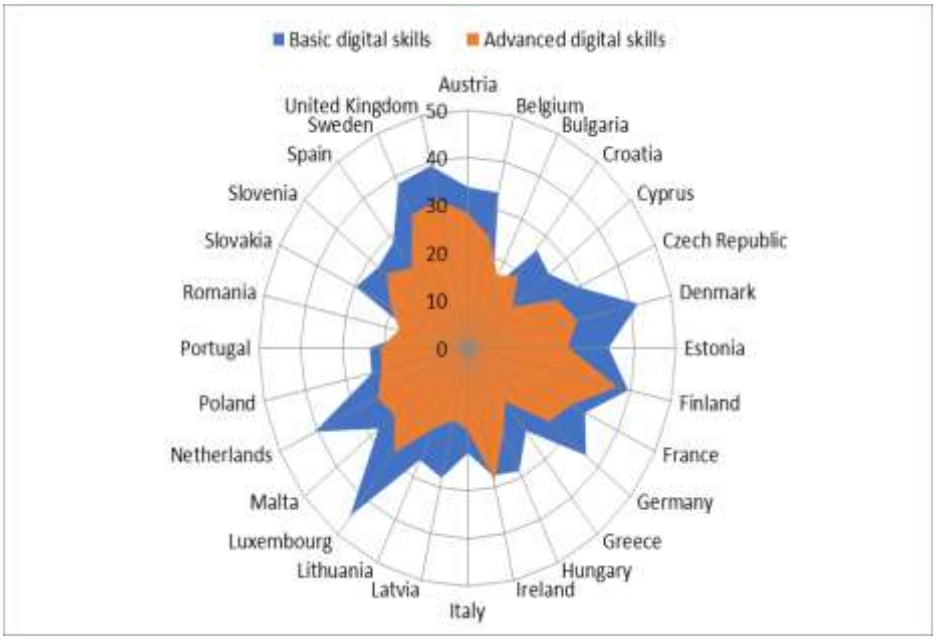
6. The Digital Economy and Society Index (DESI)

In 2014, the European Commission launched the Digital Economy and Society Index (DESI). In the size of the Human Capital, based on data collected from Eurostat,

we can say that Denmark, Luxembourg, Finland, Sweden and the Netherlands achieved the highest scores in 2016 and Romania, Bulgaria, Greece and Italy obtained the lowest scores. 79% of Europeans go online regularly (at least once a week), up 3 percentage points over last year. 44% of Europeans still do not have basic digital skills. DESI scores by dimension:

- Connectivity
- Human Capital/Digital skills
- Use of the Internet by citizens
- Integration of Digital Technology by businesses
- Digital Public Services

Fig 1 The digital competitiveness of the EU 28 member states from the perspective of human capital over the period 2014-2017



Source: European Commission, 2014-2017

The Human Capital dimension measures the skills needed to take advantage of the possibilities offered by a digital society. The European Union has slightly improved the number of STEM graduates (19 graduates per 1,000 people aged between 20 and 29 in 2014 compared to 17 in 2012) and the share of ICT specialists in the workforce (3.6% in 2015, as opposed to 3.2% in 2013). The increase in the number of ICT specialists was on average 3% over the ten-year period 2006-2015. This rapid growth demonstrates the increasing importance of ICT in the global economy.

ICT specialists are essential factors in the use of digital technology. Based on the data collected from Eurostat, we compared the EU Member States with the hiring of ICT specialists in 2016. According to this analysis, Denmark, Austria and Finland are the countries with the best skills in the field of digital skills and competences, and at the other

end, we have countries like Romania and Bulgaria, which are quite different from the EU average.

Businesses from all countries reported difficulties in recruiting ICT specialists, especially in the Czech Republic, Slovenia, Luxembourg, Austria, Belgium and Estonia. To solve this problem, some businesses offer ICT training. Thus, they manage to develop human capital, adopt and develop new technologies to overcome any obstacles.

Based on data for 2012, on average, 41.6% of EU enterprises engaged in technological innovations have provided support training. In 14 of the 23 EU Member States for which data from 2012 are available, this share was higher than 40%. The figures were highest in Cyprus (85.5%) and Luxembourg (72.1%) and the lowest in Spain, Romania, Latvia and Sweden (all below 30% in 2014).

High employee incompatibilities and inappropriate levels are very costly for employers, workers and society in general. According to Cedefop's forecasts, around 16 million jobs will be created between 2015 and 2025, requiring a high level of education, while jobs with a low level will be reduced by more than 7 million.

7. Conclusions

Competitiveness, innovation and job creation in the European industry are increasingly determined by the use of new information and communication technologies. This must be supported by a workforce that has the knowledge and skills needed to use these new technologies efficiently. Productivity increase is not the result of technological progress, but it is instead an effect of the diffusion of information and communication technology at the level of human capital. It is very clear that it is not enough for an economy to have technology if it does not have the staff to use these technologies. The lack of ICT specialists and workers with advanced ICT skills could hamper Europe's growth objectives. The European Commission is working on a series of initiatives to stimulate ICT skills in the workforce so as to make a balance between demand and supply of specialists. The Coalition on Digital Competitiveness and Jobs must support cooperation between education, employment and industry to develop a wide variety of digital talents and to ensure that individuals and the workforce in Europe have the appropriate digital skills. These people must have sufficient knowledge, information and creativity to create a competitive advantage for the organization.

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