

## EDUCATION AND TRAINING AS ENHANCERS OF ECONOMIC GROWTH AND COMPETITIVENESS

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**Abstract:** A nation requires the contribution of several factors to be able to achieve sustained levels of economic development over time. One of the most important and differentiating indicators of a nation's success is the qualification of its population, which is reflected in the degree of sophistication, decision-making ability, and strategic vision of its leaders and elites. Kruss et al. (2015) analyze the importance of education, skills, labour efficiency, technological innovation, and more advanced production for economic development.

Based on the Global Competitiveness Index developed by the World Economic Forum, focusing on the evolutionary behaviour of a group of 40 countries (top 20 most competitive and the European Union countries), between 2008 and 2017, this paper aims to determine whether a correlation can be established between the competitiveness of countries and the education and training indicators of societies. The results reveal that, to different degrees, there is a quantifiable relationship between education and training (during the active life) of the labour factor and the competitiveness of economies, which will be reflected in the level of development of nations, the creation of wealth, and the establishment of high and sustainable levels of social welfare.

**Keywords:** *Education, knowledge, training, competitiveness, economic development.*

### 1. Introduction

Economic development can be assessed through the country's competitiveness, leading to a greater capacity to create wealth in the economy and higher income levels, themselves reflected in social and human development and the population's well-being. Competitiveness and consequently economic growth are desired by any country. Globalisation has increased economic competition within and between countries and regions of the world. Economic competitiveness is generally seen as a valid index to judge the level of prosperity of a country [(García-Sánchez et al., 2021); (Oliinyk et al., 2021); (Sahlberg, 2006)]. The increasing change that the globalisation process has brought, has created a new paradigm in the world economy that is challenging traditional theories of competitiveness and growth. Studies emphasize that, against the backdrop

of a growing and highly globalized and competitive world economy, a competitiveness strategy oriented towards technological science and innovation is critical for increasing the competitiveness of countries and achieving long-term sustainable growth [Chankseliani & McCowan, 2021) (Doğan, 2016); (Carayannis & Grigoroudis, 2014); (Cantwell, 2006)].

Several authors point out that under the conditions of a highly globalised and competitive world economy, the competitiveness strategy oriented towards technological science and innovation is crucial for increasing the competitiveness of countries, but also for achieving long-term sustainable growth [(Secundo et al., 2020); (Doğan, 2016); (Mazzucato et al., 2020); (Carayannis & Grigoroudis, 2014); (Cantwell, 2006)]. Faberberg (1988) developed a model of international competitiveness and economic growth with different trends where the ability to compete technologically is central, as opposed to the ability to compete on delivery and the ability to compete on price, which is more limited.

Petrariu et al. (2013) argue that innovation, being an activity associated with developed countries, is associated with the economic growth achieved by countries in the long run. Verspagen (2006) analysed the gap between the evolutionary approach and the "endogenous growth theory", considering that this gap is rooted in fundamental differences in their basic worldviews. Endogenous growth theory, in the neoclassical tradition, adheres to a view in which cause and effect are separable. Ulku (2004) analyses endogenous growth models based on innovation developed in R&D sectors, allowing for sustainable economic growth, provided there are constant returns from innovation in terms of R&D. National competitiveness is also related to countries' entrepreneurship capacity, another driver of economic growth (Gardiner et al., 2012). Korez-Vide and Tominc (2016) conclude that efficiency-oriented countries have made greater progress in several pillars of competitiveness, which is reflected in their economic growth.

The World Economic Forum has developed an index that assesses the competitiveness of nations, based on the factors that determine economic growth and development and tries to explain why some countries are more successful than others in creating economic growth and income. The competitiveness index distinctly weights different components, each of which reflects complex aspects and is grouped into 12 pillars of economic competitiveness the basic requirements (institutions, infrastructure, macroeconomic environment, or basic health and education) that characterise factor-oriented economies; the efficiency enablers (higher education and training, goods and services market efficiency, labour market efficiency, financial market development, technological readiness or market size) key aspects for efficiency-oriented economies; and the innovation and sophistication factors (business sophistication or innovation) factors exploited by innovation-oriented economies (WEF, 2016). In 2018, the World Economic Forum updated the model, including new concepts and new methods of data collection. The Global Competitiveness Index 4.0 provides new insights into factors that have grown in importance with the 4th Industrial Revolution: human capital, innovation, resilience, and agility (WEF, 2017).

### 1.1. The Importance of education in the competitiveness of an economy

Barro (2001) considers some differences that emerge in determining differences in economic growth between countries, such as the trend towards a higher convergence rate in rich countries with significant effects of international openness, and changes in the terms of trade in less developed countries, as well as negative aspects of government consumption in these countries. Badruddin et al. (2019) evaluate the impact of education on entrepreneurship with an influence on the country's innovative performance and national competitiveness.

Education serves to shape the level of socioeconomic development around the world, assessing the impact of national education system development indicators on the determinants of economic development, macroeconomic, innovation and technological determinants (Chentukov et al, 2021). The performance of secondary and higher education institutions in terms of research and development criteria is fundamental to boosting economies and improving national economic performance indicators (Tóth et al, 2019).

Over time, the increasing need for reforms in the education sector has been justified by the urgent need to increase labour productivity and promote economic development and growth through the expansion and improvement of education [(Wilkinson, 2022); (Bilan et al., 2020); (Hanushek & Woessmann, 2010); (Sahlberg, 2006)]. It is generally assumed that to increase economic competitiveness, citizens must acquire the knowledge, skills, and attitudes necessary for civic success and the development of a knowledge-based economy [(Baumann & Winzar, 2016); (Lane, 2012)]. Sahlberg (2006) concludes that instead of competition between education systems, networking, deeper cooperation, and open sharing of ideas at all levels are essential if the role of education in economic competitiveness is to be enhanced.

Several studies analyse the relationship between the migration of higher-skilled workers, economic growth, and the competitiveness of countries. Oliinyk (2021) concluded that the immigration of workers with higher education impacts positively and significantly on increasing the competitiveness and economic development of countries. Ramoniene & Lanskoronskis (2011) determine that aspects such as qualities and quantities of secondary and higher education, funding capacity, quality of scientific research institutions, and links between higher education and the labour and business sectors are fundamental to national competitiveness. The growing competitiveness of the markets is creating new challenges for education and, in particular, for higher education institutions (Paul, 2005). Antoniuk et al, (2019) develop a systemic vision of the global and comprehensive competitiveness of national higher education systems.

On the other hand, Gyimah-Brempong et al. (2006) determined that all levels of human capital creation, including higher education, have a positive and statistically significant effect on the growth rate of per capita income, particularly in developing countries. Kruss et al. (2015) analyse the importance of education, skills, labour efficiency, technological innovation, and more sophisticated production for economic development.

## 1.2. Training as an enabler of the human factor

The labour market is facing new challenges, from improving the mobility or employability of workers, with vocational training being fundamental (Mizrahi & Natan Krup, 2022). Dima et al. (2018) analyse the influence of different indicators relating to the knowledge economy on the competitiveness of countries, such as access of the population to higher education, or indicators of lifelong learning, with the results reflecting the importance of innovation and education as determining factors of competitiveness and economic development.

Training is one of the important predictors of the competitiveness of nations, i.e., excellent performance in the continuous development of human capital is essential for nations to achieve high performance at the economic level. Pelinescu (2015) considers that growth focused on intelligence, sustainability, and inclusion, cannot be achieved without a relevant contribution of skills, knowledge, or value of people, commonly known as human capital. Nowadays, the labour market wants workers who have an additional set of skills and attributes - employability skills - that mould them to the demands of competitiveness (Suartha et al, 2017).

Borras & Edquist (2015) analyse the primary focus given to the development of competencies (education, training, and skills) through the creation of innovation policies. The paper identifies three overall deficiencies and imbalances in innovation systems in terms of education, training, and skills: the insufficient levels of skills in a system, the mismatch between companies' short-term needs for specific skills and the long time needed to develop them, and the imbalances between internal and external sources of skills in companies. Based on these elements, the document draws up a set of general criteria for the (re)design of policy instruments that address these tensions and imbalances (Borras & Edquist, 2015).

Perez & de Pablos (2003) determine how, in the new economy, the search by firms for sustained competitive advantage depends on the development and efficient use of knowledge-based resources. However, not all resources are equally relevant for the achievement of competitive advantages and the conjugation of knowledge management, intellectual capital and strategic management of human resources is essential for the development of an integrative framework of analysis of human capital [(Pasban & Nojedeh, 2016); (Perez & de Pablos, 2003)]. Ashton & Green (1996) define that throughout the industrialized and developing world, economic growth is increasingly linked to skills training to foster increased labour productivity, reflected in higher living standards. Le et al. (2020) assess the relationship between education and training as one of the greatest concerns for the labour market, as the main drivers of growth and development, with lifelong learning standing out.

Several studies seek to assess the impact of education and training in a country on the country's economic growth and competitiveness [(Kurbanov, 2023); (Na, 2021); (Popkova & Zmiyak, 2019); (Cherkesova et al., 2016); (Blundell et al., 1999)]. Wilson & Briscoe (2004) suggest a weak correlation between investment in human resources and growth in gross national

product, while increased investment in education leads to higher productivity resulting in significant social rates of return. Brante & Sloka (2021) assess the importance of vocational education in developing the national economy and ensuring the country's competitiveness, with new and innovative forms of training to qualify professionals in the knowledge and skills required by the labour market.

Mincer (1984) considers that human capital growth is both a condition and a consequence of economic growth, with activities involving not only the transmission and incorporation into people of available knowledge but also the development and creation of new knowledge. Galor & Tsiddon (1997) analyse the interaction between human capital distribution, technological progress, and economic growth, considering that the composition of human capital is a key factor in determining the pattern of economic development.

Bravo-Ortega & De Gregorio (2005) assess the importance of resource endowment for economic development, with natural resources holding a permanent positive effect on income, resulting in welfare gains, and a negative effect on its growth rate that can be offset by a high level of human capital. Thus, once again, the importance of human capital in a country's economic development is emphasised.

## 2. Methods and research objectives

This paper provides an evolutionary analysis of the rankings of higher education and training in the top 20 most competitive countries and the nations belonging to the European Union, constituting a group of 40 countries, between 2008 and 2017. The quality of higher education and training in the workplace is crucial for any economy that wants to move up the value chain, developing more sophisticated and valuable production processes and products. In the current global context, economies must have well-trained workers who can adapt quickly to a changing environment. Therefore, the quality ratings of the education system, in an assessment made by the business sector according to the need to increase its competitiveness; and the evolution of the extent of staff training, a key aspect of human capital development in enterprises, were considered as variables for analysis. The extent of staff training and its continuity throughout life is of major importance for efficient work performance (often neglected in many economies), and for ensuring a constant upgrading of the skills of workers to the changing needs of economies.

To test the existence of a relationship between competitiveness and education, the methodology adopted consisted of developing correlation analysis models (Pearson's coefficient) for each year of the period under analysis and a multiple regression model for the last year in which there is available data. With this methodology, it was intended to understand the evolution of the values of the correlations over the period under analysis, with a particular incidence in 2017. The values associated with the variables included in the models were the inverted values of the rankings of the indexes of forty countries related to Competitiveness (IC), Higher Education and Training (HET), Quality of Educational System (QES), and Extension of Staff Training (EST). Through

this model, it would be possible to get data that would allow perceiving and quantifying the degree of the relationship between the independent variables (HET, QES, and EST) and the dependent variable (IC). The hypotheses formulated were as follows:

H1: Competitiveness and Higher Education and Training are positively and strongly correlated.

H2: Competitiveness and Quality of the Educational System are positively and strongly correlated.

H3: Competitiveness and the Extent of Staff Training are positively and strongly correlated with each other.

H4: Competitiveness is statistically dependent on all independent variables.

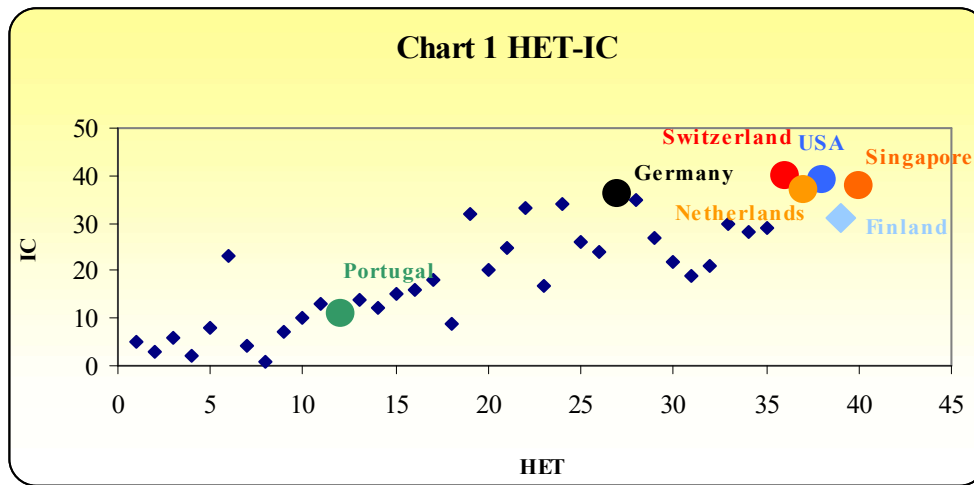
### 3. Discussion

The analysis of correlations shows that the first three hypotheses were partially confirmed by data. The values of all correlations indicate that the variables are associated with each other, although the impact of the independent variables is not the same over the years under analysis. Thus, the correlations between Higher Education and Training and Competitiveness, on the one hand, and between the Extension of Staff Training and Competitiveness, on the other, show reduced variations over the 2008-2017 period: in the first case, the correlation coefficient values are between 0.84 (2009, 2014 and 2016) and 0.89 (2011 and 2013) and, in the second case, there is a smaller variation, between 0.88 (2013) and 0.91 (2008-2010), but both always within the range of strong positive correlations of the Pearson coefficient scale. On the other hand, the correlations between the Quality of the Educational System and Competitiveness have a wider variation, from 0.73 (2014) to 0.84 (2017), that is, in some years this coefficient fell within the range of moderate positive correlations, thus being variable with the least impact on the behaviour of competitiveness. In summary, the correlation values confirm that the higher the level of Higher Education and Training, Extension of Staff Training and Quality of Education System, the stronger the competitiveness of the countries included in the study, based on the analyzed rankings. This assertion is confirmed by the systematic presence of the countries that are at the top places in the rankings that we adopted as independent variables among the ten most competitive countries: Switzerland, USA, Singapore, Netherlands, Germany, Hong Kong, Sweden, United Kingdom, Japan, and Finland. Focusing on the European Union (EU) countries, and in addition to those already mentioned, Denmark, Austria, Luxembourg, and Belgium stand out, placed among the twenty most competitive countries. Although these conclusions are important for this study, if the analysis focuses only on correlations for the year 2017, we will find some significant differences between the models.

Through the scatter plot of the correlation between the Higher Education and Training rankings and the Competitiveness Index (Figure 1), the gap between Germany and the remaining four most competitive countries is evident, being surpassed by nine countries with lower

competitiveness indexes. The very good performance of Finland should also be highlighted, which places the country in second place in the Higher Education and Training ranking. Data for Portugal confirm the correlation of the model, with an association between the values for Higher Education and Training and the country's position in the Competitiveness Index ranking. However, it should be noted that Portugal's performance in Higher Education and Training is better than in countries with higher Competitiveness Index rankings, such as Malta, Poland, and, mainly, Luxembourg.

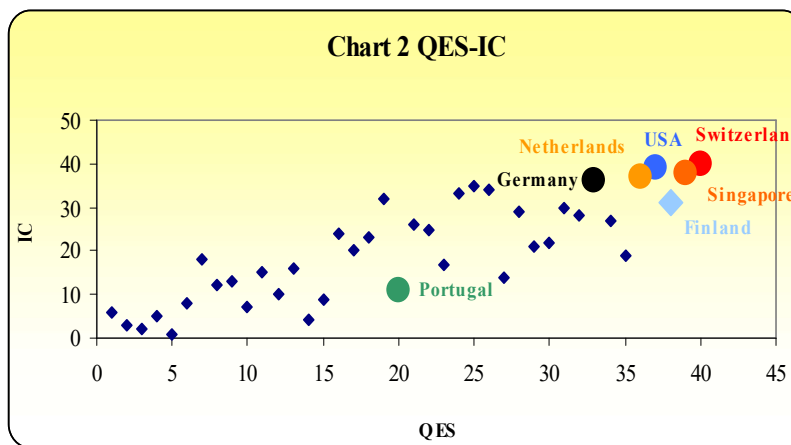
**Figure 1. High Education and Training and Competitiveness**



Source: WEF (2008-2017)

When we analyze the scatter plot representing the correlation between the Quality of the Educational System and the Competitiveness Index (Figure 2), we realize that, among the five most competitive countries, Germany is, again, the one that loses more ground to the top, being overtaken once again by Finland, Ireland and Canada. In this indicator, Portugal performs quite well, clearly above more competitive countries, such as Spain, France, Luxembourg, Austria and Japan.

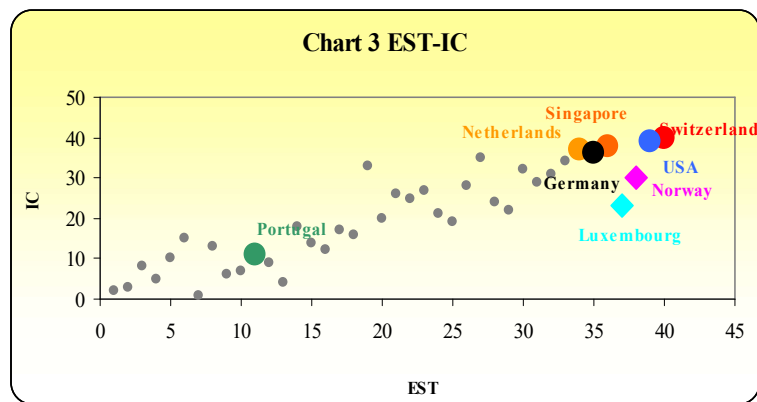
**Figure 2. Quality of Educational System and Competitiveness.**



Source: WEF (2008-2017)

Finally, the scatter plot relating to the correlation between the Extent of Staff Training and the Competitiveness Index (Figure 3) is clear in demonstrating the top 5 disruptions by the meddling of two countries with lower competitiveness rankings (Norway and Luxembourg), taking Germany and the Netherlands out of the top five for Staff Training Extension. Finland, which stands out in the other two indicators, has a lower performance in the EST than the seven countries highlighted in the chart and is even surpassed by Sweden. In this indicator, Portugal has its worst performance, being surpassed by countries with a lower Competitiveness Index such as Slovenia or Cyprus.

**Figure 3. Extension of Staff Training and Competitiveness.**



Source: WEF (2008-2017)

In addition to the correlation analyses, we developed a multiple linear regression model just for the data of the same indicators for 2017, to test H4. The explanatory capacity of the model is good ( $r^2 = 0.85$ ) and confirms the statistical relationship between the Extension of Staff Training and Higher Education and Training, as independent variables, and Competitiveness. However, this relationship is not verified for the Quality of the Educational System ( $p > 0.05$ ), which reinforces the lesser relevance of this indicator as an explanatory factor of competitiveness. Thus, H4 is not fully confirmed. Using stepwise regression analysis to assess the effect of the three explanatory variables on the dependent variable, it was possible to infer that QES loses significance whenever HET is present in the model.

#### 4. Conclusions

The aim of this paper is to assess the importance of aspects relating to education in nations for their competitiveness and prosperity, reflecting the economic development generated. In fact, national competitiveness strategies based on the pillars of training and education of human resources and technological innovation are differentiating and more sustainable in the long term.



From the analysis of the correlations carried out, the relevance of education and training in the competitiveness of each country is perceptible, although there are differences in the weight of each of the indicators, as well as in the performance of each country. Switzerland, the USA, and Singapore are consistently among the top five countries in terms of Higher Education and Training, Quality of Education System and Extension of Staff Training – which helps to explain why they are the countries with the highest Competitiveness Index in 2017 – it is possible to find in some indicators the presence of countries – such as Finland, for example – that show better performances.

Another conclusion that we can draw is that the values of the coefficients point to a greater impact of the Extension of Staff Training on competitiveness, with the weakest indicator being the Quality of the Educational System. Furthermore, this indicator has no statistical relevance in the regression model, which is a particularly important factor in explaining why a country like Finland does not have a higher Competitiveness Index, despite its position in the Quality of the Educational System and Higher Education and Training rankings. Although with more modest results than Finland, Portugal is also affected by this factor. In other words, the best performance of the country among the analyzed rankings is precisely in the Quality of the Educational System, whose impact on the Competitiveness Index is weaker than it would be with any other of the indicators. For this analysis, we must bear in mind that these data refer to 2017, when Portugal reached only the 42nd place in the Competitiveness Ranking, starting to recover from falling two years in a row (from 36th in 2014 – then the best ranking to far – to 38th in 2015 and 46th in 2016), the 17th more competitive country in the European Union, below Lithuania and above Italy. In this context, the results show that, with different weightings, there is a quantifiable relationship between the education and training (extended throughout working life and not just during the traditional education period) of human resources and the competitiveness of economies, which has an impact on the stage of development of countries, the capacity to create wealth to be distributed among society and the establishment of high and sustainable levels of social welfare.

In conclusion, to increase the competitiveness of nations, the mainstay of economic growth, it is essential that economies base their economic development model on sophisticated technology, knowledge, and qualified human resources. These will be the pillars for a developed economy fighting for sophisticated markets and demanding consumers, but with high purchasing power, where the potential for value creation, brands, and reputation will be substantially higher, formatting the economy for a spiral of sustainable growth.

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