

The Role of Higher Education in Shaping Global Talent Competitiveness and Talent Growth

Liene Leikuma-Rimicane, Erick T. Baloran, Roel F. Ceballos, and Milton Norman D. Medina

Abstract—The role of higher education in shaping global talent competitiveness and growth in the modern world is an excellent area of interest. To meet the growing demand for talented human capital in today's modern industries, HEIs must mobilize and standardize policies and develop programs for talent management among students as the future workforce. This study aimed to analyze the role of HEI in shaping talent competitiveness and growth. Selected higher education indicators that characterize the talent and growth development of at least 117 countries were analyzed using R version 4.1.3. The Global Talent Competitiveness Index (GTCI) was used to measure the talent competitiveness of the selected countries. To measure talent growth, we used the average annual change in the GTCI over the last five years; hence secondary data on the role of higher education in shaping talent competitiveness and growth were used. Various academic factors and skills that stimulate global talent competitiveness and growth are outlined in this study. Considering the factors that affect talent competitiveness and growth globally, colleges and universities place a strong emphasis on developing graduates' skill sets, advocating for, and organizing aspects in terms of mean years of schooling, including professional development, internet, and digital skills, and getting students ready for international co-invention and scientific publication.

Index Terms—Competitiveness, development, education, economic growth.

I. INTRODUCTION

As the main driving force of the talent economy, the idea of talent has become widely employed in scientific, economic literature, and global economic research. Talent is constant and the primary determinant of a fundamental component of the modern world's countries' economic development referring to their attained economic success. At the same time, a country's own talent competitiveness is often not the driving force behind its short-term economic success. Often, it is sufficient to attract talent from outside the country to

enhance economic growth. Still, it is also essential to nurture skills and create conditions for efficient workforce within the country. This is for the modern world's countries to be sustainable. The Global Talent Competitiveness Index (GTCI) considers all these factors [1].

The GTCI assesses how countries grow, recruit, and retain talent allowing policymakers to develop policies to improve talent competitiveness. It assesses a country's talent competitiveness by identifying solid ecosystems. Greater flexibility, independent branding opportunities, financial independence, strong links between government and businesses, use of technology, investment in innovation and research, entrepreneurial aspects, and levels of collaboration among stakeholders are all criteria used to evaluate strong ecosystems. High-income countries appear to be leading in this survey because they can establish a talent pool with global knowledge and skills on a constant basis. In 2018, Switzerland is ranked first in the index, followed by Singapore, the United States, Norway, and Sweden [2]. Literature expresses the need for a description of competencies perceived as essential for talented professionals, particularly in international business, not only from a European but also from an East Asian perspective [3], [4]-[7] in line with the increased global demand for talent [8].

Relative to this, talented professionals with set of competencies are in demand for the economic development. With the concept of human capital, which is rooted in economic science development, [9] it was explained that economists seek to highlight and draw attention to the ability of workers to work with machines and design same to enable humans cope with hard work in the world of work. In view of this, there is certainly the need for the individual to increase his/her knowledge, skills and abilities for the progress and development of our world and society. In addition, human capital involves increase investment in education and training of the individuals [10]. Individual's abilities can be enhanced through education and training that bring about effective change in the performance of jobs. These skillful individuals are shaped as human resources of a country. Moreover, in today's competitive business industries, companies are looking for competitive human capital. The search of factors that explain the competitive advantage of companies have revealed that individual competencies are resources that enable companies to generate profits and maintain their competitive edge. The company's strategy is determining the competencies that its employees should have to help and support successful development.

In the European context, a region's ability to attract and retain highly talented skilled workers has become a critical factor in increasing its economic advantage and well-being. Furthermore, talents are defined in a broad sense and relate to

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those with a tertiary degree. The overall ranking of European regions in terms of talent attraction and retention reveals that the most innovative countries, such as Switzerland, Norway, Finland, and the Netherlands of the top regions, account for a considerable share with high percentage of attracted talents. In 2019, research found that London, United Kingdom, is the most appealing region inside the European Union, followed by Île de France which contains the French capital and the UK region "Berkshire, Buckinghamshire, and Oxfordshire." Outside of the European Union, the best-ranked regions are Norway's Oslo, Akershus area and Switzerland's Zurich. The top eight countries in the top 10 European regions are also among the top 14 countries in the world, with Switzerland at the top [11]. Since 2015, various viewpoints on talent management have been set in European Higher Education. The culture toward talent development has improved in 11 European countries and it now has a place in most education philosophies among higher education institutions. For example, in the Netherlands, research universities are the first HEIs to launch honors programs, followed by universities of applied sciences which is unique amongst its EU counterparts. Further, every European country has at least some policies or programs in place to help gifted students enhanced their training. These provisions are frequently based on cognitive abilities. If higher education recognizes talent development, it is most likely placed in the teacher education. Higher Education Institutions particularly research universities, work in the worldwide realm of scientific research as well. Most often, most-cited journals publish the best research. Hence, countries that want to succeed on the world stage must follow the system's rules [12].

In Asia, talent mobility is fluid because the number of highly talented individuals crossing borders expands. For example, a Chinese corporation may hire a European team to handle investment in Africa. As a result, attracting and retaining talent within national borders has become a critical policy priority in this region. Faced with mounting pressure to improve their worldwide university rankings, Asian governments and universities have tried a variety of strategies, including specific funding schemes and other sorts of assessments to shape teaching, learning, and research activities [12]. Talent becomes a mainstream political agenda to drive mega-social/economic transformation and competition [13]. The integration of foreign talent into local universities started when labor quality improved, and supplementation of the shortage of local graduates became the critical concern for more mature economies such as Japan, Korea, Taiwan, or Singapore. Not so much in Asian countries with very high population and high turn-over of graduates. For example, the Japanese government ensured to internationalize educational systems and campuses by introducing degree programs taught in English. Higher education institutions are also expected to improve their inter-university networks to share educational resources and other outputs [14]. These are intended to attract students and researchers from different countries with friendly learning or working environments. Such aspiration is closely linked to the transformation of local talent into a global human resource, and it has served as a supplement to a national economic agenda [14], [15]. In some Asian countries, such as

Malaysia, HEIs, particularly universities, are seen as talent attractors, educators, and retainers. Higher education has been identified as a vital aspect in building the country's talented human capital. Many of Malaysia's programs emphasize the need to foster human capital development by establishing a "world-class" higher education system [16], [17]. Also, China has a vast talent pool worldwide, particularly in Western countries, including Australia, and the importance of higher education institutions in launching measures to bring overseas talent back to mainland China in several ways [18].

With above foregoing scenarios, it is evident that higher education institutions are building talent programs to address the global demand for talented workforce in the worldwide job market. These programs concentrate on three talent domains: communication, achieving results, and seeing patterns and interrelationships [19]. International business education programs prepare students to meet the demands of globally operating businesses. These demands are rapidly changing due to globalization, more mobility, and new technology, and more advanced skills are required [20]-[23]. Global companies recognize that highly talented workers provide a competitive advantage [24]-[26]. This results in high demand for highly talented workers with a set of various competencies vital for companies [27]. This talent demand impacts education, as it is becoming increasingly vital to prepare talented learners to become talented professionals. In addition, special talent programs are being developed in higher education to train such talent with specialized skills required by the technical field [12], [28], [29].

Considering the rich literature on the role of higher education in shaping talent worldwide, this paper aimed to test the role of higher education in developing global talent competitiveness and growth. Regression analysis and correlation analysis on variables were done to characterize countries' higher education and talent competitiveness in the modern world. The authors rely on the human capital theory for the theoretical underpinning of this study. The theory asserts that human capital, which refers to an individual's knowledge and abilities, maybe created, acquired, accumulated, improved, retained, and managed, and its value can be manifested in all levels of society [30], [31]. Competent human capital has been demonstrated to predict population, productivity, and total economic growth, which is the core aspect of this theory [32]. In this study, the human capital theory posits that formal training provided by higher education institutions improves individuals' productive ability [33]. This study provides a theoretical referent on various factors which significantly stimulate and inhibit the talent competitiveness and growth of countries in the modern world. With the increasing demand for talented human capital in today's modern industries, HEIs must invest in mobilizing and standardizing policies and strengthening programs for talent management among students as future workforce. Hence this study provides information for higher education institutions in the world on which skillsets for talents a priority for investments.

II. METHOD

The basis of information for this study is based on the Global Talent Competitiveness Index (GTCI) report released by INSEAD. The GTCI measures how well countries enable, attract, grow, and retain talents equipped with vocational, technical, and global knowledge skills [34]. It is, therefore, an appropriate measure of talent development of countries in the modern world. The authors used two indicators to measure the talent development of the world's countries. First, GTCI score was used to measure the talent competitiveness of countries. Second, the average annual change in GTCI scores over the last 5 years was used as the measure of talent growth of the world's countries. The methodology used by INSEAD to measure talent competitiveness and growth by GTCI was based on a composite index and is summarized in Table I.

Furthermore, the aim of this paper was to consider the working factors from the area of higher education which are defined by methodology of the World Economic Forum (WEF) which will facilitate talent competitiveness and

growth of countries in the modern world. Data for these working factors of global higher education is contained in the 2018 and 2019 Global Competitiveness Index report of the WEF. A sample involving countries from different parts of the world was used to study the relationship of higher education, talent competitiveness, and talent of a country. Countries with complete data in both the GTCI and GCI reports were included in the study. The researchers focused on the 2018 and 2019 GCTI reports only and did not include data from 2020 to 2021 during the critical years of the COVID-19 pandemic. Considering shifting events in the pandemic period, the researchers opted to explore only the pre-pandemic GCTI data, which sets the limitation of the study. Hence, investigating the role of HEI in shaping talent during the pandemic period would be another area of research concern for future researchers.

TABLE I: STRUCTURAL FRAMEWORK OF THE GLOBAL TALENT COMPETITIVENESS INDEX (GTCI)

Global Talent Competitiveness Index (GTCI)					
Input			Output		
Enable	Attract	Grow	Retain	TechVoc Skills	Global knowledge skills
Regulatory Landscape	External Openness	Formal Education	Sustainability	Mid-Level Skills	High-Level Skills
Market Landscape	Internal Openness	Lifelong Learning	Lifestyle	Employability	Talent Impact
Business and Labour Landscape	Access to Growth Opportunities				

Source: INSEAD (2019)

TABLE II: DEFINITIONS AND EXPLANATIONS OF INDEPENDENT VARIABLES

Independent Variable	Definition	Interpretation of Results/Scores
Skillset of Graduates	This measure of the quality of education system in a country is related to the quality of teaching. The value of this indicator is calculated based on the response in the Executive Opinion Survey by the WEF: "In your country, to what extent do graduating students from secondary education and university possess the skills needed by businesses? Answer ranges from 1(not at all) to 7(to a great extent).	Higher scores indicate that the higher education system in the analyzed countries mold students and produce graduates that meet the required skills and knowledge for talent competition in different contexts.
Critical Thinking in Teaching	This measure of the quality of education system in a country is related to the quality of teaching. The value of this indicator is based on the response to the survey question "In your country, how do you assess the style of teaching?" [1=frontal, teacher based, and focused on memorizing; 7 = encourages creative and critical individual thinking]	Higher scores indicate that lectures and exercises emphasize different forms of knowledge applications that motivates students to work independently, be creative and think critically.
Scientific Publications	A measure of the quality of science and technology outputs at research institutions and universities of the analyzed countries. The value of this indicator is taken from the number of published papers cited in other papers at least h times. The H-index reflects both the number of publications and the number of citations per publication.	High scores indicate that the analyzed countries have highly productive research in institutions and universities.
Research Institution Prominence	A measure of the quality of higher education system related to the production of science and technology outputs. Specifically, it measures the prominence and standing of private and public research institutions within the analyzed country.	High score is an indicator that the country has good performance and are competitive enough in producing science and technology related outputs.
Internet Users	This measure of the quality of education system in a country is related to information and communication technology. Specifically, it measures the percentage of individuals who used internet from any location and for any purpose, irrespective of the device and network used in the last three months.	Higher quality of education requires the use and integration of digital technologies. High score for this variable indicates that a country has greater capacity to utilized ICT in the teaching and learning processes.
Digital Skills among active Population	This measure of the quality of education system in a country is related to information and communication technology. The value for this indicator is calculated based on the response to the survey question: "In your country, to what extent does the active population possess sufficient digital skills? [1= not at all; 7= to a great extent]	High score for this variable indicates that a large proportion of the active population in the analyzed country possess advanced digital skills including but not limited to use of online learning resources, programming, among others.
Patent Applications	A measure of the quality of higher education related to a country's innovation capability. The value of this measure is calculated using the total number of patent applications per one million population.	High score indicates that the country has more talents that are capable of innovation.

International Co-inventions	A measure of the quality of higher education related to a country's innovation capability. The value of this measure is calculated using the total number of patent applications with at least one co-inventor from abroad per one million population.	High score indicates that the country has more talents that are capable of innovation and collaboration with talents worldwide.
Mean Years of Schooling of Current Workforce	A measure of the quality of higher education related to the number of years spent to education among the population. The value is calculated as the average number of completed years of education among 25 years and older population.	High score indicates that most of the adult population in a country have higher educational attainment.

Correlation and regression analyses were used, and all analyses were done using R. Regression analysis determines the relationship between dependent and explanatory variables. The dependent variable is the Global Talent Competitiveness Index while the selected explanatory variables for the analysis are Skillset of Graduates (SOG), Critical Thinking in Teaching (CTiT), Scientific Publications (SP), Research Institution Prominence (RIP), Internet Users (IU), Digital Skills among the Active Population (DS), Patent Applications (PA), and International Co-Inventions (ICI) and Mean Years of Schooling of Current Workforce (MYS). These nine explanatory variables indicate how higher education institutions promote and develop talent competitiveness and talent growth among their students and graduates. These are essential measures shared by The World Economic Forum, which focused on how HEIs tap human talent as a critical factor linking innovation, competitiveness, and growth in the 21st century, especially in the context of modern industries where digital/internet skills, research and innovation, international collaboration and other important variables are expected to prosper. Investing in these aspects would make HEIs capable of producing a human workforce for industries with greater capacity to effect innovative changes in the world market through their knowledge, skills, and competencies. Including these learners and graduates in the pool of workers as talented 21st-century workers. Hence, HEIs can increase talent mobility by using these nine variables. With a talented workforce, we are creating the workplace a much more integrated, transparent, and well-functioning environment that empowers employees to be more productive and enables multi-national companies to succeed in the 21st century.

III. RESULTS

A. Analysis on the Role of Higher Education Indicators to Talent Competitiveness in the Analyzed Countries

To analyze the role of the selected higher education indicators in developing talent competitiveness, multiple regression was used. As a result of the regression analysis, the following regression equations were obtained for the period 2018-2019:

$$y = -9.54 + 7.41 * x_1 + 0.01 * x_3 + 0.23 * x_5 + 0.22 * x_8 + 0.79 * x_9$$

where:

- y-GTCI, score from 1 to 100, 2018
- x₁- skillset of graduates, score from 1 to 7, 2018
- x₃- scientific publications, H-index, 2018
- x₅- internet users, % of adult population, 2019
- x₈- international co-invention, per million population, 2018
- x₉- mean years of schooling (current workforce), years,

2018

Excluded variables:

- x₂- critical thinking in teaching, score from 1 to 7, 2018
- x₄- quality of research institutions, score from 0 to 100, 2018
- x₆- digital skills among the active population, score from 1 to 7, 2019
- x₇- patent applications, per million population, 2018

Source: calculated by the authors using the R Software based on the data of INSEAD, 2019; World Economic Forum, 2019.

The 2018 Global Competitiveness Report contains the 117 countries' performance on each of the 98 indicators that compose the GCI 4.0. Sets of pillars organize these indicators. In this study, nine indicators related to HEIs were analyzed as factor variables in shaping talent competitiveness. These indicators include internet users under the pillar ICT adoption. Other indicators which fall under pillar skills are mean years of schooling, skillset of graduates, digital skills among population, and critical thinking in teaching. Also, international co-inventions, scientific publications, patent applications, and quality of research institutions are factor variables considered under pillar innovation capability. These indicators were tested as predictor variables that are related to the outcome variable - talent competitiveness index.

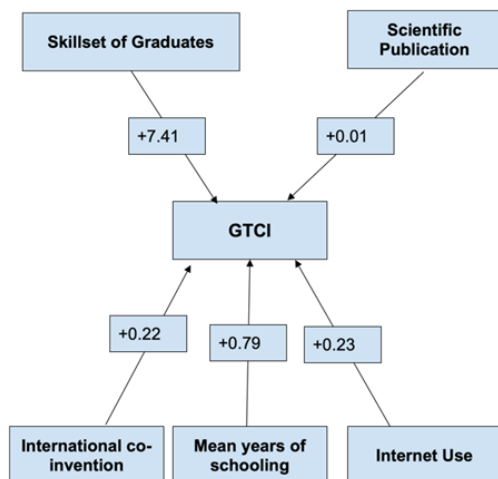


Fig. 1. The role of higher education in talent competitiveness of the world's countries, statistically significant factor variables and the β-coefficients of the regression equation, n=117 countries, 2018. [Source: elaborated by the authors based on regression equation 1].

As shown in Eq. (1) and EQ. 1, statistically significant factors stimulating the talent competitiveness of countries in 2018 turned out to be five out of nine potentially possible: skillset of graduates (β=+7.41), mean years of schooling (β=+0.79), internet use (β=+0.23), international co-invention (β=+0.22), and scientific publication (β=+0.01). Among these five-factor variables, the skillset of graduates seemed to be the best predictor of countries' talent competitiveness. All

other factors did not have a statistically significant effect on talent competitiveness in 2018.

$$y = -17.22 + 8.54 * x_1 + 0.01 * x_3 + 0.18 * x_5 + 0.24 * x_8 + 1.10 * x_9$$

where:

y-GTCI, score from 1 to 100, 2019

x₁- skillset of graduates, score from 1 to 7, 2019

x₃- scientific publications, H-index, 2019

x₅- internet users, % of adult population, 2019

x₈- international co-invention, per million population, 2019

x₉- mean years of schooling (current workforce), years, 2019

Excluded variables:

x₂- critical thinking in teaching, score from 1 to 7, 2019

x₄- quality of research institutions, score from 0 to 100, 2019

x₆- digital skills among the active population, score from 1 to 7, 2019

x₇- patent applications, per million population, 2019

Source: calculated by the authors using the R Software based on the data of INSEAD, 2020; World Economic Forum, 2020.

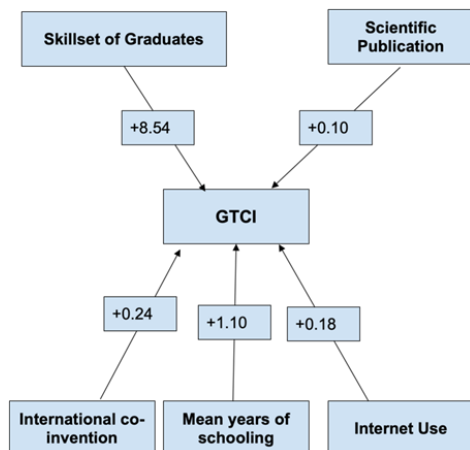


Fig. 2. The role of higher education in talent competitiveness of the world's countries, statistically significant factor variables and the β -coefficients of the regression equation, $n=122$ countries, 2019. Source: elaborated by the authors based on regression equation 2.

In 2019, the GCI was gauged using 103 indicators, and similarly, nine of these indicators related to HEIs served as factor variables of 122 countries' talent competitiveness. In parallel to 2018 data, Eq. (2) and Fig. 2 shows that statistically significant factors stimulating the talent competitiveness of countries in 2019 turned out to be five out of nine potentially possible: skillset of graduates ($\beta=+8.41$), international co-invention ($\beta=+1.10$), mean years of schooling ($\beta=+0.24$), internet use ($\beta=+0.18$), and scientific publication ($\beta=+0.10$). The skillset of graduates is still the best predictor of countries' talent competitiveness.

The regression analysis results of the role of HEIs in shaping talent competitiveness of the world's countries from the year 2018 to 2019 had shown five constant factor variables. The skillset of graduates, international co-invention, mean years of schooling, internet use, and scientific publication are predictors that increase the talent competitiveness index among countries. It is interesting to note that none of these factors reduce it. Further, data

revealed that beta coefficient values to show the degree of change in the talent competitiveness as outcome variable is significantly higher in 2019 than in 2018. For example, factor such as the skillset of graduates has an increased β -coefficients in 2019 compared to 2018. This further mean that for every 1-unit increase in the skillset of graduates, the talent competitiveness will increase by 8.54 (in 2019). While for every 1-unit increase in the skillset of graduates, the talent competitiveness will increase by 7.41 (in 2018). This is like other factors such as international co-invention, mean years of schooling, and scientific publication except for internet use since β -coefficients seems to have a slight decrease in its degree of influence by 0.05 from 2018 to 2019. However, it is interesting to note that these five-factor variables remained the significant stimulators of talent competitiveness among countries.

B. Analysis on the Role of Higher Education Indicators in Shaping Talent Growth

Another important objective of this study was to analyze the role of the selected higher education system indicators to talent growth using multiple regression analysis. As a result of the regression analysis, the following regression equations were obtained for the period 2018-2019:

$$y = -11.1 + 1.08 * x_1 + 0.03 * x_5 + 0.99 * x_6 - 0.04 * x_8$$

where:

y-GTCI growth, score from 1 to 100, 2013-2018

x₁- skillset of graduates, score from 1 to 7, 2018

x₅- internet users, % of adult population, 2018

x₆- digital skills among the active population, score from 1 to 7, 2018

x₈- international co-invention, per million population, 2018

Excluded variables:

x₂- critical thinking in teaching, score from 1 to 7, 2018

x₃- scientific publications, H-index, 2018

x₄- quality of research institutions, score from 0 to 100, 2018

x₇- patent applications, per million population, 2018

x₉- mean years of schooling (current workforce), years, 2018

Source: calculated by the authors using the R Software based on the data of INSEAD, 2019; World Economic Forum, 2019.

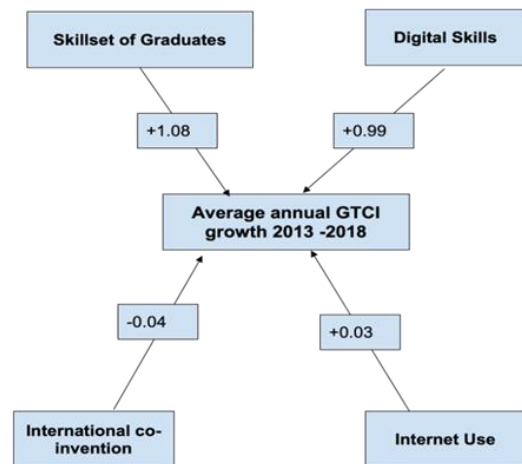


Fig. 3. The role of higher education in talent growth of the world's countries, statistically significant factor variables and the β -coefficients of the regression equation, $n=88$ countries, 2018. Source: elaborated by the authors based on regression equation 3.

In terms of the role of HEIs in shaping talent growth, data in Eq. (3) and Fig. 3 shows that four out of nine factors have the most significant effect on talent growth of the world’s 88 countries in 2018: the skillset of graduates ($\beta=+1.04$) as the strongest predictor followed by digital skills ($\beta=+0.99$) and internet use ($\beta=+0.03$). Interestingly, digital skills became an emerging factor that contributed to talent growth. This factor did not have a statistically significant effect on talent competitiveness in 2018 and 2019. On the other hand, international co-invention was an inhibiting factor which does not contribute to an increase in the talent growth of the world’s countries but, on the contrary, reduces it. Its beta coefficients indicate that for every 1-unit increase in the international co-invention among HEIs, the talent growth will also decrease by 0.04 in 2018. This is most likely because the rise of high demand for international co-invention has been challenging for HEIs to achieved and sustain since it requires expanded global research and development networks.

$$y = -10.8 + 1.27 * x_1 + 1.07 * x_2 + 0.02 * x_5$$

where:

y-GTCI growth, score from 1 to 100, 2014-2019

x_1 - skillset of graduates, score from 1 to 7, 2019

x_2 - critical thinking in teaching, score from 1 to 7, 2018

x_5 - internet users, % of adult population, 2019

Excluded variables:

x_3 - scientific publications, H-index, 2018

x_4 - quality of research institutions, score from 0 to 100, 2019

x_6 - digital skills among the active population, score from 1 to 7, 2019

x_7 - patent applications, per million population, 2019

x_8 - international co-invention, per million population, 2019

x_9 - mean years of schooling (current workforce), years, 2019

Source: calculated by the authors using the R Software based on the data of INSEAD, 2019; World Economic Forum, 2019.

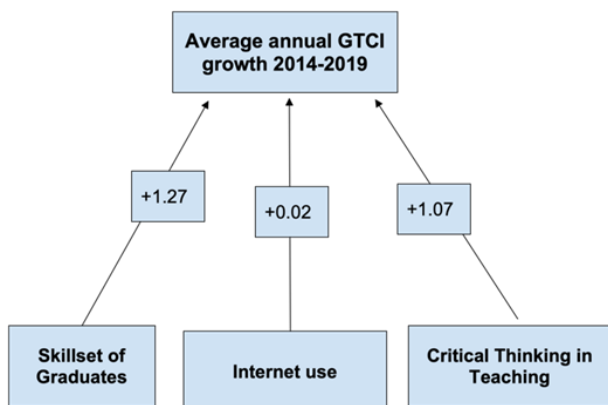


Fig. 4. The role of higher education in talent growth of the world’s countries, statistically significant factor variables and the β -coefficients of the regression equation, $n=88$ countries, 2019. Source: elaborated by the authors based on regression equation 4.

In 2019, the talent growth of the world’s countries was positively and significantly influenced by the following factors: skillset of graduates ($\beta=+1.27$), internet use

($\beta=+0.02$), and critical thinking in teaching ($\beta=+1.07$) as shown in Eq. (4) and Fig. 4. It is also interesting to note that critical thinking in teaching became an additional factor that stimulates talent growth in 2019. Its beta coefficients indicate that for every 1-unit increase in the critical thinking in teaching among HEIs, the talent growth will also increase by 1.07 (2019) – most likely since the way teachers integrate and develop critical thinking skills of students contribute to the production of talented graduates ready for the competitive work industries.

In Table I, for a complex perception of the results of the regression analysis, the authors summarized statistically significant factors – both stimulating and inhibiting the talent competitiveness and growth of countries in the modern world.

The summarized data of the regression analysis for the period 2018-2019 as shown in Table I, allowed the authors to prove the significant stimulating role of HEIs in shaping the talent competitiveness and growth of countries in the modern world. It is only necessary to stress that talent, measured for the world’s countries by the Global Talent Competitiveness Index, is mainly stimulated by varying variables present as core functions and targets among colleges and universities worldwide. Hence, HEIs have a big role in developing talents among their graduates ready for the highly competitive modern world.

TABLE III: SUMMARY TABLE OF FACTORS THAT SIGNIFICANTLY STIMULATE AND INHIBIT THE TALENT COMPETITIVENESS AND GROWTH OF COUNTRIES IN THE MODERN WORLD, 2018-2019

Components of	2018		2019	
	Inhibiting factors	Stimulating factors	Inhibiting factors	Stimulating factors
Talent Development		Skillset of Graduates		Skillset of Graduates
		Scientific Publications		Scientific Publications
Talent Competitiveness [GTCI]	No such factors	Internet use	No such factors	Internet use
		Mean years of schooling		Mean years of schooling
		International co-invention		International co-invention
		Skillset of Graduates		Skillset of Graduates
Talent Growth [Average annual GTCI growth]	International co-invention	Internet use	No such factors	Internet use
		Digital skills of the active population		Critical Thinking in Teaching

Source: elaborated by the authors based on regression Eq (1-4).

IV. DISCUSSION

Talent competitiveness and growth among countries measured by the Global Talent Competitiveness Index are mainly stimulated by factor variables related to Higher Education institutions. From 2018 to 2019, the role of HEIs in shaping talent competitiveness of the world’s countries had shown five constant factor variables. The skillset of graduates, international co-invention, mean years of schooling, internet use, and scientific publication are

predictors that increase the talent competitiveness index among countries. On the other hand, in 2018, talent growth was stimulated by the skillset of graduates as the strongest predictor, followed by digital skills and internet use. International co-invention was noted to be an inhibiting factor. In 2019, the talent growth of the world's countries was positively and significantly influenced by similar factors called skillset of graduates and internet use, including critical thinking in teaching as an additional factor stimulator.

Colleges and universities worldwide have a set of programs for molding the talents of their students, preparing and molding them to be graduates with a set of skills and knowledge for a talent competition in various work contexts. The skillset of graduates being the strongest predictor of talent competitiveness and growth worldwide indicates the role that HEIs play in delivering a quality education system with a quality teaching and learning culture that taps the skills of students from various backgrounds, thus preparing them for the high demand of talented workforce in the international labor market. The results of this study substantiate the idea that labor market employers worldwide considered skills as the most significant factor in employing graduates. For instance, employers will look for skilled graduates with computer-related talents [35]. Other international companies also emphasized the importance of soft skills. These skills are most often developed through higher education [36]. Hence, HEIs play an essential role in the economic growth of any country through the skills and productivity of their graduates. With this, most employers have some expectations about the graduates' skills when they graduate from universities [37].

Moreover, the average number of completed years of education among the adult population is considered a determinant of augmenting the world's talent competitiveness and growth. International companies prefer people with higher educational attainment as the product of HEIs as part of their talent mobility mechanisms. Employee's educational qualification is one factor considered. This encourages mobility among employees since it is a critical element of good talent management, encompassing recruitment, hiring, training, and workforce planning. The need to educate their organization's employees on talent mobility and its benefits through seminars and conferences is deemed necessary [38]. Hence, they must motivate their staff to enroll in postgraduate certificate programs for example. This will allow for effective workforce utilization to promote organizational success and development.

The findings indicated that skills in using and maximizing the internet stimulates both talent competitiveness and growth among countries from 2018 to 2019. Also, digital skills of the active population as a distinct factor variable specifically contribute to talent growth, as revealed in 2019's GTCI. This further means that integration and use of digital technologies in teaching among HEIs contributed in developing talents among students as potential talented human capital among industries. The use of the internet in education and developing students' digital skills makes them more qualified and flexible with the technological demands at various work settings. Hence, countries' capacity to utilize ICT in pedagogy stimulates human talent. With this, most countries nowadays invested on advancing the ICT

infrastructure particularly in the HEIs. Digital technologies are now an intrinsic part of the university student experience [39]. The university contexts in which students are positioned have an evident influence on their use of digital technology. Universities have a responsibility to continue to support students' digital studies in practical logistical and study-focused ways. HEIs must continue to develop their digital resource repositories. Digital skills should be one of the top priorities for investment amongst HEIs in the world. Relatively, according to van [40], work industries in the current setting are increasingly demanding for individuals with highly digitally competent experts who develop and disseminate ideas and information. Indeed, innovation is dependent on workers and their ability to build knowledge [41]. New ideas and techniques develop in the creative industries, and human capital is a critical component of success.

Scientific publication is another critical factor variable for increasing talent competitiveness and growth. Countries have highly productive research institutions and universities contributed greatly to the development of talent growth and competitiveness. All global HEIs have invested in research production, publication, and utilization. They seek to meet standards in increasing the H-index of their pool of faculty and student researchers, both the number of publications and citations per publication. The finding expands the contention that HEIs, particularly research universities, work in the worldwide realm of scientific research publication [12]. In connection with this, HEIs have the role of preparing a pool of students as future scientific researchers who will work for both applied and basic research that impact the industry's innovation, systems, and processes. Many organizations and industries employ university graduates who engage in a wide variety of scientific activities, ranging from highly practical and goal-oriented research to advanced and basic research [42].

Aside from the factors mentioned above, critical thinking in teaching was a significant predictor of talent growth in 2019. Data revealed that the way teachers integrate and develop students' critical thinking skills contributes to the formation of talented graduates ready for competitive job environments. A group of authors have highlighted the critical role of HEIs in the development of higher-level thinking skills [43]-[45]. These skills include reflection and self-awareness, among others, because it is believed to contribute to the analysis and solution of social problems in the future when students become professionals. Students join the labor market; employers have emphasized the necessity for critical thinking abilities in the industries and a rapidly changing world [46]. Employers believe that a critical thinker will be able to come up with novel ideas. Critical thinking, often known as higher-order reasoning, adds value to a company.

On the other hand, international co-invention was identified as a critical aspect in increasing talent competitiveness. In 2019, however, it had become an impeding element that does not contribute to the world's countries' talent growth but, on the contrary, hinders it. This is most likely due to the increased demand for worldwide co-invention, which has proven difficult for HEIs to meet and

maintain because it necessitates increased innovation and collaboration with talent. To deal with this conundrum educational system must acknowledge collaboration as an essential part of co-invention in producing knowledge [47]. Collaboration is linked to increased production value, quality, and quantity. Collaborative work earns more citations than individual work, has a greater acceptance rate in academic journals, increases productivity, and allows academics to focus on more critical research problems.

V. CONCLUSION

Higher education institutions play a significant role in shaping global talent competitiveness and talent growth. Considering talent as the main driving force of the talent economy, colleges and universities focus on developing the skillset of graduates, advocating, and organizing aspects in terms of mean years of schooling including professional development, internet, and digital skills, and making ready for international co-invention and scientific publication since these are factor variables which influence talent competitiveness and growth worldwide. From 2018 to 2019, HEIs focused on their graduates' skills and productivity, equipping them as actors be economic growth agents. Investing in adult population professional development is also beneficial to talent competitiveness. The integration and use of digital technologies in teaching at HEIs have also aided in developing students' talents.

Furthermore, HEIs are responsible for preparing a pool of students to work as future scientific researchers, conducting both applied and basic research that impacts industry innovation, systems, and processes. Aside from that, HEIs play a role in instilling critical thinking in students by assisting in developing talented graduates who are prepared for competitive labor markets. Collaboration is also an essential factor to consider because it has been linked to higher production value, quality, and quantity, particularly in research. Colleges and universities are the breeding grounds for creative individuals who may collaborate in various professional settings to sustain and expand innovation.

Therefore, using the framework of the annual report on the Global Talent Competitiveness Index, provided evidence that competitiveness and growth in terms of talent are stimulated by the factor variables related to higher education institutions. The way HEIs operationalized their core functions in skills training, technology integration, research and publication, and internationalization and collaboration initiatives are practically the main determinants of a key component of the talent competitiveness and growth of the modern world's countries. It is safe to conclude that HEIs are responsible for nurturing talent and creating conditions to attract talents from today's global adult population.

Given that the study only covers the 2018 and 2019 Global Competitiveness Index reports of the WEF, it is recommended that future researchers also analyze the status of talent competitiveness and talent growth in the last two years (2020-2021). Other researchers may consider critical events that potentially altered the outcome, i.e., a paradigm shift resulting from COVID-19. Also, doing qualitative research on the role of HEIs in shaping talent

competitiveness and growth will help researchers get in-depth information from the perspective of the various HEI contexts worldwide.

CONFLICT OF INTEREST

The authors declare no conflict of interest in the preparation of this manuscript. This paper is originally made by the authors and not considered for publication in any journals or online platforms and solely submitted for IJNET.

AUTHOR CONTRIBUTIONS

LR lead the development of the concept paper, formulate research questions, data gathering, and data analyses; EB conducted the data analyses, data cleaning, and revisions; RC conducted the statistical analyses; MM conducted data analyses, copy editing, manuscript formatting, and correspondence.

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REFERENCES

- [1] L. Leikuma-Rimicane, V. Komarova, J. Lonska, N. Selivanova-Fyodorova, and I. Ostrovska, "The role of talent in the economic development of countries in the modern world," *Entrepreneurship and Sustainability Issues*, vol. 9, no. 2, p. 488, December 2021.
- [2] D. Sharma, R. Taggar, and D. Jain, "Enhancing talent competitiveness in the technological era," *AIMS Journal of Research*, vol. 13, no. 2, pp. 18-22.
- [3] F. R. Littrell, "Desirable leadership behaviors of multi-cultural managers in China," *Journal of Management Development*, vol. 21, pp. 5-74, January 2002.
- [4] J. Wang, "Understanding managerial effectiveness: A Chinese perspective," *Journal of European Industrial Training*, vol. 35, no. 1, pp. 6-23, 2011.
- [5] L. Wang, K. T. James, D. Denyer, and C. Bailey, "Western views and Chinese whispers: Re-thinking global leadership competency in multi-national corporations," *Leadership*, vol. 10, pp. 471-495, 2013.
- [6] V. Wickramasinghe and N. D. Zoyza, "An assessment of managerial competency needs: Empirical evidence from a Sri Lankan telecommunication service provider," *The International Journal of Human Resource Management*, vol. 20, pp. 2547-2567, 2009.
- [7] Y. Yamazaki, "Using a competency approach to understand host-country national managers in Asia" *The International Journal of Human Resource Management*, vol. 25, pp. 2103-2128, 2014.
- [8] S. Beechler and I. C. Woodward, "The global war for talent," *Journal of International Management*, vol. 15, pp. 273-285, 2009.
- [9] G. S. Becker, "Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, Chicago: University of Chicago Press. 2009.
- [10] I. Kofler, E. Innerhofer, A. Marcher, M. Gruber, and H. Pechlaner, "Talent competition within Europe," *The Future of High-Skilled Workers*, pp. 73-82, Palgrave Pivot, Cham., 2020.
- [11] European Commission. The EU Regional Competitiveness Index 2019. (October 15, 2019). [Online]. Available: <https://cohesiondata.ec.europa.eu/stories/s/Regional-Competitiveness-Index-2019/363v-4uq6/>
- [12] GTCI, "2019 global talent competitiveness index," 2019.
- [13] M. V. Wolfensberger, "Perspectives on talent development in European higher education," *Talent Development in European Higher Education*, pp. 251-268, Springer, Cham., 2015.
- [14] K. H. Mok, "Higher education transformation for global competitiveness: Policy responses, social consequences and impact on the academic profession in Asia," *Higher Education Policy*, vol. 28, no. 1, pp. 1-15, 2015.
- [15] K. H. Mok and P. Hallinger, "The quest for world class status and university response in Asia's world cities: An introduction," *Journal of*

- Higher Education Policy and Management*, vol. 35, no. 3, pp. 230–237, 2013.
- [16] Ministry of Education, Culture, Sports, Science and Technology (MEXT). (2015). *Support for Internationalization of Universities*. [Online]. Available: <http://www.mext.go.jp/english/highered/1326670.htm>
- [17] K. H. Mok and S. J. Chan, “Promoting global cities status: Talent attraction and retention in Asia,” *Globalisation, Societies and Education*, vol. 18, no. 1, pp. 1-6, 2020.
- [18] N. Azman, M. Sirat, and V. Pang, “Managing and mobilising talent in Malaysia: issues, challenges and policy implications for Malaysian universities,” *Journal of Higher Education Policy and Management*, vol. 38, no. 3, pp. 316-332, 2016.
- [19] R. Yang, “Benefits and challenges of international mobility of researchers: The Chinese experience,” *Globalisation, Societies and Education*, 2016.
- [20] P. Heugten, M. Heijne-Penninga, P. Robbe, D. Jaarsma, and M. Wolfensberger, “International perspectives on the profile of highly talented international business professionals,” *Journal of Education for Business*, vol. 92, no. 7, pp. 323-331, 2017.
- [21] E. Basri and S. Box, “The global competition for talent: Mobility of the highly skilled,” Paris, France: OECD, 2008.
- [22] M. Dieck-Assad, “Globalization and the business schools: Toward business and world-sustainable leadership,” *Journal of Teaching in International Business*, vol. 24, pp. 168–187, 2013.
- [23] K. L. Milhauser and T. Rahschulte, “Meeting the needs of global companies through improved international business curriculum,” *Journal of Teaching in International Business*, vol. 21, pp. 78–100, 2010.
- [24] G. K. Stahl, I. Bjorkman, E. Farndale, S.S. Morris, J. Paauwe, P. Stiles and P. Wright, “Six principles of effective global talent management,” *MIT Sloan Management Review*, vol. 53, pp. 25–42, 2012.
- [25] D. G. Allen, D. G., Bryant, and J. M. Vardaman, “Retaining talent: Replacing misconceptions with evidence-based strategies,” *The Academy of Management Perspectives*, vol. 24, no. 2, pp. 48–64, 2010.
- [26] M. Buckingham and R. M. Vosburgh, “The 21st century human resources function: It’s the talent, stupid!” *Human Resource Planning*, vol. 24, no. 4, pp. 17–23, 2001.
- [27] K. Mellahi and D. G. Collings, “The barriers to effective global talent management: The example of corporate elites in MNEs,” *Journal of World Business*, vol. 45, pp. 143–149, 2010.
- [28] A. Azevedo, G. Apffelthaler, and D. Hurst, “Competency development in business graduates: An industry-driven approach for examining the alignment of undergraduate business education with industry requirements,” *The International Journal of Management Education*, vol. 10, no. 1, pp. 12–28, 2012.
- [29] Q. B. Bullock, “Valuing opportunities to learn,” *Journal of the National Collegiate Honors Council*, vol. 16, no. 2, pp. 27–29, 2015.
- [30] G. W. Lanier, “Towards reliable honors assessment,” *Journal of the National Collegiate Honors Council*, vol. 9, pp. 81–149, 2008.
- [31] B. Becker and B. Gerhart, “The impact at human resource management on organizational performance,” *Academy of Management Journal*, vol. 39, no. 4, pp. 779-801, 1996.
- [32] R. Florida, “The economic geography of talent,” *Annals of the Association of American Geographers*, vol. 92, no. 4, pp. 743–755, DOI:10.1111/1467-8306.00314, 2002.
- [33] A. Merwe, “Does human capital theory explain the value of higher education? A South African case study,” *American Journal of Business Education*, vol. 3, no. 1, pp. 107-118, 2010.
- [34] INSEAD. (2018). The global competitiveness index 2018. [Online]. Available: <https://www.insead.edu/sites/default/files/assets/dept/globalindices/docs/GTCI-2018-report.pdf>
- [35] D. D. Bowman, “Declining talent in computer related careers,” *Journal of Academic Administration in Higher Education*, vol. 14, no. 1, pp. 1-4, 2018.
- [36] G. Tholen, S. J. Relly, C. Warhurst, and J. Commander, “Higher education, graduate skills and the skills of graduates: The case of graduates as residential sales estate agents,” *British Educational Research Journal*, vol. 42, no. 3, pp. 508–523, 2016.
- [37] A. M. Baird and S. Parayitam, “Employers’ ratings of importance of skills and competencies college graduates need to get hired: Evidence from the New England region of USA,” *Education and Training*, vol. 61, no. 5, pp. 622-634, 2019.
- [38] N. Nawaz, “Impact of talent mobility on employee performance in software companies, Bangalore,” *The International Journal of Management*, vol. 2, no. 1, pp. 1-2, 2013.
- [39] M. Henderson, N. Selwyn, and R. Aston, “What works and why? Student perceptions of ‘useful’ digital technology in university teaching and learning,” *Studies in Higher Education*, vol. 42, no. 8, pp. 1567-1579, 2017.
- [40] M. Krstić, J. Filipe, and J. Chavaglia, “Higher education as a determinant of the competitiveness and sustainable development of an economy,” *Sustainability*, vol. 12, no. 16, p. 6607, 2020.
- [41] R. Piergiovanni, M. A. Carree, and E. Santarelli, “Creative industries, new business formation, and regional economic growth,” *Small Business Economics*, vol. 39, no. 3, pp. 539–560, <https://doi.org/10.1007/s11187-011-9329-4>, 2012.
- [42] E. Archambault, and V. Larivière, “Scientific publications and patenting by companies: A study of the whole population of Canadian firms over 25 years,” *Science and Public Policy*, vol. 38, no. 4, pp. 269-278, 2011.
- [43] R. H. Ennis, “Critical thinking across the curriculum: A vision,” *Topoi*, 1–20, <http://doi.org/10.1007/s11245-016-9401-4>, 2016.
- [44] M. J. Velásquez and H. Figueroa, “Desarrollo del pensamiento crítico en estudiantes de educación superior en El Salvador,” *Panorama*, vol. 6, no. 10, pp. 7-20, 2012.
- [45] A. R. Villarini, “Teoría y pedagogía del Pensamiento Crítico,” *Perspectivas Psicológicas*, vol. 3, no. 4, pp. 35-42, 2003.
- [46] E. Laar, A. J. Deursen, J. A. Dijk, and J. Haan, “Determinants of 21st-century digital skills: A large-scale survey among working professionals,” *Computers in Human Behavior*, vol. 100, pp. 93-104, 2019.
- [47] F. Wouden, “A history of collaboration in US invention: changing patterns of co-invention, complexity and geography,” *Industrial and Corporate Change*, vol. 29, no. 3, pp. 599-619, 2020.

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