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QUANTITATIVE ASSESSMENT OF HUMAN CAPITAL IN LATVIA

Sanita LASMANE, Una LIBKOVSKA, Liene RESELE-DŪŠELE, Zane ZONBERGA

Faculty of Economics and Management, Ventspils University of Applied Sciences, Ventspils, Latvia

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Abstract. The importance of human capital has been a subject of discussion for several centuries. Over time, various methods for its quantitative assessment have been developed, each offering its own insights into the role of human capital in economic growth of a country. The study focuses on the case of Latvia by analyzing different types of quantitative human capital indicators. The study reviews existing methodologies used for a quantitative assessment of human capital, including indicator-based, cost-based and income-based methods, as well as six human capital indicators such as the human capital index by the World Bank, the human capital index by the Institute for Health Metrics and Evaluation, and the global human capital index by the World Economic Forum. The results show that, in five out of six indicators, Latvia ranks between the 21st and the 39th place in the world. However, some indexes offer outdated information or place a big focus only on one specific metric. Based on these findings, the authors of the paper propose a new quantitative approach for assessing human capital that integrates labour market, education and health indicators and metrics. The new approach shows that there is room for human capital potential in Latvia.

Keywords: human capital, quantitative assessment, labour market, education, health, Latvia.

JEL Classification: J24, C43, I25, O15.

Corresponding author. E-mail: *sanita.lasmane@venta.lv*

1. Introduction

Discussions about the importance of human capital have taken place since the 17th century. The early contributors to the theory of human capital are Sir William Petty, Adam Smith, Horace Mann and Theodore William Schultz with the latter being widely recognized as the main founder of modern human capital theory, as well as the person who first formulated the term *Human capital*. (e.g., Mann, 1872; Petty, 1888; Schultz, 1960; Mathur, 1999; Le et al., 2005; Smith, 2012; Holden & Biddle, 2017; Iallouchen et al., 2018; Khaykin et al., 2020; Trofimov & Baawi, 2020; Bosi et al., 2021; Gruzina et al., 2021). Schultz argued that human knowledge and skills, which have economic value, play a very important role in the creation of wealth (Schultz, 1961). Some economists have said that technological change is the driving force behind national development (e.g., Klenow & Rodriguez-Claire, 1997; Easterly & Levine, 2001), however, it is also recognized that human capital plays the most important role in driving technological change (e.g., Nelson & Phelps, 1966; Romer, 1990; Becker, 2002). Mukhopadhyay (2021), referring to Carneiro et al. (2011) and Heckman (2006), argues that education provides an individual with the opportunity to acquire new skills and, in most cases, also a higher salary compared to individuals who have no education. The main focus in the research of human capital has been on its qualitative assessment, however, recent research has placed more emphasis on the methods of quantitative assessment of human capital. Several indicators and indices have been created across the world (Samans et al., 2017; Lange et al., 2018; Lim et al., 2018; Managi & Kumar, 2018; World Bank, 2018; United Nations Development Programme, n.d.).

1.1. Problem statement and research questions

Latvian labour market faces several challenges like a large share of the low-skilled labour force, low labour productivity, decreasing population and regional disparities. (Ministry of Economics, Latvia, 2018; Pārresoru koordinācijas centrs, 2020; Ministry of Economics, Latvia, 2022; Ministry of Welfare, Latvia, 2023) These are long-term problems Latvia has faced for many years. The problems mentioned above are all related to human capital, however, human capital is not measured quantitatively in the country which hinders the oppor-

tunity to create policies related to human capital that help increase the overall productivity and economy of a country (Brodny & Tutak, 2024).

The purpose of this study is to evaluate and compare existing quantitative measures used for assessing human capital to determine the best method for measuring human capital at the macroeconomic level (national level). A new approach is proposed in the study for quantitative evaluation of human capital in small economies like Latvia.

Research questions:

1. What methods are currently used to assess human capital?
2. What are the weaknesses of currently used methods?
3. What is the best approach to assess human capital in Latvia?

1.2. Data sources and timeframe of data collection

Data for the new human capital approach were collected for years 2014–2023 which was the longest possible timeframe with available data for all indicators used in the creation of the index. When comparing the results for Latvia across internationally used human assessment methods, the newest data available were used.

Data about Latvia across different human capital indicators and indices were collected from the official reports of respective indicators and indices. Publicly available secondary data were used to create the new human capital approach. Data sources include the official statistics portal of Latvia, Eurostat database and World Happiness Report. Data used to calculate the new human capital approach can be seen in Table A1. Data used in the creation of the new human capital approach were processed in *Microsoft Excel* using the min-max scaling because they have different ranges and this method allows to put them all on the same scale (see Table A2).

1.3. Scientific novelty and practical contribution of the paper

The scientific novelty of the paper is as follows. Firstly, instead of focusing on one aspect of human capital (for example, education as can seen for IWR), the new human capital approach integrates labour market, health and education related indicators to show the multidimensional nature of human capital. Secondly, instead of being created with several year intervals (see, for example, WB HCI), the new approach only uses annually available data allowing to monitor the development of human capital from year to year.

The practical contribution lies in the fact that the quantitative assessment of human capital is currently not being done in Latvia. The new capital index fills the research gap and provides institutions and policymakers with a method for quantitative assessment of human capital at the national level.

1.4. Structure of the paper

The structure of the paper is as follows. Section one presents introduction, problem statement, research questions, data sources, timeframe of the data collection and scientific novelty and practical contribution of the paper. The second section provides an overview of different methods for quantitative assessment of human capital. The third section shows a comparison of human capital indicators. In the fourth section authors introduce the new approach for quantitative assessment of human capital at the national level including calculations done for Latvia. The fifth section offers discussion, conclusions, limitations and future research.

2. Literature review and existing approaches to quantitative assessment of human capital

There is no single formula for the quantitative assessment of human capital. Economists, global organizations, and other interested parties use different indicators to calculate it. Liu (2011) and Abraham and Mallatt (2022) describe three approaches for calculating human capital:

1. Indicator method. It uses an indicator or indicators that demonstrate the state's investment in human capital and the most characteristic features of its population (the share of students enrolled in school, the average number of years spent in school, the level of literacy). If there are several indicators, an index with weighted indicators is created. Liu (2011), referring to the study by Stroombergen et al. (2002), emphasizes that the biggest disadvantage of the indicator method is that it uses various indicators that do not have a common unit of measurement, which is also agreed by Abraham and Mallatt (2022). It has been used in the calculation of the global human capital index by the World Economic Forum which includes indicators such as school enrolment rate, literacy rate, educational attainment and labour force participation rate (Samans et al., 2017), and the human capital index by the World Bank which includes indicators like expected years of schooling, test scores and child and adult survival rates (Kraay, 2019; World Bank, 2021).
2. Cost method. It focuses on expenditure on education, which allows assessing the investment in education-related human capital. The method uses indicators such as the share of students enrolled in school by age, gender and type of education obtained, direct expenditure on formal education and training. Even though the method includes monetary expenditure, Liu (2011) believes that it could be expanded to include non-monetary expenditure like the value of the time devoted to education by the student and his parents. Abraham and Mallatt (2022) consider the dis-

advantage to be the fact that it is quite difficult to obtain the necessary data. The cost method requires assumptions about the depreciation of human capital over time because people's skills can lose their relevance over time, and a person's life expectancy decreases with each year lived. The method also does not consider the effects of migration.

3. Income method. It focuses on the future income stream that will be generated by investments in human capital and calculates their present value. Using the income method, it is necessary to obtain data on the share of students enrolled in school by age, gender and type of education obtained; the number of residents in the country by age, gender and level of education obtained; the income level of the population by age, gender and level of education obtained; mortality rates by age and gender. It also uses assumptions about the overall growth rate of the future income level and the intertemporal discount rate (Liu, 2011; Abraham & Mallatt, 2022). According to Abraham and Mallatt (2022), obtaining data for this method is as difficult as obtaining data for the cost method. It is difficult to estimate human capital for a person who has not yet completed education and for a person who is not involved in the labour market.

Liu and Fraumeni (2020) identify six main approaches to measuring human capital. They are divided into two groups: monetary-based and indicator-based human capital measurements. Monetary-based human capital measurements focus on demographic indicators and income levels. They are:

1. Human capital indicator by the World Bank presented in the report *The Changing Wealth of Nations 2018*: *Building a Sustainable Future* (CWON) (Lange et al., 2018).
2. Human capital indicator by the United Nations Environment Programme and the Urban Institute of Kyushu University presented in the *Inclusive Wealth Report* (IWR) (Managi & Kumar, 2018).

Indicator-based human capital measurements also include indicators related to health, living standards, knowledge and skills. They include:

1. Human capital index by the Institute for Health Metrics and Evaluation (IHME HCI) (Lim et al., 2018).
2. Human development index by the United Nations Development Programme (UNDP HDI) (United Nations Development Programme, n.d.).
3. Human capital index by the World Bank (WB HCI) (World Bank, 2018)
4. Global human capital index by the World Economic Forum (WEF GHCI) (Samans et al., 2017).

The results of Latvia according to all six measures of human capital are analyzed below.

2.1. Human capital indicator by the World Bank

The human capital indicator by the World Bank (CWON) focuses on the monetary and economic benefits of human capital. In 2018, the World Bank presented its report *The Changing Wealth of Nations 2018*: *Building a Sustainable Future*, which assessed human capital wealth using the lifetime income method of Jorgenson-Fraumeni (Jorgenson & Fraumeni, 1989, 1992a, 1992b). The present value of the expected future income of people aged 15–65 is calculated based on household surveys (Lange et al., 2018; Liu & Fraumeni, 2020). The expected earnings of employees are calculated based on the Mincer earnings function. Unfortunately, separate results on the lifetime earnings of a person of working age in Latvia are not available. Results related to human capital are available for the world as a whole and for individual groups of countries, which are formed based on the income level in them. Based on the results of the study, the authors conclude that highly qualified employees are needed to continue the economic development in the world.

The report provides general information about Latvia. It compiles information on 141 countries and territories and their total wealth per capita in 2014. Total wealth is made of the following indicators: produced capital, human capital, natural capital, net foreign assets. Human capital accounts for 47.9% of Latvia's total wealth (see Table A3). Latvia ranks 39th in the human capital indicator. 21 of the 38 countries with higher human capital than Latvia are located in Europe. Switzerland, Norway and Luxembourg are the TOP3 countries. Latvia's neighbouring country Estonia is ranked above Latvia (33rd place), while Lithuania is slightly below Latvia: in the 44th place (Lange et al., 2018).

2.2. Human capital indicator by the United Nations Environment Programme and the Urban Institute of Kyushu University presented in the Inclusive Wealth Report

The United Nations Environment Programme and the Urban Institute of Kyushu University in their *Inclusive Wealth Report* (IWR) calculate the inclusive wealth index, which consists of 3 main indicators: natural capital, manufactured capital and human capital (Managi & Kumar, 2018; Liu & Fraumeni, 2020). In percentage terms, the largest part (approximately 61%) of Latvia's total wealth is made up of human capital, in which the focus is on education and health. It is worth noting that the distribution of Latvia's wealth calculated in CWON is drastically different. In numbers, human capital per capita (measured in thousands of constant 2005 USD) in 2014 was 49.5 thousand USD. Based on this result, Latvia ranked 63rd among 140 countries (Managi & Kumar, 2018).

Looking at the changes in human capital growth for the period between 1995 and 2014 (taking 1990 as the base year), total human capital has decreased every year for which the data is available compared to the previous

year for which the data is available. However, it should be considered that the population of Latvia is decreasing every year (Official Statistics Portal, 2024a), so the statistics on total human capital can be misleading. Data on the changes in human capital growth per capita during the same period shows that it has been constantly growing (see Table A4). For comparison, the growth of human capital per capita in Latvia between 1995 and 2014 has been slightly higher than in Estonia, but lower than in Lithuania in each year for which the data is available (in 2014, the change in Estonia was 4.2%, while in Lithuania it was 7.4%) (Managi & Kumar, 2018).

2.3. Human capital index by the Institute for Health Metrics and Evaluation

Human capital index by the Institute for Health Metrics and Evaluation (IHME HCI) is expressed as the expected number of years of life for each birth cohort of people aged 20 to 64, adjusted for educational attainment and quality and health status. The authors of the study consider education and health to be the most important indicators of human capital. Sensitivity analysis is used to calculate the human capital index. The index includes data on educational attainment, learning, health and survival rates (Lim et al., 2018).

The institute has compared the estimated human capital of 195 world countries in 1990 and 2016. In 1990, Latvia was ranked 31st, with an expected human capital of 18 years (it was 25 years in Finland which ranked 1st). In 2016, Latvia climbed to the 21st place with an expected human capital of 23 years (it was 28 years in Finland which ranked 1st). The TOP47 countries had an expected human capital of 20 or higher in 2016 (compared to only 22 countries in 1990). Besides Latvia, 31 other countries had an expected human capital growth rate of 5 years between 1990 and 2016. 21 countries had an expected human capital growth rate higher than Latvia, but only one of them was a European country: Poland, with a growth rate of 6 years. The TOP3 places were occupied by Turkey (12 years of growth), Saudi Arabia (10 years of growth) and China (9 years of growth). The authors of the study associate higher human capital growth with faster economic growth in the country (Lim et al., 2018).

In 2016, Latvia's indicators in the indicators determined by the institute were as follows (Lim et al., 2018):

1. Life expectancy (0–45 years): 42 years. Together with Belarus (22nd place), Lithuania (39th place) and Bulgaria (47th place), this was the 2nd lowest result among countries with an expected human capital of 20 or more. Only Ukraine (45th place) had a lower result in this indicator: 41 years.
2. Health status (0–100): 80. Among the first 47 countries, only 10 of them (Slovenia, Poland, Croatia, Slovakia, Cuba, Turkey, China, Ukraine, Serbia and Bulgaria) had a lower score than Latvia.
3. Educational attainment (0–18 years): 14 years. Among the TOP47 countries, only 2 countries had a higher score: Finland (1st place) and Belarus (22nd place) both had a result of 15 years.
4. Learning (0–100): 87. 17 countries (among the TOP 47) had a higher score than Latvia, with the highest one being Singapore (13th place), where it reached 98.

2.4. Human development index by the United Nations Development Programme

The human development index by the United Nations Development Programme (UNDP HDI) consists of the following components (United Nations Development Programme, n.d.):

1. Health: expressed as the life expectancy of a newborn child.
2. Education: calculated as the expected number of years spent in school and the average number of years spent in school.
3. Standard of living: measured as gross national income per capita.

In 2022, Latvia ranked 37th out of 193 countries with a score of 0.879. Latvia's neighbour, Estonia, ranked 31st (0.899), while Lithuania shared the 37th place with Latvia (0.879). For comparison, in 2021, Latvia was ranked 39th, Estonia was 32nd, and Lithuania was 36th. Information on the human development index has been available since 1990, and Estonia has had a higher score than Latvia every year. Lithuania has also been above Latvia every year, with the only exception being 2022, when the human development index was identical in both countries. The human development index in Latvia from 2012 to 2022 can be seen in Table A5. It has grown every year except for 2021 which can be explained with the consequences of Covid-19 crisis (United Nations Development Programme, 2024, n.d.)

2.5. Human capital index by the World Bank

The human capital index by the World Bank (WB HCI), first introduced to the public in 2018, is designed to measure the level of human capital or the level of productivity that a child born today can expect to have by the time he reaches the age of 18, given the current conditions in the country. It focuses on the future, rather than the current labour force, so that countries can better respond to their own policies. The index ranges from 0 to 1, with 1 representing the most productive country and meaning that the productivity of a child born today will be 100% when he reaches the age of 18 because he has received full education and health (World Bank, 2018). It is made of the following indicators (World Bank, 2018):

1. Education. Three separate indicators are used here: the expected number of years spent in school by the age of 18; the internationally agreed, harmonized test scores; and an indicator that combines the quantity of education or the expected number of years spent in school by the age of 18 and the

quality of education that is based on results obtained in the international tests.
2. Health. It includes the level of impaired growth and development of children under the age of 5; and the adult survival rate, which is measured as the chance of 15-year old people to survive till the age of 60.
3. Survival. It is the chance of a child born today to survive till the age of 5.

The 2018 and 2020 human capital index reports by the World Bank offer not only information on the human capital index in 2018 and 2020, but also on the recalculated human capital index in 2018 and the human capital index in 2010. The human capital index for 2018 was recalculated using the latest available data, while the human capital index for 2010 was calculated to compare changes in the index over a longer period of time (a decade in this case). Latvia's results and position among the other countries of the world for which data were available in these indexes were as follows (World Bank, 2018, 2021; World Bank, n.d.-a):

1. Human capital index in 2010: 0.68. Data were available for 103 countries of the world, and Latvia ranked 34th. In 5 countries, the human capital index was 0.80 or higher: Singapore (0.85), South Korea (0.82), Japan (0.82), Finland (0.82) and the Netherlands (0.80). Among the European Union countries, only Bulgaria and Romania had a lower human capital index than Latvia in 2010.
2. Human capital index in 2018: 0.72. Among the 157 countries and territories, Latvia ranked 35th. Singapore (0.88), South Korea (0.84), Japan (0.84), Hong Kong (0.82), Ireland (0.81), Finland (0.81), Australia (0.80), Canada (0.80), Netherlands (0.80) and Sweden (0.80) took the TOP places in the world. Bulgaria, Greece, Luxembourg, Malta, Romania, Slovakia and Hungary were the European Union countries in which the human capital index was lower than in Latvia.
3. Back-calculated human capital index in 2018: 0.74. The index is available for 167 countries and territories, and Latvia ranked 31st. In 9 countries, the recalculated human capital index was 0.80 or higher: Singapore (0.89), Japan (0.84), South Korea (0.83), Hong Kong (0.82), Ireland (0.81), Finland (0.81), Canada (0.80), the Netherlands (0.80) and Sweden (0.80). The index for 9 European Union countries was lower than for Latvia (Bulgaria, Greece, Croatia, Lithuania, Luxembourg, Malta, Romania, Slovakia and Hungary).
4. Human capital index in 2020: 0.71. This result ranked Latvia 31st among 174 countries and territories. The countries with the highest indexes were Singapore (0.88), Hong Kong (0.81), South Korea (0.80), Japan (0.80), Canada (0.80), Macau (0.80), Finland (0.80) and Sweden (0.80). 6 European Union countries had a lower result than Latvia: Bulgaria, Greece, Luxembourg, Romania, Slovakia and Hungary.

The results in the human capital index among Baltic countries show that 2018 was the only year in which Latvia was ahead of one of its Baltic neighbours: both calculated human capital index and back-calculated human capital index in Latvia was 1% higher than in Lithuania. In 2020, the human capital index was the same in both countries (0.71), while, in 2010, it was 1% higher in Lithuania. In Estonia, the human capital index was 3–7% higher than in Latvia and 4–7% higher than in Lithuania in each year it was calculated (World Bank, 2018, 2021).

Table A6 shows a comparison of the results of indicators included in the calculation of human capital index in Latvia in 2018 and 2020. There is stability in survival rates. In both years, the chance of a newborn child to survive till the age of 5 was 100%, while the chance of a 15-year old person to survive till the age of 60, or the adult survival rate, differed by only 1% in both years of observation, in 2020 it being 1% lower than in 2018 (World Bank, 2018, 2021).

An alarming trend can be observed in the results related to education. The number of years spent in school in 2020 compared to 2018 has increased by 0.3 years, but the results of harmonized test scores have decreased significantly, because of which the learning-adjusted years of schooling has also decreased. Pupils spend more time at school, but their level of knowledge is decreasing (World Bank, 2018, 2021).

Neither in 2018 nor in 2020 data on the level of impaired growth and development of children under the age of 5 in Latvia were available (World Bank, 2018, 2021).

2.6. Global human capital index by the World Economic Forum

The global human capital index by the World Economic Forum (WEF GHCI) provides an opportunity to assess a country's current and projected human capital, and compare it across regions, generations and income groups. It consists of four main indicators: knowledge, deployment, development and know-how. Each indicator accounts for 25% of the total index, and they are divided into 21 sub-indicators, where each sub-indicator is calculated for a specific age group (Samans et al., 2017).

In 2017, Latvia's global human capital index was 69.85, ranking it in the 28th place out of 130 countries. For comparison, Estonia's global human capital index was 73.13 (12th place), while Lithuania's index was 70.81 (25th place) (Samans et al., 2017). More detailed results of the global human capital index in Latvia were as follows (Samans et al., 2017):

1. Knowledge: 81.57. Latvia ranked 6th, however, the authors of the paper doubt the veracity of the results of the sub-indicator *Primary education attainment rate*, because, in all age groups for which information is collected, they are shown as 100%. When collecting information on a specific indicator, the authors of the index consider statistics on residents who have obtained at least ISCED level 1

education. In Latvia, it is primary education, which is acquired from grade 1 to grade 6. Statistics on the highest level of education attained by residents over the age of 15 for the period from 2019 to 2023 are available on the official statistics portal of Latvia. Statistics show that, in 2019, 6 011 people had ISCED level 0, which indicates that they had no education or had obtained education that is lower than primary education. Statistics for 2017 are not available, however, there is no evidence that there were no individuals with this level of education in the country 2 years before the statistics were compiled (Official Statistics Portal, 2024b).

2. Deployment: 67.23. Latvia ranked 52nd, which is the country's worst result among the indicators of the global human capital index. Latvia's lowest places were in the sub-indicator *Unemployment rate*. Poor results were also achieved in the sub-indicator *Labour force participation rate*.
3. Development: 72.07 (35th place in the world). The best result was achieved in the sub-indicator *Secondary enrolment gender gap*, where Latvia's result was 100%, giving it the 1st place in the world. The results of the other sub-indicators fluctuated between the 31st and the 59th place.
4. Know-how: 58.52. This result gave Latvia the 41st place. Latvia was ranked 25th in the sub-indicator *High-skilled employment share*, 33rd in the sub-indicator *Economic complexity*, 78th in the sub-indicator *Medium-skilled employment share* and 91st in the sub-indicator *Availability of skilled employees*.

Research shows that human capital is multidimensional, and the choice of indicators used to measure it strongly affects the results. Liu and Fraumeni (2020) calculated a rather strong correlation between the indices, however, the study presented differences in monetary-based indicators. Angrist et al. (2021) admit that data on education quality play an important part in analyzing the development of human capital but are not available in all countries. This gap shows the need for indices at the national level that can be regularly updated in small economies like Latvia. In recent years, researchers have continued to enrich the field of quantitative assessment of human capital. For example, Demirgüç-Kunt and Torre (2022) expanded the human capital index by the World Bank by including tertiary education and health risk factors like obesity, smoking and heavy drinking. Sari and Tiwari (2024) proved that there can be very large differences in human capital measurement within a country emphasizing the need for regularly available data to analyze the changes in human capital development.

3. Comparison of human capital indicators

In Table A7, results across the Baltic states have been compared to see Latvia's results in a context and understand where it ranks among its neighbours with whom Latvia shares history as well as economic similarities. The latest available data for each indicator has been used.

The Baltic states typically fall into the upper-middle range and, in some cases, upper range among other countries in the world. Estonia has had better results than Latvia and Lithuania in all indicators except for *IWR* in which Lithuania has been higher than its neighbours. Estonia outperforms Latvia and Lithuania in indicators such as IHME *HCI*, *UNDP HCI*, *WB HCI* and *WEF GHCI* which shows that the quality of education is higher there as these indicators take education related measurements into account. That matches international reports on Estonia's competencies in education and digital environment. Estonia's results suggest that investments in future-oriented education help to increase the overall human capital performance.

Latvia ranks below Lithuania in *IWR* and *WEF GHCI* indicators showing worse results when it comes to the labour market. Latvian labour market problems are well known and have been there for a long time – low productivity, regional disparities, high share of economically inactive and long-term unemployed people, mismatch between labour market needs and skills people have (Pārresoru koordinācijas centrs, 2020; Latvijas Republikas likums, 2021; Ministry of Economics, Latvia, 2022; Ministry of Welfare, Latvia, 2023).

One indicator cannot paint a picture of everything that is happening around (Managi & Kumar, 2018), and no human capital indicator will be without its shortcomings, however, the authors see the following limitations in the indicators discussed earlier in the work (for a more detailed comparison, see Table A8):

1. CWON provides an opportunity to calculate the lifetime income of a person aged between 15 and 65. The authors of the paper believe that such an indicator is not entirely correct, since the cost of living in each country is different, and the salaries of employees in the country, which are a part of the calculations, are also different.
2. IWR assesses human capital using only a few indicators, which are mainly related to education and do not reflect the overall picture of human capital.
3. IHME CHI only reflects a country's future potential, while human capital is an indicator that also reflects a country's current potential (Liu & Fraumeni, 2020). When calculating future human capital, it is assumed that GDP will grow at a moderate pace, but, in the event of natural disasters or war, the predicted human capital will no longer be true, as the country will need a recovery period (Lange et al., 2018).
4. UNDP HDI only uses a few indicators to calculate its index. For example, the education-related indicator considers the number of years spent in school, but not pupil achievements.
5. WB CHI provides an opportunity to assess only the expected human capital, not the human capital already present in a country. The average harmo-

nized test scores are obtained from different sources, and the ages of the test takers and the subjects in which they were taken are not the same in all countries. Indicators related to impaired growth and development are not available at all in some countries, including Latvia (World Bank, 2018).

6. WEF GHCI includes indicators for which the veracity of some (e.g. *primary education attainment rate*) is questionable, casting doubt on the overall result of the human capital index.

The biggest problem for the existing indicators lies in the fact that they are not available annually and for recent years, which limits the possibility of a deeper analysis of human development in Latvia over the years. For example, CWON is only available for 2014; WB CHI is a widely used indicator in the world but has only been published for specific years (2010, 2018 and 2020) and does not provide continuous annual data.

4. New human capital approach

An ideal human capital index that would provide a comprehensive look on human capital and its development over the years would integrate all aspects related to it including quality of education, digital skills, skill level of employees, labour productivity and morbidity. Unfortunately, the construction of such an index is limited due to data availability. Data about adult literacy in Latvia is available once every 10 years, with the latest publicly available data (as of February 2025) being 2021 (World Bank, 2024a). Data on PISA (Programme for International Student Assessment) by the OECD is available every 3 years. As of February 2025, the latest available data is for 2022 (Organisation for Economic Co-operation and Development, n.d.), while the newest available data on harmonized test scores are for 2020. When developing the methodology for the results, Angrist et al. (2021) wrote that information on the latest test results would be available every 2–3 years, but, as of February 2025, the latest information available in the database provided in their article was for 2017, despite it last being updated in 2024 (World Bank, 2024b). The World Bank offers a separate section on its website with data on harmonized test scores. The latest information provided is for 2020 (World Bank, n.d.-b). To be able to monitor human capital development and analyze changes from year to year, the authors of the paper propose a new approach that includes official, annually updated data that are related to 3 main aspects of human capital: labour market, education and health. Indicators related to the labour market give an opportunity to assess how actively the population in the country is involved in the labour market. Education related indicators allow to understand how developed the education sector is in the country, which is the basis of human capital. Health indicators are important in the context of human capital, because healthy people are more productive and more important for the development of the country than sick and tired people. The new human capital is expressed by the equation:

$$Human\,capital = labour\,market + education + health\,.$$

The approach shows the human capital potential of a country. It ranges between 0 and 1, with 1 representing a country with a fully achieved human capital potential. Each indicator consists of several sub-indicators data for which are available annually. Indicators and their sub-indicators can be seen in Table 1.

Table 1. Indicators and sub-indicators of the new human capital approach for Latvia (source: table made by the authors of the paper)

Indicator	Sub-indicator
Labour market	Share of economically active population, % (ages 15–64)
	Employment rate, % (ages 15–64)
	Youth employment rate, % (ages 15–24)
	Share of people employed in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services), % of total employment
	Employed ICT specialists, % of total employment
Education	Share of population who attained tertiary education (ISCED 5–8), %
	Share of young people neither in employment nor in education and training (NEET), % of total number of population of respective age group (ages 15–24)
	Share of early leavers from education and training, % (ages 18–24)
Health	Average life expectancy at birth
	Healthy life years at birth
	Share of people with some level of disability, % (ages 16–64)
	Happiness index

As of February 2025, information on the sub-indicators shown in Table 6 is available for years 2014–2023 (see Table A1). The sub-indicators have different units of measurement (percentage, year, index), therefore it is necessary to normalize the data and create a united scale of measurement. A scale ranging from 0 to 1 is used for data (see Table A2). For sub-indicators in which a higher value is associated with a better situation in the country (for example, employment rate, average life expectancy at birth), the min-max scaling formula is used to normalize data:

$$X_i^{'} = \frac{X_i - \min(X)}{\max(X) - \min(X)},$$

where $X_i^{'}$ – value of the normalized sub-indicator; X_i – value of the current sub-indicator; $\min(X)$ – minimum value of the sub-indicator over a certain period; $\max(X)$ – maximum value of the sub-indicator over a certain period.

The inverse min-max scaling formula is used to normalize indicators where a lower value is associated with a better situation in the country (for example, share of people with some level of disability, share of early leavers from education and training):

$$X_i^{'} = 1 - \frac{X_i - \min(X)}{\max(X) - \min(X)}.$$

For all indicators, except for data on the share of people employed in high-technology sectors, employed ICT specialists and the happiness index, the minimum and maximum values range from 0 to 100. The happiness index ranges from 0 to 10. The minimum and maximum values for the share of people employed in high-technology sectors and employed ICT specialists have been determined using the values observed during the period included in the study as they are in a small range.

Table 2 summarizes the results of the authors' study on the new human capital approach for years 2014–2023. The results show that positive trends and growth in human capital potential are observed. The index has grown in all years compared to the year before, except for 2016 and 2023. Despite the positive trends, in 2023, human capital potential had only reached slightly more than ⅔ of its maximum potential.

Table 2. The new human capital approach for Latvia, 2014–2023 (source: table made by the authors of the paper)

Year	Result
2014	0.541
2015	0.551
2016	0.548
2017	0.574
2018	0.564
2019	0.583
2020	0.634
2021	0.656
2022	0.721
2023	0.717

5. Discussion and conclusions

There are different types of quantitative measures of human capital. The authors of the paper have analyzed 6 of them for whom the data about Latvia is available – *CWON*, *IWR*, *IHME HCI*, *UNDP HDI*, *WB HCI* and *WEF GHCI*. The 6 indicators have not been analyzed together about Latvia or the Baltic states. It is difficult to compare the indicators as they are created based on different data and use different types of measurement. The number of countries and territories included in the indicators varies considerably (between 130 and 195). The results of the analysis conducted about the globally used human capital indicators and indices show that Latvia has a stable position in the world mainly ranking between the 21st and 39th place. The exception is the human capital indicator by the United Nations Environment Programme and the Urban Institute of Kyushu University described in the *Inclusive Wealth Report* (IWR) in which Latvia ranks 63rd. The results match the findings of Liu and Fraumeni (2020) who calculated that this indicator has the worst Spearman and Pearson correlation with other human capital indicators. Original reports of the indicators emphasize multidimensional aspects of human capital (see IHME HCI, UNDP HDI, WB HCI, WEF GHCI). This study complements the previous literature by offering a comparison specifically to Latvia and the Baltic states and filling the research gap by proposing an index that can be updated annually and is specific to a small economy with its dynamics.

Latvia shows the best results when it comes to indicators that take into account basic health and education attainment (IHME HCI, UNDP HDI). When it comes to monetary indicators (CWON, IWR), Latvia places lower as measure like GDP per capita falls behind the average European level. Latvia shows good results when it comes to education enrolment, however, when labour market indicators and education quality are considered, the results are lower (IHME HCI, UNDP HDI, WB HCI, WEF GHCI).

5.1. Limitations and future research

Every indicator has its disadvantages with most popular ones being the fact that there is no data about the latest years available which makes it difficult to update the indicator, and the focus being too much on only one parameter (for example, education). Focusing too much on a single indicator or not taking one related to human capital into account at all can result in misinterpretation of Latvia's human capital situation. A better and more detailed perspective on it requires considering the advantages and disadvantages of each indicator and proposing a new approach that integrates several, annually available indicators.

While the proposed approach fills the research gap and allows an annual measurement of human capital, limitations of it should be considered. Firstly, the new approach relies completely on secondary data allowing to use only those indicators that are consistently available. It integrates indicators related to labour market, health and education, however, measurements like literacy and education quality are not included in the index as they are not available on yearly basis. Because of that, qualitative aspects of human capital are not fully considered in the new approach. Secondly, the structure of the approach is subject to methodological choices, for example, the selection of sub-indicators. Different methods used in the research can result in different outcomes. Thirdly, the new approach only evaluates the human capital in one country – Latvia. Comparison of different countries in Europe and the world would allow to create a stronger validation of the methodology. Despite the listed limitations, the approach remains suitable for the objectives of the study. By using official and annually updated data

the authors of the paper ensure that the approach can be calculated every year addressing one of the main problems of existing human capital indicators. The data used are transparent allowing other researchers and policymakers to follow and analyze the contribution of each sub-indicator. For policymakers, the approach also offers a practical monitoring tool that can be updated every year and used to improve existing labour market, health and education policies.

The findings of this study show that indicators used to measure human capital all around the world are useful for cross-country comparisons but might not be the best for small economies with country-specific dynamics. The study provides a framework for creating indicators at the national level that are theoretically justified.

In future research, the authors of the paper suggest improving the approach by including new indicators in it, specifically, the ones related to the quality of education if they are available annually and extending it to other countries in Europe and world.

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References

Abraham, K. G., & Mallatt, J. (2022). Measuring human capital. *Journal of Economic Perspectives*, *36*(3), 103–130. https://doi.org/10.1257/jep.36.3.103

Angrist, N., Djankov, S., Goldberg, P. K., & Patrinos, H. A. (2021). Measuring human capital using global learning data. *Nature*, *592*, 403–408. https://doi.org/10.1038/s41586-021-03323-7

Becker, G. S. (2002). Human capital. *The Concise of Encyclopedia of Economics*: *Library of Economics and Liberty*. https://www.econlib.org/library/Enc/HumanCapital.html

Bosi, S., Lloyd-Braga, T., & Nishimura, K. (2021). Externalities of human capital. *Mathematical Social Sciences*, *112*, 145–158. https://doi.org/10.1016/j.mathsocsci.2021.03.013

Brodny, J., & Tutak, M. (2024). A multi-criteria measurement and assessment of human capital development in EU-27 countries: A 10-year perspective. *Journal of Open Innovation*: *Technology*, *Market*, *and Complexity*, *10*(4), Article 100394. https://doi.org/10.1016/j.joitmc.2024.100394

Carneiro, P., Heckman, J. J., & Vytlacil, E. J. (2011). Estimating marginal returns to education. *American Economic Review*, *101*(6), 2754–2781. https://doi.org/10.1257/aer.101.6.2754

Demirgüç-Kunt, A., & Torre, I. (2022). Measuring human capital in middle income countries. *Journal of Comparative Economics*, *50*(4), 1036–1067. https://doi.org/10.1016/j.jce.2022.05.007

Easterly, W., & Levine, R. (2001). It's not factor accumulation: Stylized facts and growth models. *The World Bank Economic Review*, *15*(2), 177–219. https://doi.org/10.1093/wber/15.2.177

Gruzina, Y., Firsova, I., & Strielkowski, W. (2021). Dynamics of human capital development in economic development cycles. *Economies*, *9*(2), Article 67. https://doi.org/10.3390/economies9020067

Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, *312*(5782), 1900–1902. https://doi.org/10.1126/science.1128898

Holden, L., & Biddle, J. (2017). The introduction of human capital theory into education policy in the United States. *History of Political Economy*, *49*(4), 537–574. https://doi.org/10.1215/00182702-4296305

Iallouchen, A., Essarsar, M., Benkada, A., & Belouchi, M. (2018). Human capital or man-capital theory. *International Journal of Scientific & Engineering Research*, *9*(8), 80–84.

Jorgenson, D. W., & Fraumeni, B. M. (1989). The accumulation of human and nonhuman capital, 1948-84. In *The measurement of savings*, *investment and wealth* (pp. 227–286). University of Chicago Press. https://www.nber.org/system/files/chapters/c8121/c8121.pdf

Jorgenson, D. W., & Fraumeni, B. M. (1992a). The output of the education sector. In *Output measurement in the service sectors* (pp. 303–341). University of Chicago Press.

Jorgenson, D. W., & Fraumeni, B. M. (1992b). Investment in education and U.S. economic growth. *The Scandinavian Journal of Economics*, *94*(Supplement), 51–70. https://doi.org/10.2307/3440246

Khaykin, M. M., Lapinskas, A. A., & Kochergina, O. A. (2020). The development of the theory of human capital in the historical dimension. *Advances in Economics*, *Business and Management Research*, *139*, 505–510. https://doi.org/10.2991/aebmr.k.200509.090

Klenow, J. P., & Rodriguez-Clare, A. (1997). The neoclassical revival in growth economics: Has it gone too far? *NBER Macroeconomics Annual*, *12*, 73–103. https://doi.org/10.1086/654324

Kraay, A. (2019). The World Bank Human Capital Index: A guide. *The World Bank Research Observer*, *34*(1), 1–33. https://doi.org/10.1093/wbro/lkz001

Lange, G.-M., Wodon, Q., & Carey, K. (2018). *The changing wealth of nations 2018*: *Building a sustainable future*. World Bank. https://doi.org/10.1596/978-1-4648-1046-6

Latvijas Republikas likums. (2021). Par Sociālās aizsardzības un darba tirgus politikas pamatnostādnēm 2021–2027 gadam [Law on social protection and labour market policy guidelines 2021–2027] (adoption: 01.09.2021). *Latvijas Vēstnesis*. https://www.vestnesis.lv/op/2021/171.9

Le, T., Gibson, J., Oxley, L. (2005). *Measures of human capital*: *A review of the literature* (New Zealand Treasury Working Paper 05/10). ResearchGate.

Lim, S. S., Updike, R. L., Kaldjian, A. S., Barber, R. M., Cowling, K., York, H., Friedman, J., Xu, R., Whisnant, J. L., Taylor, H. J., Leever, A. T., Roman, Y., Bryant, M. F., Dieleman, J., Gakidou, E., & Murray, C. J. (2018). Measuring human capital: A systematic analysis of 195 countries and territories, 1990–2016. *The Lancet*, *392*(10154), 1217–1234. https://doi.org/10.1016/S0140-6736(18)31941-X

Liu, G. (2011, 10 October). *Measuring the stock of human capital for comparative analysis*: *An application of the lifetime income approach to selected countries* (OECD Statistic Working Papers 2011/06, No. 41). OECD. https://doi.org/10.1787/5kg3h0jnn9r5-en

Liu, G., & Fraumeni, B. M. (2020). *A brief introduction to human capital measures* (IZA Discussion Paper No. 13494). IZA Institute of Labor Economics. https://doi.org/10.2139/ssrn.3654931

Managi, S., & Kumar, P. (2018). *Inclusive wealth report 2018*: *Measuring progress towards sustainability*. Routledge. https://doi.org/10.4324/9781351002080

Mann, H. (1872). *Annual reports on education*. Lee and Shepard; Lee, Shepard, and Dillingham.

Mathur, V. K. (1999). Human capital-based strategy for regional economic development. *Economic Development Quarterly*, *13*(3), 203–216. https://doi.org/10.1177/089124249901300301

Ministry of Economics, Latvia. (2018). *Informatīvais ziņojums par darba tirgus vidēja un ilgtermiņa prognozēm* [Informative report on medium and long-term labour market forecasts]. https://www.em.gov.lv/lv/media/601/download

Ministry of Economics, Latvia. (2022). *Informatīvais ziņojums par darba tirgus vidēja un ilgtermiņa prognozēm* [Informative report on medium and long-term labour market forecasts]. https://www.em.gov.lv/lv/media/14720/download

Ministry of Welfare, Latvia. (2023). *Labour market report 2023*. https://www.lm.gov.lv/lv/gada-parskati-par-darba-tirgu

Mukhopadhyay, U. (2021). Differential education subsidy policy and wage inequality between skilled, semi-skilled and unskilled labour: A general equilibrium approach. *Review of Development and Change*, *26*(1), 40–62. https://doi.org/10.1177/09722661211003186

Nelson, R. R., & Phelps, E. S. (1966). Investment in humans, technological diffusion, and economic growth. *The American Economic Review*, *56*(1/2), 69–75.

Official Statistics Portal. (2024a). *IRS010. Population at the beginning of year, population change and key vital statistics 1920–2024*. https://data.stat.gov.lv/pxweb/en/OSP_PUB/START__POP__IR__IRS/IRS010

Official Statistics Portal. (2024b). *IZT010. Population aged 15 and over by the highest educational level attained, sex and age groups at the beginning of year 2019–2024*. https://data.stat.gov.lv/pxweb/en/OSP_PUB/START__IZG__IZ__IZI/IZT010

Pārresoru koordinācijas centrs. (2020). *Latvijas nacionālais attīstības plāns 2021– 2027 gadam* [National development plan of Latvia for 2021–2027]. https://pkc.gov.lv/sites/default/files/inline-files/20200204_NAP_2021_2027_gala_redakcija_projekts_.pdf

Petty, W. (1888). *Essays on mankind and political arithmetic*. Cassell & Company, Limited.

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, *98*(5), 71–102. https://doi.org/10.1086/261725

Samans, R., Zahidi, S., Leopold, T. A., & Ratcheva, V. (2017). The Global Human Capital report 2017: Preparing people for the future of work. *World Economic Forum*. https://weforum.ent.box.com/s/dari4dktg4jt2g9xo2o5pksjpatvawdb

Sari, V. A., & Tiwari, S. (2024). The geography of Human capital: Insights from the subnational Human Capital Index in Indonesia. *Social Indicators Research*, *172*, 673–702. https://doi.org/10.1007/s11205-024-03322-x

Schultz, T. W. (1960). Capital formation by education. *Journal of Political Economy*, *68*, 571–583. https://doi.org/10.1086/258393

Schultz, T. W. (1961). Investment in Human Capital. *The American Economic Review*, *51*(1), 1–17.

Smith, A. (2012). *An inquiry into the nature and causes of the wealth of nations*. Wordsworth Editions Limited.

Stroombergen, A., Rose, D., & Ganesh, N. (2002). *Review of the statistical measurement of Human Capital*. Statistics New Zealand.

The Organisation for Economic Co-operation and Development. (n.d.) *PISA data and methodology*. https://www.oecd.org/en/about/programmes/pisa.html#data

Trofimov, I. D., & Baawi, N. A. (2020). *Human Capital*: *State of the field and ways to extend the concept* (MPRA, Paper No. 107039). MPRA Munich Personal RePEc Archive.

United Nations Development Programme. (2024). *Human Development Report 2023/2024. Breaking the Gridlock*: *Reimagining cooperation in a polarized world*. United Nations Development Programme. https://doi.org/10.18356/9789213588703

United Nations Development Programme. (n.d.). *Human Development Index* (*HDI*). https://hdr.undp.org/data-center/human-development-index#/indicies/HDI

World Bank. (2018). *The Human Capital project*. World Bank. https://doi.org/10.1596/30498

World Bank. (2021). *The Human Capital Index 2020 update*: *Human capital in the time of COVID-19*. World Bank. https://doi.org/10.1596/34432

World Bank. (2024a). *Literacy rate, adult total* (*% of people ages 15 and above*) – *Latvia*. https://data.worldbank.org/indicator/SE.ADT.LITR.ZS?locations=LV

World Bank. (2024b). *Harmonized learning outcomes* (*HLO*) *database*. https://datacatalog.worldbank.org/search/dataset/0038001

World Bank. (n.d.-a). *2020 HCI*: *Country briefs and data*. https://www.worldbank.org/en/publication/human-capital#Briefs

World Bank. (n.d.-b). *Harmonized test scores*. https://genderdata.worldbank.org/en/indicator/hd-hci-hlos?gender=total

APPENDIX

Table A1. New human capital approach sub-indicators before normalization

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Share of economically active population, % (ages 15–64)	74.6	75.7	76.3	77.0	77.7	77.3	78.2	75.8	76.8	76.6
Employment rate, % (ages 15–64)	66.3	68.1	68.7	70.1	71.8	72.3	71.6	69.9	71.3	71.4
Youth employment rate, % (ages 15–24)	32.5	34.5	32.8	33.0	33.1	31.8	29.6	27.9	30.6	30.6
Share of people employed in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services), % of total employment	3.4	3.3	3.1	3.6	3.5	3.3	4.0	4.5	5.3	5.2
Employed ICT specialists, % of total employment	2.5	2.7	2.7	2.8	2.5	3.1	3.6	3.8	4.4	4.4
Share of population who attained tertiary education(ISCED 5–8), %	25.9	27.0	28.3	28.9	29.2	30.5	32.4	33.0	33.4	33.1
Share of young people neither in employment nor in education and training (NEET), % of total number of population of respective age group (ages 15–24)	12.0	10.5	11.2	10.3	7.8	7.9	7.1	8.6	8.6	7.2
Share of early leavers from education and training, % (ages 18–24)	8.5	9.9	10.0	8.6	8.3	8.7	7.2	7.3	6.7	7.7
Average life expectancy at birth	74.3	74.7	74.8	74.8	75.0	75.6	75.1	73.1	74.4	75.5
Healthy life years at birth	53.4	53.0	53.6	51.4	52.3	53.1	53.4	53.8	54.2	54.6
Share of people with some level of disability, % (ages 16–64)	21.8	21.8	21.9	25.1	24.1	24.0	23.4	21.9	21.5	24.4
Happiness index	5.07	5.10	5.56	5.85	5.93	5.94	5.95	5.93	6.18	6.20

Table A2. New human capital approach sub-indicators after normalization

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Share of economically active population, % (ages 15–64)	0.746	0.757	0.763	0.770	0.777	0.773	0.782	0.758	0.768	0.766
Employment rate, % (ages 15–64)	0.663	0.681	0.687	0.701	0.718	0.723	0.716	0.699	0.713	0.714
Youth employment rate, % (ages 15–24)	0.325	0.345	0.328	0.330	0.331	0.318	0.296	0.279	0.306	0.306
Share of people employed in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services), % of total employment	0.136	0.091	0.000	0.227	0.182	0.091	0.409	0.636	1.000	0.955
Employed ICT specialists, % of total employment	0.000	0.105	0.105	0.158	0.000	0.316	0.579	0.684	1.000	1.000
Share of population who attained tertiary education (ISCED 5–8), %	0.259	0.270	0.283	0.289	0.292	0.305	0.324	0.330	0.334	0.331
Share of young people neither in employment nor in education and training (NEET), % of total number of population of respective age group (ages 15–24)	0.880	0.895	0.888	0.897	0.922	0.921	0.929	0.914	0.914	0.928
Share of early leavers from education and training, % (ages 18–24)	0.915	0.901	0.900	0.914	0.917	0.913	0.928	0.927	0.933	0.923
Average life expectancy at birth	0.743	0.747	0.748	0.748	0.750	0.756	0.751	0.731	0.744	0.755
Healthy life years at birth	0.534	0.530	0.536	0.514	0.523	0.531	0.534	0.538	0.542	0.546
Share of people with some level of disability, % (ages 16–64)	0.782	0.782	0.781	0.749	0.759	0.760	0.766	0.781	0.785	0.756
Happiness index	0.507	0.510	0.556	0.585	0.593	0.594	0.595	0.593	0.618	0.620

Table A3. Latvia's wealth per capita, 2014 (at constant 2014 prices, US dollars per capita) (source: Lange et al., 2018)

Indicator	Wealth per capita, US dollars
Total wealth	236 907
Produced capital	113 746
Human capital	113 472
Natural capital	18 738
Net foreign assets	–9 049

Table A4. Changes in human capital growth in Latvia, 1995–2014 (base year = 1990) (source: Managi & Kumar, 2018)

Year	Changes in total human capital growth	Changes in human capital growth per capita
1995	–0.7%	0.7%
2000	–1.2%	1.7%
2005	–1.8%	2.6%
2010	–2.7%	3.2%
2014	–4.6%	5.1%

Table A5. Human Development Index in Latvia, 2012–2022 (source: United Nations Development Programme, 2024; United Nations Development Programme, n.d.)

Year	Human Development Index	Life expectancy, years	Expected number of years spent in school	Average number of years spent in school	Gross national income per capita, purchasing power parity of 2017, US dollars
2012	0.837	73.7	15.6	12.7	23 804
2013	0.846	74.2	16.1	12.8	24 661
2014	0.850	74.4	16.1	12.9	25 457
2015	0.853	74.7	16.1	12.9	26 505
2016	0.858	74.8	16.3	12.9	27 471
2017	0.863	74.8	16.5	13.1	28 602
2018	0.868	75.0	16.6	13.2	29 560
2019	0.873	75.5	16.5	13.3	30 570
2020	0.873	75.5	16.5	13.3	30 562
2021	0.865	73.6	16.6	13.3	31 443
2022	0.879	75.9	16.6	13.3	32 083

Table A6. Results in different indicators of human capital index in Latvia (2018, 2020) (source: World Bank, 2018, 2021, n.d.-a)

Indicator	Result in 2018	Result in 2020	Comments
Expected number of years spent in school till the age of 18	13.3 years	13.6 years	According to the World Bank, full education is received by those who have spent 14 years in school by the age of 18.
Average harmonized test scores	530	504	According to the World Bank, the indicator ranges from 300 to 625, where 625 denotes the highest achievements.
Learning-adjusted years of schooling	11.3 years	11 years	It is an indicator that combines the number of years spent in school and the quality of education received. The highest possible score is the same as the expected number of years spent in school by the age of 18: 14 years.
Chance of a child born today to survive till the age of 5	100%	100%	The highest possible score is 100%.
Adult survival rate (chance of a 15-year old person to survive till the age of 60)	85%	84%	The highest possible score is 100%.
Level of impaired growth and development of children under the age of 5	Data about Latvia is not available.	Data about Latvia is not available.	

Table A7. Comparison of human capital indicator results across the Baltic states (source: Samans et al., 2017; Lange et al., 2018; Lim et al., 2018; Managi & Kumar, 2018; World Bank, 2021; United Nations Development Programme, 2024)

Indicator	Year	Number of countries (and territories)	Latvia	Lithuania	Estonia
CWON (human capital per capita, 2014 USD at market exchange rates)	2014	141	113 472 (39th place)	100 081 (44th place)	155 041 (33rd place)
IWR (human capital per capita, thousands of constant 2005 USD)	2014	140	49.5 (63rd place)	62.4 (69th place)	58.6 (74th place)
IHME HCI (estimated human capital as expected years of life of people aged 20–64)	2016	195	23 years (21st place)	21 years (39th place)	24 years (17th place)
UNDP HDI (human development index)	2022	193	0.879 (37th place)	0.879 (37th place)	0.899 (31st place)
WB HCI (human capital index)	2020	174	0.71 (31st place)	0.71 (31st place)	0.78 (12th place)
WEF GHCI (global human capital index)	2017	130	69.85 (28th place)	70.81 (25th place)	73.13 (12th place)

Table A8. Comparison of human capital indicators (source: Samans et al., 2017; Lange et al., 2018; Lim et al., 2018; Managi & Kumar, 2018; World Bank, 2021; United Nations Development Programme, n.d.)

Indicator	Description	Sub-indicators	Years available (as of February 2025)
CWON	Human capital per capita	–	2014
IWR	Human capital per capita	–	1990, 1995, 2000, 2005, 2010, 2014
IHME HCI	Human capital index that shows the expected number of years of life for each birth cohort of people aged 20 to 64, adjusted for educational attainment and quality, and health status.	Life expectancy (expected years lived for ages 20–64). Health status (wasting; stunting; anaemia; cognitive impairment; vision loss; hearing loss; infectious disease prevalence). Educational attainment (average years of education). Learning (average standardized test scores).	1990, 2016
UNDP HDI	Human development index that uses data on people's health, education and standard of living to assess it.	Health (life expectancy of a newborn child. Education (the expected number of years spent in school and the average number of years spent in school). Standard of living (gross national income per capita).	1990–2022
WB HCI	Human capital index that is measured as the productivity a child born today will have when he reaches the age of 18.	Education (the expected number of years spent in school by the age of 18; the internationally agreed, harmonized test scores; an indicator that combines the quantity of education or the expected number of years spent in school by the age of 18 and the quality of education that is based on results obtained in the international tests). Health (the level of impaired growth and development of children under the age of 5; the adult survival rate, which is measured as the chance of 15-year old people to survive till the age of 60). Survival (the chance of a child born today to survive till the age of 5).	2010, 2018–2020
WEF GHCI	Global human capital index that assesses people's level of knowledge, deployment in the labour market, development and know-how.	Knowledge (literacy and numeracy; primary education attainment rate; secondary education attainment rate; tertiary education attainment rate). Deployment (labour force participation rate; employment gender gap; unemployment rate; underemployment rate). Development (primary education enrolment rate; quality of primary schools; secondary education enrolment rate; secondary enrolment gender gap; vocational education enrolment rate; tertiary education enrolment rate; skill diversity of graduates; quality of education system; extent of staff training). Know-how (high-skilled employment share; medium-skilled employment share; economic complexity; availability of skilled employees).	2013, 2015-2017