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THE RELATIONSHIP BETWEEN THE INDUSTRY-LEVEL ECONOMIC DEVELOPMENT AND HUMAN DEVELOPMENT IN LATVIA

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Abstract

Research purpose. There is some empirical evidence of the relationship between economic and human development at a country level. Human development is most frequently proxied by the Human Development Index (HDI). Considering the fact that HDI is a measure covering the fields of several Sustainable Development Goals (SDGs), the overwhelming idea of the research is to determine the impact of sector economic development on the achievement of SDGs. The research goal is to establish if there is a relationship between economic development, using Latvian sector statistics, and the human development of Latvia.

Design / Methodology / Approach. The paper uses different types of regression analyses of the longitudinal data to determine if there is a relationship between HDI and economic development indicators in different sectors of the Latvian economy. The sample includes industry-level data on eight industries and HDI data collected from 2010 to 2020. The regression analysis was applied to HDI as a dependent variable, and a selected set of industry variables was assessed as a group of independent variables (both individual for industries and aggregated on the country level). The set included the indicators of the turnover of companies, number of companies, added value, total personal costs and number of employees in full-time employment.

Findings. The findings partly support the proposal that economic development relates to human development because some factors of economic growth have formed a statistically strong relationship with HDI (added value, total personal costs, and the number of employees in full-time employment), while others have not (turnover and number of companies). The fact that some statistically proven relationships had a positive while others had a negative direction suggests that the relationship between economic development and human development is bidirectional depending on specific indicators.

Originality / Value / Practical implications. There is an obvious research gap in the investigated field in Latvia and even in the Baltics. The current paper contributes to the knowledge base about factors affecting human development and enlarges the statistical data basis. Besides, this study contributes to the development of national strategic plans by determining which sectors and which indicators have a significant impact on HDI. Research information will be useful for the NAP report after 2027 for assessing the level of achievement of strategic goals, especially in the priorities "Strong families, healthy and active people", "Knowledge and skills for personal and national growth", and "Competitiveness and material well-being of companies".

Keywords: economic growth; human development; industries.

JEL codes: O10; O15.

Introduction

Policymakers have long been attempting to promote and sustain economic growth (Sultana et al., 2022) because it is the foundation of the stable and prosperous development of societies. Various aspects of

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economic growth have been included in Agenda 2030 of the Sustainable Development Goals (henceforth - SDGs) of the United Nations (UNDP, 2022). For example, Goal 8 aims at providing decent work and ensuring economic growth. In contrast, Goal 9 addresses the issues of industry, innovation and infrastructure and Goal 7 on the provision of affordable and clean energy. Some other sustainable goals, however, focus on human capital. Goal 1 promotes the eradication of poverty; Goal 3 aims at improving healthcare and well-being; goal 4 asserts the importance of good education, while Goal 10 prioritises socioeconomic equality. This means that the United Nations view the attainment of economic growth through the prism of human development. Such an approach is supported by empirical evidence consistent with which there is a relationship between economic growth and human capital development (Stephen, 2015; Suri et al., 2011).

Human capital affects economic development directly and indirectly through technologies (Diebolt & Hippe, 2019). The need to explain the interaction of human, technological and economic capitals even led to the emergence of Unified Growth models (Diebolt & Hippe, 2019). Furthermore, human capital is the key driver of innovations, which generate economic growth, and transformations and realise national potentials (Martinidis et al., 2022) that are essential for the transition to Society 5.0 and Industry 5.0, ultimately leading to the emergence of human-centric industries (Carayannis & Morawska-Jancelewicz, 2021) that merge human intelligence with artificial and machine performance in industries, creating symbiotic ecosystems (Leng et al., 2022), such as human cyber-physical systems (Saniuk et al., 2022). Such human-centric societies and industries (5.0) are expected to enhance the quality of life of societies due to their focus on sustainability, human life, and the environment (Ghobakhloo et al., 2022). The values and objectives of Society 5.0 and Industry 5.0, therefore, are in contrast to those of the current Industry 4.0, which aims at profits (Ghobakhloo et al., 2022). Clearly, economic, and human development should be considered in tandem to ensure the transition to the next level of socioeconomic development. One good example that demonstrates the effect of human development on economic development is provided by the research of Grillitsch et al. (2021). In their study, the authors examined the effect of change agency, which is created by human agency, on regional development in Norway and determined that the potency of human capital to transform economic development is undeniable due to its ability to generate innovations and engage in entrepreneurial activities. In their view, this happens because human agents make decisions, develop strategies, and take actions that create transformations and economic growth (Grillitsch et al., 2021).

The relationship between economic and human development could be studied at different levels, such as global, regional, and national. The application of global and regional research findings on small countries with a mediocre level of development might be problematic because the data collected on large and medium-sized nations and well-developed small nations might not be fully relevant or descriptive of them. One such small nation is Latvia, located in the Baltic Sea region. According to the recent country report of the Organization for Economic Cooperation and Development (2022), Latvia needs to continue to invest in economic growth and address human capital challenges, such as high levels of poverty and poor funding of health care. The Ministry of Economics of the Republic of Latvia, in the Annual Report 2021, postulated the need to boost human capital development as part of the overall economic development of the nation. However, any need for economic theory should be rooted in statistical analysis. Therefore, the goal of this research was to statistically determine if there is a relationship between economic development and human development in Latvia. Economic development was encoded through various economic development indicators across various industries, while human development was proxied through the human development index. If such a relationship was to be obtained, the need to invest in human development in order to support economic growth would be justified in the context of Latvia.

One major limitation of this research includes the limited number of industries and indicators chosen to represent these industries. Another limitation pertained to the choice of only one parameter of human development that was used to represent the entire domain of human development. The selected indicator – the human development index – does not encode a variety of important human development issues such as empowerment, inequality, poverty, etc. In the future, this research should be expanded to incorporate more industries and more indicators of both industrial and human development.

Literature review

The core representation of any nation is its people. The well-being of people is based on material goods, healthcare and social services that are available to them (Qui et al., 2022). Therefore, the core of all economic activities lies in the cycle of economic activities that are produced by and for the benefit of people. Consequently, improvements in one type of development should lead to improvements in some other types of development. However, it is not always the case because the relationship between economic and human development is complex.

On the one hand, economic development has been viewed as an impetus for human development (Croes et al., 2021). Since economic development is expected to result in a higher level of overall development of a nation (Xu & Li, 2020), the quality of life is expected to improve, too. However, in some cases, a higher level of economic development might not lead to improvements in the quality of life, in which case economic development does not contribute to the overall human development but rather widens a socioeconomic inequality gap (Akisik et al., 2020). Under such circumstances, economic development is promoted neither by human nor technological capital; instead, it is fuelled by natural resources (Rahim et al., 2022). Therefore, the economic development of such nations might be neither economically nor environmentally sustainable. In contrast, if economic development correlates with a higher level of human development, such economic development is stable, fruitful, and consistent with the Sustainability Goals of the UN Agenda 2030. The reason pertains to the contribution of human capital to economic growth.

On the other hand, the human development level affects the level of economic development of nations either by increasing or reducing economic growth (Rahim et al., 2021). In fact, the attainment of SDGs is possible only via human capital development (Fahimi et al., 2018) because human capital has a certain level and range of competencies to produce economic outputs (Dasic et al., 2020). Furthermore, human capital represents an interface connecting the input of consumed resources and the outputs generated by resource consumption (Shidong et al., s2022). Therefore, the quality of human capital yields economic growth and actions that translate into a level of sustainability of resource use and the generation of economic outputs.

Thus, economic development affects human development, and human development affects economic development. This means there is a relationship between economic and human development. This relationship forms the core of socioeconomic development, which combines economic outputs with those related to human development in society. As with any relationship, the relationship between economic and human development outputs is complex because it is formed by various components, or else indicators, that are connected in a network-like manner. The connectivity of such networks is sensitive to changes in the market, which might partly explain why some researchers, such as Akisik et al. (2020), have obtained the effect of economic development on human development. In contrast, others have gained the opposite outcomes (Rahim et al., 2021). As a result of such inconsistency, some researchers question the size and significance of the impact of human capital on economic growth (Zhang & Wang, 2021). Nevertheless, there is a growing body of research, proving the opposite (Zhang & Wang, 2021). For example, in a study of 141 countries, Sultana et al. (2022) proved the direct relationship between human capital quality, especially in the areas of education and health, and economic growth. In their study, a higher level of human capital correlated with a higher level of economic growth, which is consistent with Xu & Li (2020), who explored this relationship in China.

Overall, empirical research supports the bidirectional effect of economic and human development on each other. When human capital expands activities across various sectors of the economy, it results in economic growth. For example, the expansion of the tourism sector in Ecuador, created by human capital, contributed to the enhanced indicators of economic growth (Rivera, 2017). However, for human capital to be able to generate new economic outcomes leading to foreign investment into the economy (Shidong et al., 2022), the economy needs to invest in human capital to enable it to yield innovations, becoming innovative human capital that works effectively in knowledge economies (Xu & Li, 2020). This creates the bidirectional cycle of the effect of economic and human development on each other.

The relationship between economic and human development is studied through the evaluation of the relationship among indicators of economic and human development across various sectors of the economy. The economic indicators that are affected by human capital include GDP, capital deepening, technology, labour productivity and financial development, both short- and long-term (Dankyi et al., 2022; Pelinescu, 2015). No wonder the ageing population with lower productivity is often associated with slower economic growth (Bairoliya & Miller, 2021). Although there are various human capital factors, such as the level of education or unemployment, the key indicator used as a proxy for human capital development is the Human Development Index (henceforth – HDI) (Biggeri & Mauro, 2018; Dorfell & Schuhmann, 2022). HDI has been construed for the United Nations Development Programme in order to assess the living conditions of the population (Biggeri & Mauro, 2018) and the macro-level socioeconomic development of nations (Resce, 2021) in comparison to other nations (Mangaraj & Aparajita, 2021). In other words, HDI has been designed to tap into two major aspects of the quality of life of the population – economic factors and social aspects, including education and health (Assa, 2021). Despite HDI limitations, such as methodological constraints in the construction of the index and the exclusion of the factors of environmental sustainability, freedom (Biggeri & Mauro, 2018; Mangaraj & Aparajita, 2021), inequality, poverty, security, etc. (UNDP HDR, 2022), HDI is still widely used. HDI represents a single indicator, which is formed by analysing data of three indices - life expectancy index, education index and GN index, which cover the three dimensions of HDI – long and healthy life, knowledge, and a decent quality of life, respectively (UNDP HDR, 2022).

To sum up, theoretical and empirical evidence suggests a relationship between economic growth and human development. Such a relationship might be bidirectional and is measured by various indicators. Since the research output on the relationship between economic and human development in Latvia is sparse, the value of this research lies in the exploration of such a relationship across a set of Latvian industries.

Methodology

The aim of the research was to determine if there is a relationship between economic development and human development in Latvia. To attain the aim, the following research question was proposed: Is HDI affected by industry development indicators across various industries in Latvia? To answer the research question, the following primary set of hypotheses was proposed:

- Hypothesis 1. The human development index is positively related to the turnover of Latvian companies which are involved in key industry sectors.
- Hypothesis 2. The human development index is positively related to the number of Latvian companies which are involved in key industry sectors.
- Hypothesis 3. The human development index is positively related to the economic value added by Latvian companies which are involved in key industry sectors.
- Hypothesis 4. The human development index is positively related to the total personnel costs of Latvian companies which are involved in key industry sectors.
- Hypothesis 5. The human development index is positively related to the number of employees in Latvian companies which are involved in key industry sectors, in their full-time equivalent.

The data on HDI for Latvia was collected from the Human Development Reports of the United Nations Development Programme. The data on development indicators for eight industries were retrieved from the National Statistical Bureau of the Republic of Latvia. Both types of data were open source. The selected industries included accommodation and catering, construction, electricity, information and communication services, manufacturing, processing, service, and trade. In contrast, the development indicators across these industries covered the number of companies in the industry sector, their turnover in thousands of euros, added value in thousands of euros, personnel costs in thousands of euros and full-time employee equivalent. The final dataset comprised 88 elements for the analysis. This sample was considered robust as it was analysed as longitudinal data of the 11 years from 2010 to 2020. Several factors affected the choice of the period. First, the methodology of HDI construction was amended in

2010 (see Mangaraj & Aparajita, 2021), which means that the content of HDI before 2010, on the one hand, and from 2010 onwards, on the other hand, differed. Second, 2010 was the onset of the stabilisation period after the world financial crisis.

The linear regression and multifactor regression analyses were run to determine if the national HDI is affected by economic development factors across different sectors of the national economy. Earlier, the long-term relationship between human and economic development through regression analysis was employed by Diebolt and Hippe (2019), who identified the impact of human development on economic development and innovations at regional levels in Europe. In the regression analysis of this paper, the human development index was used as a dependent variable, while a set of industry variables formed a set of independent variables (both individual for industries and aggregated on the country level). The analysis was run in SPSS.

The limitations of this method in relevance to the described sample, as well as the way to implement regression analysis, are described in many sources, including (Lester University, 2022). The key limitations include a relatively small sample (88 elements), which can be mitigated by the two factors. First, the selected industries were among the key industrial contributors to the economic development throughout the entire period of 2010-2020. In 2021, their collective input into the Latvian GDP was above 83%. Second, the sample could have been enriched only by adding data from the years which preceded 2010, and those were years influenced by the global economic crisis which would distort the prepared sample because the final data sample would include the data on economic development in the years of crisis and stable development. Therefore, the authors of this paper decided to accept the limitations produced by the size of the sample instead of verifying data collected under different macroeconomic circumstances.

Results

The results of linear and multifactor regression analyses are included in this section of the paper. First, the model was tested for accuracy (see Fig. 1).

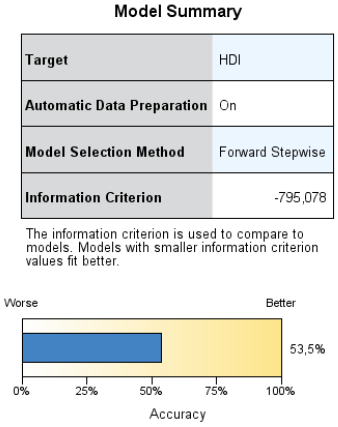

Fig. 1. Automated linear regression model of HDI development in Latvia (summary) (Source: authors' contribution)

Three independent variables have contributed to the variance explained for the dependent variable – total personnel costs (the most significant variable, which contributes 50% of accuracy to the developed model), number of employees in full-time equivalent (contributing about 38% to the accuracy of the developed model) and added value (contributing about 12% to the accuracy of the developed model). The logic behind this looks relatively intuitive – total spending on personnel indicates the level of employee sustainability, which, in turn, is related to the elements of HDI. Added value and amount of

full-time equivalent employees indicate the level of industrial development and are negatively related to the HDI level, which can be explained by the fact that the increased HDI arises from the industries providing higher economic outcomes with fewer employees, which is a feature of innovative human capital.

Following the preliminary automated linear regression analysis, the linear regression analysis was run for each of the studied factors that might define the HDI dynamics from the industry development perspective. The results for turnover as an independent variable are presented in Table 1.

Table 1. Regression analysis results for ANOVA (HDI is a dependent variable)

Variable/Constant	Significance	Coefficient b	Variance explained
Constant	0.000	0	1.4%
Turnover, thousand euro	0.273	0.118	

The variance explained by the range of company turnover is very low, 1.4% only, and the factor appears to be statistically non-significant. Thus, turnover is not considered an important predictor for HDI. Durbin-Watson criteria are equal to 1.47, indicating slight positive autocorrelation, almost on threshold level.

Table 2. Regression analysis results for ANOVA (HDI is a dependent variable)

Variable/Constant	Significance	Coefficient b	Variance explained
Constant	0.000	0	0.4%
Number of companies	0.582	0.059	

The variance explained by the range of company quantity is even lower than in the case of turnover, 0.4% only, and the factor appears to be statistically non-significant. Thus, the number of companies in a country is not considered an important predictor for HDI. Durbin-Watson criteria is equal to 0.83, indicating positive autocorrelation.

Table 3. Regression analysis results for ANOVA (HDI is a dependent variable)

Variable/Constant	Significance	Coefficient b	Variance explained
Constant	0.000	0	6%
Added value, thousand euro	0.022	0.244	

The variance explained by the range of value added is still low, 6%, but the factor appears to be statistically significant. Thus, the added value seems to be an important predictor for HDI, though it does not define the dependent variable to a great extent. Durbin-Watson criteria are equal to 1.83, indicating no autocorrelation is revealed by analysis.

Table 4. Regression analysis results for ANOVA (HDI is a dependent variable)

Variable/Constant	Significance	Coefficient b	Variance explained
Constant	0.000	0	10%
Personnel total costs, thousand euro	0.003	0.317	

The variance explained by the range of total personnel costs is 10%, and the factor appears to be statistically significant. Thus, personnel total costs seem to be an important predictor for HDI, though it does not define the dependent variable to a great extent. Durbin-Watson criteria are equal to 2.14, indicating no autocorrelation is revealed by analysis.

Table 5. Regression analysis results for ANOVA (HDI is a dependent variable)

Variable/Constant	Significance	Coefficient b	Variance explained
Constant	0.000	0	1.5%
Number of employees in a full-time equivalent, thousand euro	0.253	0.123	

The variance explained by the range of the number of employees is only 1.5%, and the factor appears to be statistically non-significant. Thus, the number of employees in a full-time equivalent is not considered an important predictor for HDI. Durbin-Watson criteria is equal to 2.23, indicating no autocorrelation is revealed by analysis.

The implementation of other regression types modelling to the assessing predictive power of the mentioned independent variables led to the same results as linear regression modelling, allowing to adhere to the linear regression.

To finalise the research, a multifactor regression model was developed to define HDI as a dependent variable. Within the process, both turnover and the number of companies are statistically non-significant variables to define the variance of HDI. The statistics on the coefficients for the other independent variables (number of employees in full-time equivalent, total personnel costs and added value) in the model are provided in Table 6. The variance explained by those three independent variables sums up to 45.4%, indicating the excellent prediction power for HDI in Latvia in the model.

Table 6. Regression analysis results for ANOVA (HDI is a dependent variable)

Model	Unstandardised Coefficients		Standardised Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	,849	,002		401,580	,000
Number of employees in full-time equivalent	-3,974E-7	,000	-1,486	-5,382	,000
Personnel total costs, thousand euro	6,087E-8	,000	3,043	6,261	,000
Added value, thousand euro	-1,478E-8	,000	-1,336	-2,548	,013

As it was outlined in a comment to the automated linear regression, the factors of the added value and the number of full-time employees are negatively related to HDI.

Overall, the provided analysis allowed to define the following. Hypothesis 1 and Hypothesis 2 were not supported because the factors of turnover and the number of companies were found to be statistically non-significant predictors for HDI. In contrast, Hypothesis 3 and Hypothesis 4 were supported because both the added value and total personnel costs were proven to be statistically significant predictors for HDI. However, the relationship between these factors and HDI was different. In the case of the personnel costs, the relationship was positive, while in the case of the added value it was negative. Finally, Hypothesis 5 was partly supported, as the factor of the number of employees in a full-time equivalent

did not appear to be a significant factor in simple regression analysis but was proven to be statistically significant in the multiple regression analysis. In contrast to the expectation of Hypothesis 5, the relationship was found to be negative.

Overall, three hypotheses were not supported by the research results, but two hypotheses were successfully verified. Specifically, the first major outcome of the regression analysis was the lack of a significant effect for the factor of turnover in relation to HDI. This means that hypothesis 1 was not supported. This result, however, is consistent with earlier research in which employee turnover was used as a factor of business and labour market development (Lazzara et al., 2022), not as a factor of HDI. The lack of a statistical relationship between staff turnover and HDI could be attributed to differences in factors that form HDI and that motivate staff turnover. While staff turnover is triggered by microeconomic factors, such as poor work conditions and staff competencies that enable them to find a better employment place, HDI is comprised by macroeconomic factors, such as expected years of schooling, mean years of schooling, life expectancy at birth, and gross national income (GNI) per capita.

Another output of the regression analysis was the lack of a significant effect for the factor of the number of companies in a country in relation to HDI. Hypothesis 2 was discarded, too. On the one hand, this result might be considered surprising as some previous research found that the size of the market affected human capital development (Sethi et al., 2019). On the other hand, some data indicate that the size of the market does not seem to translate into a level of human development. For example, in 2021, Switzerland ranked at the top of HDI, while India was significantly behind the leader. Clearly, the size of the Swiss market is smaller than that of India.

However, another result of the regression analysis was the lack of statistical relationship between the number of employees in full-time equivalent employment and HDI. Hypothesis 5 was not supported, either. This outcome is supported by earlier research findings. For example, Checa-Olivas et al. (2021) found that it is not only the quantity but also the quality of employment that affect the quality of life and hence, human development. The quality of employment is a complex concept that covers objective and subjective factors, such as place of employment, remuneration, working hours, the ratios of value-for-money, life-work balance, potential to realise own aspirations, etc. In fact, the Latvian economy, which is characterised by the mediocre standards of life in the context of the European Union, represents a hybrid economy type that combines traditional forms of employment with gigs. Therefore, the question of full-time employment, excluding part-time employment engagements, might not be fully relevant and descriptive of the daily reality of the labour market.

In contrast to earlier results, the regression analysis produced a statistically reliable outcome for the existence of a relationship between the economic value, added by Latvian companies of the selected industries, and HDI. Hypothesis 3 was supported. One reason that could account for the connection between the economic outputs of industries and human development refers to the purpose of Industry 4.0, which encompasses the period for which the data were analysed. Industry 4.0 focuses on the implementation of more advanced computerised and artificial intelligence systems at the workplace while creating a new role for a human (Saniuk et al., 2022). Thus, a human component is not excluded from Industry 4.0 operations.

The regression analysis also supported hypothesis 4 in accord with which there is a relationship between the total personnel costs at Latvian companies in specified industries and HDI. This outcome is not surprising because both indicators characterise human development, with the only difference being that the former one measures micro-economic performance, while the second one - macro-economic outputs. This result supports the proposal that investment in staff support, and development positively affects overall human development. This position is consistent with Wang & Doty (2022), who claim that traditionally human resource development has been expected to contribute to overall human development, including the global scale.

Obviously, these research results should be taken with caution when extrapolating their outputs to all industrial sectors and the entire human development domain because only selected indicators were tested for both economic-industrial and human development categories. Nevertheless, despite such limitations, it can be concluded that since there is some relationship between economic development and human development, it is worth investing in human development because, ultimately, such investment supports

economic growth and prosperity. The outcome resonates with Ziolo et al. (2021) who claim that the attainment of the United Nations Sustainable Development Goals depends on the level of economic development of a nation.

Conclusions

The key research outcomes are the following. First, industry development indicators have been found to relate to HDI and provide a significant share of variance explained for this dependent variable. Second, the number of companies involved in the production of products and services is a non-significant factor to predict HDI, while the factors of the added value, total personal costs, and the number of employees in a full-time equivalent are statistically significant variables. Thus, the main hypothesis of this research was confirmed – indicators used to assess industry development dynamics are related to HDI through an eleven-year period analysed in the Latvian environment. However, given the fact that not all factors have yielded a significant effect, it can be concluded that not all factors forming economic growth via the proxy of industry development indicators have a direct relationship with HDI. This explains why some researchers have been able to identify the impact of economic development on human development, and vice versa, while others have not. It seems the factor of economic growth plays an important role.

Overall, the findings point to the necessity to continuously invest and support the economic development of the national economy due to its connection to the development of human capital, which ultimately translates into a higher quality of life. The fact that both positive and negative relationships between the factors of economic development and HDI were obtained suggest that bidirectional relationship between economic growth and human capital development. This means that investment in human development ultimately supports economic growth.

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