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THE IMPACT OF SPECIFIC FACTORS ON THE REVENUE OF THE IT SECTORS IN POLAND AND THE CZECH REPUBLIC

ВПЛИВ СПЕЦИФІЧНИХ ЧИННИКІВ НА ДОХОДИ ІТ-СЕКТОРІВ ПОЛЬЩІ ТА ЧЕХІЇ

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Abstract. *This article reveals the dynamics of the development of Poland's and the Czech Republic's IT/ITC sectors. The following groups of factors influencing the economic component of the IT/ITC sector were identified: tax policy, factors related to education, and labor force indicators. The simplified regression models were used for each group, and the influence of elements on the economic component of the efficiency of companies in the IT/ITC sector was presented separately. As a result of the weak argumentation of models for each group, the need to create unique models for each country based on a combination of different groups' factors was proved. Based on Var models, when conducting correlation-regression analyzes, models were derived for the dependence of the economic performance indicators of the sectors of Poland and the Czech Republic on given factors.*

Keywords: *IT sector, ITC sector, the revenue of IT sector, factors of influence, tax rates, number of employees in IT, number of students in ITC*

Анотація. *В представленій статті виявлено динаміку розвитку ІТ/ІТК секторів в Польщі й Чехії. Було визначено наступні групи чинників впливу на економічну складову сектору ІТ/ІТК: податкова політика, освітня складова, людський ресурс через показники робочої сили. За використанням спрощених побудованих регресійних моделей для кожної групи, було представлено впливовість елементів на економічну складову ефективності компаній ІТ/ІТК сектору. Внаслідок недостатності аргументації через показники моделей для груп окремо було доведено необхідність створення спеціальних моделей для кожної країни на основі сукупності чинників із різних груп. На основі Var-моделей за проведеними кореляційно-регресійними аналізами було виведено моделі залежності економічних показників ефективності секторів Польщі та Чехії від заданих чинників.*

Ключові слова: *ІТ сектор, ІТК сектор, розміри продажів, чинники впливу, податкові ставки, кількість робітників в ІТ, кількість студентів в ІТК*

Introduction. Developed IT/ITC sectors help improve the country's economy; all this directly dependency the economic and financial efficiency of these sectors. The Central and Eastern European

countries represent one of the economy's fastest-growing and most efficient examples in this direction. In this case, Poland and the Czech Republic are excellent examples of the representation of the CEE region.

The purpose of the article is to analyze the status and performance of the IT/ITC sector in Poland and the Czech Republic; determine the impact factors on the economic component of the sector results for each country.

Recent literature review. International-type companies have a significant influence on the development of both the economies of individual countries and the relationship between countries. Small and medium-sized companies represent a significant part of the development of TNC networking [1]. Currently, companies in the technology sector have begun to occupy significant positions. Different researchers analyzed the efficiency factors of companies. For example, Madhani (2009) noticed that the educational component as a concept of human capital could be seen as a component of the concept based on the main three types of resources that increase the company's competitiveness and form the Resource Based View [2]. Bollen et al. (2005) noted the importance of human capital and its impact on their work. However, a rather complex relationship between indicators was noted, and the difference in indicators across sectors was indicated [3]. Agiomirgianakis et al. (2011) examined indicators of spending on research and development, investment in human resources, graduates in science and technology, and GDP per capita. The study further proved the positive impact of human capital on companies [4]. Durante (2021) presented an analysis of several studies that confirmed the impact of tax policy on economic growth. The positive impact of lowering tax rates can be noted [5]. R. Katz and J. Jung (2021) proved that companies depend on special tax rates. Since the placement of capital is a rather important aspect of the development of companies, corporate tax harms this aspect [6]. In addition, earlier studies have examined the dependence of TNC companies' revenues on investment in R&D and noted the rise in economic performance from using different tax rates to avoid paying the total amount [7,8].

The topic is mainly disclosed without specified sectors or from the side of research and development and investment. However, the IT/ITC sector is exciting and needs to be understood.

Methodology. The primary test based on the constructed VAR model verifies the non-causality of the Granger Causality Test, with the dependent variable and the selected factors. The general model takes the following form for the dependent variable:

$$\text{Revenue}_{\,t} = \alpha_1 + \sum_{i=1}^{p} \beta_{1i}\,\text{Tax}_{t-1} + \sum_{i=1}^{p} \gamma_{1i}\,\text{Study}_{t-1} + \sum_{i=1}^{p} \varepsilon_{1i}\,\text{Emp}_{t-1} + \sum_{i=1}^{p} \epsilon\,\text{Opt}^{1}{}_{t-1} + \sum_{i=1}^{p} \vartheta\,\text{Opt}^{2}{}_{t-1} + \delta_{1t} \quad (1)$$

An explanation of the components of the equations presented: Revenue – an economic indicator of activity; Tax – taxation rates; Study – spending on all levels of education; Emp – the number of employees in the IT/ITC sector; Opt^1 – variable factor: the number of students of the ITC specialization for all students (Stall) or the number of graduates of the ITC specialization for all graduates (Grall); Opt^2 – variable factor: wages in the IT sector (Wg) or personnel costs in the IT sector (PC); δ – error period; α – constant component, β, γ, ε, θ, ϑ – coefficients that need to be estimated; p – lag order.

The Granger test is based on the hypothesis of non-causality from the factors influencing revenue at 5%. The models have checked against Log likelihood confidence values and entry roots AR. Next, was checked the causal relationship, according to Granger. Another option for testing the model was the Wald test. The test makes it possible to note the importance and acceptability of variables in the constructed model in the presence of time delays according to limited lag values.

The final regression-correlation analyses were conducted to determine models of influencing factors for the dependent variable in each country separately. The model will acquire one of the types:

$$\text{Revenue} = \alpha_1 + \beta_1\text{Tax} + \varepsilon_1\text{Study} + \theta_1\text{Grall} + \gamma_1\text{Wg} \quad (2)$$

$$\text{Revenue} = \alpha_1 + \delta_1\text{Emp} + \vartheta_1\text{PC} \quad (3)$$

Preliminary analysis. An essential element in understanding the effectiveness of the IT sector for the countries of Central and Eastern Europe is the study of the number and size of companies.

In Poland, in 2021, there were 149,111 companies registered in the ITC sector. It represents the maximum value for the period from 2010 to 2021. In 2021, the IT segment represented a value of 86.82% in the ITC sector. An increase of 7.95 percentage points since 2010 is noticed. Similar dynamics are shown in the Czech Republic. The maximum value of the number of companies in the

general ITC sector and the IT segment was reflected in 2021. It was 56,682 registered companies in the ITC sector in the Czech Republic. The number of IT companies in the general ITC sector was 89.56% in 2021. Since 2010, there has been an increase in the weight of IT companies in the sector by 2.98 percentage points. In 2010, the value was 86.57% [9–11].

In 2010, Poland's number of companies in the ITC sector amounted to 55,304 units, with an increase of 85,841 units by 2021. It is an increase of 169.62 percentage points. The average annual growth in the number of companies from 2010 to 2021 in the ITC sector is 1.09 times, with a given value for the IT segment of 1.10. In 2010, the number of companies in the ITC sector in the Czech Republic was 35,261 units, with an increase in 2021 of 21,421 units. It represents an increase of 60.75 percentage points. The average annual growth in the number of companies from 2010 to 2021 in the ITC sector is 1.04 times. The average annual growth of IT companies in the studied years was 1.05 times [9–11].

A comparison of the indices reflects the growth of IT companies with faster changes than the growth of the whole ITC sector both in the Czech Republic and Poland.

The preliminary reviews of the ITC sectors in the countries of the CEE region made it possible to note that most companies forming the sector are represented by SMEs. From this, it can be noted that the share of SMEs in the Polish ITC sector has been growing over the study period for ten years. From 2010 to 2017, the value was more than 99.8%; since 2018, the value has reached 99.9% and has been stable over the following years. The situation in the IT segment has similar dynamics; from 2010 to 2017, there was an increase in the indicator with a value exceeding 99.8%. However, since 2018, the value has been stable at 99.89%, which is quite close to the value for the ITC sector. Hence, it is noted that the correlation between the indicators of both the general ITC sector and the separate IT segment [9–11].

Presenting the study's results for the Czech Republic, it is noted that for 2021, the number of SME companies in the ITC sector is 99.84%, while the given value for IT is 99.85%. The value is consistently represented during the study period by exceeding 99.8% [9–11].

Based on the analysis carried out on the example of the Czech Republic and Poland as representatives of CEE in the analysis of general ITC sectors and IT segments, it can be noted that, on average, the weight of SMEs by sectors or segments is at least 99.8% of the total number of companies.

Based on the available statistics, the revenue was chosen as the most comprehensive and appropriate indicator of economic activities for the IT/ITC sectors of Poland and the Czech Republic. The interval periods were chosen for each country separately: Poland from 2010 to 2020 and the Czech Republic from 2005 to 2020.

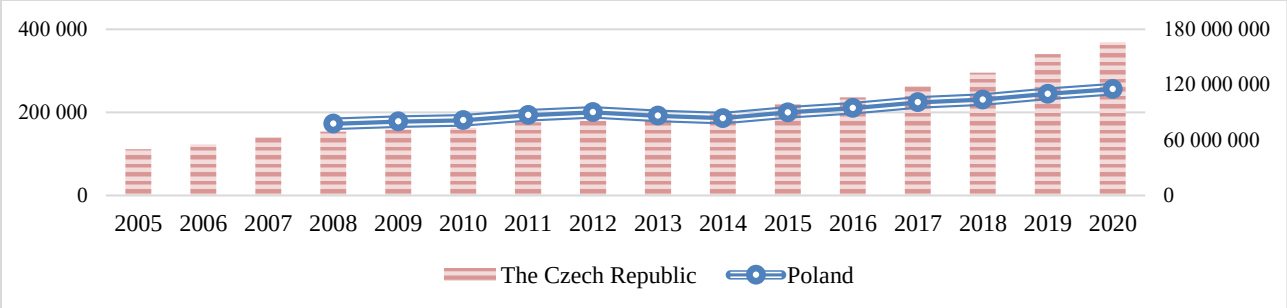

Figure 1. Dynamics of revenue by the country for the corresponding periods for the IT/ITC sector, million Czech crowns, and thousand Polish zlotys
Source: compiled by the authors based on [9,10].

The financial and economic characteristics of the IT sectors in the Czech Republic and Poland have similar dynamics during the years studied for each country. Examining the dynamics by country, it can be noted that growth for both representatives of the CEE in the IT sector began after 2014.

a) The tax system as a factor influencing the economic performance of companies

The IT sector is quite vulnerable to tax rate changes. The absence of preferential or special conditions for the IT sector characterizes the tax policies of Poland and the Czech Republic. The main influencing force for IT companies in these countries is changes in general tax rates. The central rates used in the study are corporate tax, payroll tax, and social and medical contributions of companies.

The study of each of the taxes presented allows for indicating the change over time. In general, the change is characterized by a decrease in tax rates.

Corporate tax for the two countries in 2020 was 19%. This corporate tax rate is among the highest in Central and Eastern Europe for a given year. The indicated rate is chosen as an average. In Poland, from 2008 to 2020, the corporate tax rate has not changed and amounted to 19%. In the Czech Republic, however, the corporate tax rate has changed. From 2005 to 2020, there was a decrease in the tax rate from 26% to 19% [12,13].

The payroll tax rate for 2020 is 17% for Poland and 15% for the Czech Republic [12,13].

Social and medical contributions for both countries are presented separately due to significant differences between the components and their changes over time. Social contributions in Poland have four rates: retirement, disability, sickness, and accident. The central rates for types of social insurance payments are presented below in the time change.

Table 1

Change in tax rates by type of social payments for companies in 1999-2021 in Poland

Type of payments/time/rate												
Retirement	**1999 - 2021** 19.52%											
Disability	**1999-2007**		**2007**		**2008-2011**		**2012**			**2013 - 2021**		
	13%		13%, 10%		6%		6.6%, 8%			8%		
Sickness	**1999 - 2021** 2.45%											
Accident	**1999-2002**	**2003-2005**	**2006**	**2007-2008**	**2009**	**2010-2011**	**2012**	**2013-2014**	**2015**	**2016-2017**	**2018**	**2019-2021**
	1.62%	1.93%	1.93%, 1.80%	1.80%	1.8%, 1.67%	1.67 %	1.67%, 1.93%	1.93%	1.93%, 1.8%	1.80 %	1.8%, 1.67%	1.67%

Source: compiled by the author based on data [13,14].

Health insurance as another tax burden for companies in the Polish sector has also changed over time. The central rates for medical penalties were: 7.5%, 7.58%, 7.75%, 8%, 8.25%, 8.50%, and 9%. In addition, the levy on the labor fund was 2.45% over the years [13,14].

In the Czech Republic, social payments are shown at rates for companies (as employers) based on four main contributions: health fund, pension, sickness, and unemployment contributions. The following shows how the size of these contributions' changes over time.

Table 2

Change in tax rates by type of social payments in 2000-2021 in the Czech Republic

Type of payments/time/rate			
Health fund	**2000 - 2021** 9%		
Pension	**2000 - 2004** 19.5%	**2005 - 2021** 21.5%	
Sickness	**2000 - 2008** 3.3%	**2008 - 2020** 2.3%	**2020 - 2021** 2.1%
Unemployment	**2000 - 2004** 3.2%	**2005 - 2021** 1.2%	

Source: compiled by the author based on data [12,15].

The most significant decline in Czech was experienced in unemployment payments. Despite this, there was an increasing indicator of the non-pension fund. In 2000, the total rate for the payment of social contributions was 35%, and in 2021 – 33.8%.

b) The educational component

The Czech Republic and Poland, as representatives of the CEE region, are defined as countries with a significant indicator of the quality of graduates in the professional orientation field of IT/ITC. The figure below shows a comparison of spending by country on education at all levels from 2000 to 2020. The specified data are presented in local currencies. Government expenditures on education are also displayed as a percentage of GDP.

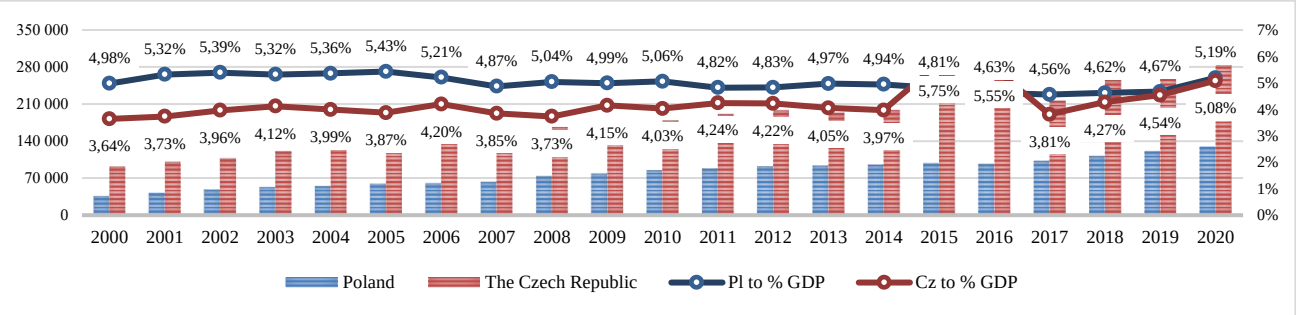

Figure 2. Spending on all levels of education and government expenditures on education as a percentage of GDP for Poland and the Czech Republic from 2000 to 2020, Polish zlotys, and Czech crowns and %

Source: compiled by the author based on data [16,17].

When considering government spending as a percentage of GDP, it is worth noting that in 2020 the indicator's value for each country was approximately at the same level. In Poland, the indicator's value was 5.19%, while in the Czech Republic, this value was 5.08% [17]. A more significant increase occurred for the Czech Republic with an increase of 1.44 percentage points; in Poland, the growth over twenty years amounted to 0.21 percentage points.

The total spent on the educational component of all types for all sources shows an increase from 2000 to 2020 in Poland. The growth amounted to 257.54 percentage points. In total, the value of receipts in 2020 in Poland for all educational programs amounted to 129,002 million Polish zlotys, with a value of 36,080 million Polish zlotys in 2000 [16].

According to the Czech Republic, from 2000 to 2014, a trend towards an increase in the indicator is reflected. In this period, the annual average cost increase was 1.06 times or a change of 5.53 percentage points. In 2020, the value of education spending at the state level amounted to 299,751 million Czech crowns. Comparing twenty years, one can note an increase in spending by 228.14 percentage points [16].

Another essential aspect of the study is analyzing the number of students enrolled in ITC programs and the number of graduates from these programs.

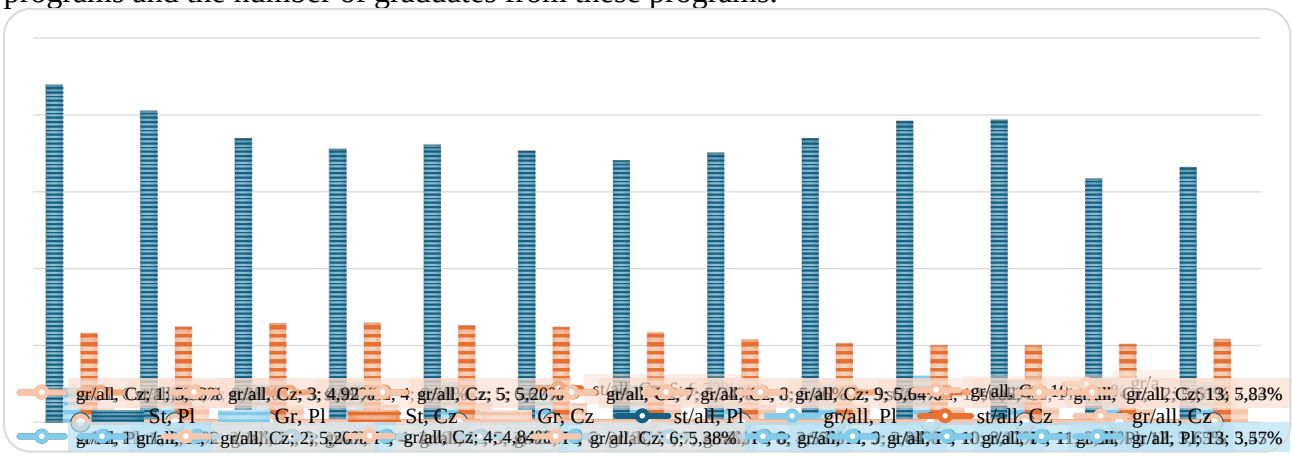

Figure 3. Comparative dynamics of the number of students and graduates and ratio to all students in the Czech Republic and Poland during 2008-2020, persons, and %

Source: calculated and compiled by the authors based on [9,10,16].

The number of students in ITC programs in Poland prevails over that of students in the Czech Republic. It is because Poland represents many institutions with a technological base.

Continuing the analysis of Poland in 2020 indicator of the number of students in ITC programs is 66,402 students. It was 10,485 students completed their studies in this area in 2020. At the same time, the share of students studying in the areas of ITC from the total number of students in 2020 was 5.45%, and graduates – were 3.57%. There was an increase in the share of attracted students from the value of 4.55% in 2008, graduates from the mark of 2.14%.

In the Czech Republic in 2020, the number of students in the field of ITC was 21,647, and the number of graduates – was 3,673 people. At the same time, the share of students studying in the areas of ITC from the total number in 2020 is 7.24%, and graduates – 5.83%. There was an increase in the share of attracted students from 6.29% in 2008 graduates from 5.03%.

For both countries, there is a downward trend in students from 2008 to 2020. It is explained as a consequence of less interest in obtaining specialization at universities and the opportunity to gain specialization skills in specialized courses.

c) The labor forces

High-quality education and low wages allow companies to choose markets in Poland and Czech while using this advantage to reduce labor costs.

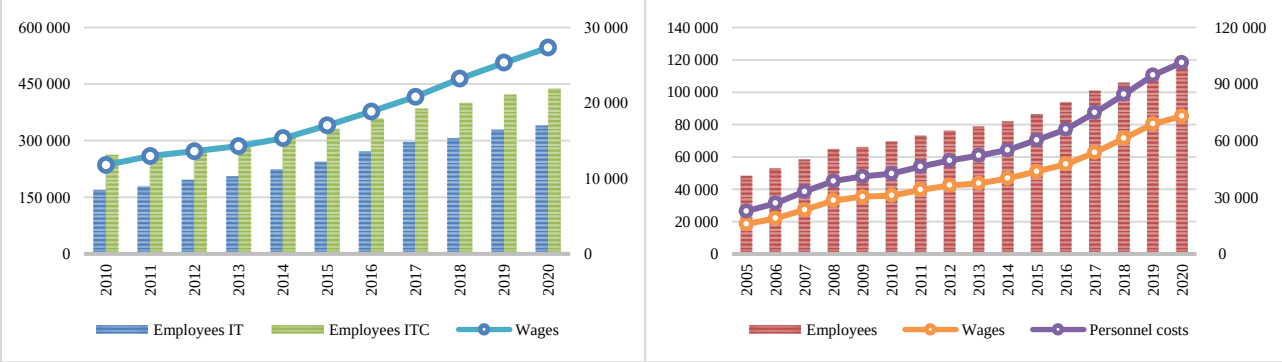

Figure 4. Providing relevant labor force indicators in Poland and the Czech Republic, persons, million Polish zlotys, and million Czech crowns
Source: compiled by the author based on data [9–11].

The general trend over the decade is an increase in the number of employees in the IT segment in both countries.

Overall employee growth over the decade in the ITC sector in Poland was 66.94 percentage points. This growth was formed based on the increase of the indicator in the IT segment of 100.38 percentage points. As a result, the share of IT employees in the overall ITC sector has been growing throughout the study period. In 2010, this figure was a share of 64.94%, and in 2020 – 77.94%. Therefore, an increase of the indicator by 16.36 percentage points is stated.

The number of employees in the general ITC sector in the Czech Republic experienced an increase of 53.27 percentage points from 2005 to 2020. In 2005, the mark was 116,670 employees, and in 2020 – 178,818 employees. The growth rate in the sector is relatively stable during the study period. The average increase was 1.06 times or 5.74 percentage points [11].

The expenses on wages of companies in the IT sector saw an increase of 132.09 percentage points during the decade in Poland. The average annual growth of this type of cost amounted to 8.81 percentage points. The highest costs compared to previous periods were from 2015 to 2018. The average annual growth in these years was 10.93 percentage points [9].

The wages in the IT sector in the Czech experienced an increase of 5.5 percentage points from 2005 to 2020. As a result, in 2020, the number of expenses of companies in the sector related to the payment of wages amounted to 16,669 million Czech crowns; in 2020, this figure reached 74,259 million Czech crowns [10].

The average annual growth amounted to a growth rate of 10.63 percentage points. The most significant growths were reflected in the periods 2006-2008. The significant growth is the consequence of the country's accession to the EU. It led to an increase in the infusion of investments and an increase in wage expenses to match the then members of the union. This statement is

substantiated by the fact that, during this period, the most significant growth dynamics in the wages paid in the foreign sector companies took place.

Moreover, there was an increase in personnel costs in the ITC sector by 179.66 percentage points in the Czech Republic. The average growth rate was 1.1 times. The increase in labor costs in the Czech IT segment correlates with earlier data, an increase in the number of employees. Growth indicators reflect a difference of 2.5 times: with an increase in the number of employees per person, there was an increase in expenses per employee by 2.5 times.

The above analysis reflects the same dynamics for both countries: the indicator of the number of employees has an upward trend; payroll spending by IT companies is also on an upward trend.

Main research results. The general analysis carried out for the IT sectors of the Czech Republic and Poland, taking into account the selected factors of influence on the economic and financial components of companies in the sectors, allows moving on to building models and studying the relationship and influence of the selected factors on the dependent variable.

1. Depending on the tax policy of the country

1.1. Poland

A correlation analysis is carried out based on previously determined tax rates for the ITC sector in Poland. The primary dependent variable is the revenue of the ITC sector. The analysis is carried out on quarterly data from 2007 to 2021.

The model takes the following form:

$$\text{Revenue} = 1.38669e+08 - 1.43606e+08\text{Tax} \quad (4)$$

The resulting model allows noting the inverse relationship of indicators: with an increase in tax rates, there will be a decrease in the indicator of the economic efficiency of companies. The statistical indicator R^2 is not sufficient to argue for the existence of a model with only one influence per shift.

1.2. The Czech Republic

A correlation analysis is carried out based on previously determined tax rates for the IT sector in the Czech Republic. The revenue of the IT segment represents the dependent variable. The study period is from 2005 to 2020.

The model takes the following form:

$$\text{Revenue} = 1.45272e+06 - 1.79129e+06\text{Tax} \quad (5)$$

The resulting model reflects the dependence on tax rates. The dynamics of interaction is an inverse characteristic: with an increase in tax rates, there is a decrease in the economic indicator of companies. The model acquires the value of low R^2 for independent existence; it is necessary to expand the factors of influence that allow the creation of an optimal model.

The constructed models in equations no.4 and no.5 allow stating information for the two countries that with a decrease in taxes, there is an increase in revenue for the sectors under study. The tax cuts across countries refer to general rates, which allows concluding that the reduction in standard rates leads to an increase in the economic performances of companies in the sector.

2. Depending on the educational component

2.1. Poland

A general review of the educational component made it possible to conduct a correlation analysis. For the initial construction of the model, the following factors were chosen spending on all levels of education, public spending on higher education, the ratio of ITC students to all, and the ratio of ITC graduates to all. Based on the constructed models, certain influencing factors were rejected in the following order: the ratio of students in ITC to all students and government spending on higher education. The annual data from 2008 to 2020 were used.

From here, the model takes the following form:

$$\text{Revenue} = 2.90497e+07 + 412.709\text{Stud} + 8.84851e+08\text{Grall} \quad (6)$$

According to the constructed model, a direct relationship between the indicators can be noted: an increase in the total costs of the educational component instigates an increase in companies' revenue. The number of graduates from ITC programs concerning all graduates was determined as the second influential factor. The overall indicator R^2 allows noting the expediency of the model's existence.

2.2. The Czech Republic

The leading indicators for the analysis were chosen: the number of students and graduates in the field of ITC, the percentage of this number to the total number, spending on all levels of education, and the ratio of graduates to students in the field of ITC. The dependent variable is revenue. The period is annual data from 2005 to 2020.

There were three analyzes with gradual deviation factors, which had a low value of the t-statistic – rejected: percentage value of the number of students in the field of ITC in general, the number of students, the ratio of the number of graduates to the number of students in the ITC, the number of graduates.

The model takes the following form:

$$Revenue = - 696121 + 0.5879Study + 1.18674e+07Stall \quad (7)$$

The two factors presented directly impact the change: the dependent variable will grow with an increase in the value of the factors. However, the model changes based on the value of a negative constant and may decrease the dependent variable's value. Therefore, the model can acquire a negative correlation value despite a separate increase in indicators. That is, the positive correlation of this model will be the value at which the results of education spending indicators and the percentage of ITC students in the number of all students, when increased by their coefficients, will exceed the negative value of the constant.

3. According to the labor force

3.1. Poland

After building models based on data on the number of employees in the IT sector and the number of wage costs, no logical correlation was found. It was revealed due to the Log likelihood index's relatively significant negative value.

It turned out to be optimal to build a model depending on the variable of each of the factors separately. Hence, analyzing the indicators using the Var model according to the Wald test is more expedient. The test makes it possible to note the simultaneous influence of indicators of wage costs of companies and the number of employees in the IT sector. The test was based on an autoregressive model using two lags. The test is proven due to the pure occurrence of AR roots in the boundedness of values. The study period for building the model was from 2010 to 2020.

Table 3

The result of the Wald test for Poland by labor force category

Dependent variable: Revenue			
Excluded	Chi-sq	df	Prob
Emp	13.44757	2	0.0012
WG	27.58692	2	0.0000
All	83.83557	4	0.0000
Sample: 2010 - 2020			
Included observation: 9			

Source: received and compiled by the author

Thus, when examining the test with a possibility of 5%, it was indicated that the indicators were influential.

The model takes the following form:

$$Revenue = - 0.16Revenue_{-1} + 0.71Revenue_{-2} + 18032.78Emp_{-2} + 41491927.3 \quad (8)$$

The results allow noting the impact of indicators of the number of employees in the IT sector and the level of expenses by companies related to wages on companies' revenue in the ITC sector.

3.2. The Czech Republic

The analyses are based on annual data from 2005 to 2020. The correlation model of the first type made it possible to discard the value of the influence of the size of the wages due to an inappropriate p-statistic. Hence, the influential factors for the variable are personnel costs and the number of employees in the sector.

The model takes the following form:

$$Revenue = 113041 - 2.76Emp + 5.68PC \quad (9)$$

The resulting model reflects the significant influence of factors on the dependent change: with an increase in personnel costs, the dependent variable grows, while at the same time, with an increase in the number of employees, there is an inverse relationship.

In evaluating the model, the R^2 indicator is satisfactory. It allows asserting the possibility of the model's existence as a separate model. At the same time, the model cannot be considered complete only if one group of indicators exists.

4. Building a general model for each country

The analyzes carried out and the models being derived allow noticing the heterogeneity of the models for each country. Despite the same study of a group of indicators by influential factors for each country, there are different elements of the economic component of the IT/ITC sector.

4.1. Poland

A general study of individual groups of factors influencing the revenue of the IT/ITC sector in Poland made it possible to derive a dependent variable model from influential factors. The derived model is valid: according to the Var model, the validity of a polynomial equation is noted, according to which the value of AR roots remains acceptable within specific values of the circle; the value of R^2 is close to 1; the Log likelihood ratio is the most widely accepted.

According to the Granger/Wald test, individually selected elements do not affect the dependent change; however, when testing for a group of elements as a specific system, the situation is reversed.

Table 4

The result of the Granger test for Poland

Excluded	Prob.	Excluded.	Prob.
Tax	0.0014	Grall	0.8854
Study	0.0934	Wg	0.0915
	All	0.0001	

Source: received and compiled by the author

The given test results allow noting the influence in the aggregate of all factors of the model on revenue, which makes the indicator dependent on changes in the elements in the system over time. From here comes the confirmation of the statements noted during the tests for groups of factors separately regarding the need to group factors into a system.

The final model takes the following form:

$$\text{Revenue in PL} = 1.18e{+}08 - 1.01e{+}08\text{Tax} + 272\text{Study} + 9.88e{+}08\text{Grall} + 211\text{Wg} \quad (10)$$

According to the derived model, the dependence of the economic component of the IT/ITC sector of the Polish sector on various factors is formed not only based on tax policy and changes in the tax burden over time but also on the factors of the educational component and labor force indicators. Tax rates reflect an inverse relationship. A direct relationship between change and influencing factors is demonstrated based on the indicator of the number of ITC graduates from the total number of students, government spending on all levels of education, and the costs associated with the wages in the sector.

4.2. The Czech Republic

Based on the studied factors of influence, in the example of the Czech Republic, an acceptable model was derived for a dependent variable: according to the Var model, a polynomial equation, where the value of AR roots is within the range of fair values, the value of R^2 is close to 1; the Log likelihood factor is acceptable.

According to the Granger/Wald test, individually selected elements do not affect the dependent change; however, when testing for a group of elements as a specific system, the situation is reversed.

Table 5

The result of the Granger test for the Czech Republic

Excluded	Prob.
Tax	0.0002
Emp	0.3556
PC	0.3994
All	0.0026

Source: received and compiled by the author

The data presented after analysis indicate that the value of the final test results improves when grouping data and creating a system of influencing factors. The probability of 5% and hypotheses of influence are acceptable for the number of employees in the sector and the companies' costs for

maintaining workers (not only the costs associated with the wages). According to the general model, the value is included in the range of acceptable values with a probability of 5%.

The derived model for the IT sector in the Czech Republic takes the following form:

$$\text{Revenue in CZ} = -3.81e{+}04 + 1.65e{+}05\text{Tax} - 1.83\text{Emp} + 4.98\text{PC} \quad (11)$$

The tax burden factor can be leveled due to the influence of the indicator of the number of employees and the cost of their maintenance as the main factors of influence.

The new view of the model will be more simplified:

$$\text{Revenue in CZ} = 1.13e{+}05 - 2.76\text{Emp} + 5.68\text{PC} \quad (12)$$

This model represents the primary dependence of the economic efficiency of the IT sector in the Czech Republic on factors related to human resources as a workforce. It should be noted that in the dependence model only between revenue and the number of employees, the correlation has a positive value with a significant negative data constant. In the extended model, shown by equation no.12, under a more significant impact of costs on employees, the relationship between revenue and the number of employees changes when the constant value changes. Hence, the direct impact on revenue reflects a change in the values of personnel costs since, with an increase in costs, the motivation of employees to work improves in favor of working for the company's results. Conversely, the inverse relationship is related to the number of employees. Therefore, this may be caused by an increase in companies' costs for employees, directly the cost of wages.

Conclusion. The main influencing factors in the IT/ITC sector were tax policy, educational component, and human resources. The first part examined the historical change in the tax burden for countries. Due to the lack of special conditions or benefits for the IT sector, the change in rates and impact on the company's revenue by corporate tax, payroll tax, and social and medical contributions were investigated. For the second part, expenditures at the state level for the educational component and the number of students and graduates assigned to the sector were studied. The third part, which marks the labor force, was studied in various indicators, such as the number of people employed in the sector, the companies' expenses for maintaining workers, and wage costs.

The final correlation and regression models and the models built based on the Granger test made it possible to determine the main factors of influence for sectors in each country separately. So, for Poland, all three of the above groups affect the economic component of the companies in the sector.

For the Czech Republic, a correlation can be noted with each group of factors. However, the maximum dependence for all tests is noted for the labor force group, namely the number of employees and the personnel costs in the sector.

Hence, despite the importance of all factors for sectors by country, each country's systems of a group of factors affecting the revenue of sectors were derived. Therefore, it will allow policy change for these factors to increase revenue in IT sectors and use taken information for other countries due to understanding the leading segment, which is necessary for improving the IT/ITC sector.

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