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THE IMPACT OF THE COVID-19 PANDEMIC ON POLISH IT ENTERPRISES – FINANCIAL SECTOR ANALYSIS

Keywords: Polish IT sector, Covid-19, financial sector analysis, Warsaw Stock Exchange.

J E L Classification: G39, M41.

Abstract: The subject of this article is a financial sector analysis of companies operating in the IT industry whose shares are listed on the main and parallel markets of the Warsaw Stock Exchange. The analysis period covers the years 2018–2022, which includes the period of the COVID-19 pandemic. Opinions vary regarding the impact of the pandemic on the activities of the described industry. The aim of the article is to assess the impact of the Covid-19 pandemic on the financial situation of IT enterprises. The authors put forward 4 theses in the article: two regarding the impact of the pandemic

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on the financial situation of the examined industry, one stating the difference in the financial situation of companies listed on the primary and parallel markets (NC) and one stating the increase in the investment attractiveness of companies from the IT sector. The financial sector analysis of the IT industry in 2018-2022 allowed us to determine general trends in given analytical areas and confirm the theses. The determined statistical parameters show that the COVID-19 pandemic had a positive impact on the financial situation of IT sector companies listed on the Stock Exchange. The changes apply to most of the analyzed enterprises. The obtained results indicate differences in the financial situation of IT sector companies listed on the main market compared to the parallel market and an increase in the investment attractiveness of IT sector companies in the analyzed period. This article is a starting point for further research in the field of IT sector analysis, including determining or changing the market position of individual enterprises.

Introduction

The activities of enterprises in the field of information technology (IT) are closely related to interactions in a complex external environment. This environment includes a number of key stakeholders, such as individual and corporate customers, hardware and software suppliers, competitors, financial institutions, company management and the local community. In the competitive environment of the IT industry, the ability to introduce innovative solutions, flexibility and the ability to adapt to evolving technologies are important. IT systems not only help improve transparency, integration and operational control, but also increase company competitive advantage. Therefore, IT systems deserve in-depth corporate and academic research (Mengcheng & Tuure, 2022). The pandemic has caused increased demand for IT technology. According to Fletcher and Griffiths, organizations that are less digitally developed are more fragile, while organizations with a higher level of digital maturity are generally more flexible (Fletcher & Griffiths, 2020). The pandemic may influence the development of the IT sector by supporting the fight against the virus. According to Shu Wei Ting and others, these may be four factors: IT provides a platform enabling access to data for pandemic monitoring, big data enables modeling and prediction of virus activity, digital technology can improve public health education and communication, artificial intelligence and deep learning can improve virus detection and diagnosis (Shu Wei Ting, Carin, Dzau & Wong, 2020). Several common global trends can be noticed in the information technology markets (Polska Agencja Informacji i Inwestycji Zagranicznych S.A.):

- products are very closely related to services, and their development and sales are mutually dependent,
- IT companies rarely specialize in only one type of service,
- the largest group of IT buyers are institutional customers,
- long-term results of IT markets depend primarily on economic factors (economic growth, economic situation, financial results of main recipient groups, institutional solutions, etc.).

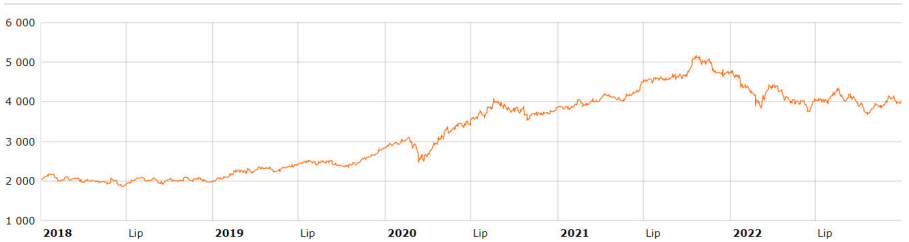
Business agility is a skill that companies should take advantage of to see and analyze changes and make decisions in uncertain situations environment, especially during the Covid-19 pandemic in terms of the activities of IT companies (Setiawati, Eve, Syavira, Ricardiant & Endri, 2022).

A sector is defined as a part of an industry that classifies enterprises producing products or services for a similar purpose, sold in the same geographical area. Based on the Polish Classification of Activities (PKD) codes, the IT sector can be classified in section J in the following sections: 61 – Telecommunications, 62 – Activities related to software and IT consulting and related activities, 63 – Information service activities. Additionally, the discussed sector includes producers and infrastructure suppliers with the codes 26.20.Z, 95.11.Z, 46.51.Z. Another approach to the definition of the discussed sector assumes that it is part of knowledge-based business services, classified as software and computer services (Stehrer, Baker, Foster-McGregor, Koenen, Leitner, Schricker, Strobel, Vieweg, Vermeulen & Yagafarova, 2014). According to OECD terminology, the IT sector is part of the ICT (Information-Communication Technology) industry. ICT connects the manufacturing and service industries whose products primarily fulfill or enable the function of information processing and communication by electronic means, including transmission and display (OECD iLibrary, 2023).

In Poland, you can see a growing number of companies operating in the IT industry. In the years 2020-2022, it increased from 32,201 to 36,795 (TPA Poland / Baker Tilly TPA, 2023). A small percentage of these companies are listed on the Warsaw Stock Exchange (WSE) on the primary and parallel NewConnect (NC) markets. The market situation of IT companies listed on the main market is illustrated by the WIG-Informatyka stock index. The WIG-Informatyka Index (WIG-Info) is a sector index consisting of companies participating in the WIG index and at the same time classified in the "IT" sector. The sub-index portfolio contains the same packages as in the WIG index portfolio (GPWBenchmark, 2023). WIG-Info, like other WIG sub-indices, is an indicator that takes into account the share price and income from dividends paid. Figure 1 shows the WIG-

Info values in period analyzed in this article. Over the analyzed period, WIG-Info increased from 2,000 to 4,000, reaching even values exceeding 5,000 at the end of 2021.

Figure 1. WIG-Info index quotations in 2018–2022



S o u r c e : GPWBenchmark, 2023.

Are the analyzed stock exchange index influenced by macroeconomic factors and the financial situation of enterprises? The results of research conducted by A. Paździor and M. Paździor (in 2014–2016) indicate a limited (moderate) correlation of the value of WIG-Info, i.e. market prices of shares, and the financial situation of the surveyed companies included in the indicator. According to the authors, this is due to the speculative nature of investors' decisions in this sector (Paździor & Paździor, 2018). P. Szkudlarek stated that at the turn of 2008 and 2009 (financial crisis), companies included in WIG-Info felt the effect of the change in the economic situation with some delay. According to the author, this was due to the deteriorating possibilities of financing IT investments, as well as to state budget constraints (Szkudlarek, 2010).

The dependence of companies' results on sector affiliation was examined by Gostkowska-Drzewiecka and Majerowska. The IT sector was not the subject of this research, but it was found that in terms of profitability there is a visible relationship between indicators and sector affiliation. Moreover, the authors found that the profitability of assets depends on the size of the enterprise (Gostkowska-Drzewicka & Majerowska, 2018). Dębkowska examined the financial condition of the e-services sector in a multidimensional aspect. The author carried out an analysis on a random sample of enterprises, consisting of 46 elements, concluding that the analyzed companies in the e-services sector

are characterized by quite large differences in terms of their financial condition (Dębkowska, 2015).

During the COVID-19 pandemic, the IT sector in Poland experienced dynamic changes. The demand for solutions enabling remote work has increased, which has prompted IT companies to accelerate digitization and provide tools supporting remote work. The e-commerce sector has made its presence felt, growing due to consumer preferences towards online shopping. At the same time, the IT sector had to face supply and logistics challenges, influenced by changes in global supply chains. The rapid shift to remote work has highlighted the role of technologies enabling remote management as well as online collaboration. The impact of the pandemic varied across industries in the IT sector. Some companies have experienced an increase in demand for their products and services, while others have encountered difficulties due to project delays or customer financial constraints. Analyzing individual company financial reports and market trends can provide more precise information on this topic. The term "during the pandemic" used by the authors of this study means 2020–2021. The aim of the article is to assess the impact of the Covid-19 pandemic on the financial situation of IT enterprises.

The authors of this study put forward the following theses:

1. The Covid-19 pandemic had a positive impact on the financial situation of IT sector companies listed on the WSE.
2. The Covid-19 pandemic resulted in deviations from the average values of the analyzed indicators of companies in the IT sector in the analyzed period.
3. The financial situation of companies listed on the main market differs from the financial situation on the parallel market (NC) in the analyzed period.
4. The investment attractiveness of IT sector companies listed on the WSE, measured by the Price to Earnings ratio, increased in the analyzed period.

In the opinion of entrepreneurs operating in the IT sector, the effects of the pandemic, significant from the financial point of view, are not clear (Szcucka, Lisek & Strycharz, 2021):

- in the opinion of less than half of the companies in the sector, the balance of changes as a result of the pandemic is positive, while for 57% the balance was unfavorable,

- the most frequently observed positive effects included: increased demand in many sectors and administration, increased sales of offered services or products and expansion of the offer,
- the negative effects included: problems resulting from the disruption of the company's financial liquidity, limitation of important investments in equipment,
- smaller companies mainly suffered financial losses, while larger companies reported higher costs and reduced work efficiency (remote work),
- after a period of caution in 2020, employers' declarations signal that most sector entities are focused on intensive development.

The research methodology and the course of the research process

The research method adopted in this article is sector analysis. It can be conducted at the macroeconomic level, examining the impact on the sector of factors such as: inflation, unemployment, demand/supply, interest rates, etc. Sectoral analysis can also be of a microeconomic nature. The source of data for this analysis are the financial statements/annual reports of both listed and unlisted companies. This analysis may focus on the entire activity of the entity as a whole or take into account only selected aspects. A summary of available research on the sectoral analysis of Polish enterprises is presented in table 1.

Table 1. Previous research on sectoral analysis of Polish enterprises

Autor	The scope of the study and conclusions
Bieniasz and Gołaś (2008)	Analysis of the differentiation of financial liquidity of enterprises in Poland. It was carried out according to the sectors of the national economy and according to the section of industrial processing. The level of financial liquidity of Polish enterprises is gaining a constant upward trend, regardless of the sector in which the entity operates.
Mosiejko, Bernadelii and Sierant (2019)	Analysis of Polish listed companies in the field of financial liquidity management in terms of sectors. They showed that the financial liquidity of the analyzed public companies varies depending on the sector of activity. The most stable sectors were chemicals and raw materials, industrial production, construction and assembly production and consumer goods.

Table 1. Previous...

Autor	The scope of the study and conclusions
Figura (2013)	Research on the issue of financial liquidity by sector. For all the analyzed financial liquidity ratios, statistically significant differences were found between their sectoral distributions of values.
Gostkowska-Drzewicka and Majerowska (2018)	Dependence of the results of companies listed on the WSE on the sector in which they operate. Significant differences were found in the level of the profitability of assets (ROA) and return on equity (ROE) ratios of the analyzed companies depending on their affiliation to particular sectors.
Goldmann and Zawadzki (2020)	Sectoral analysis of companies in the computer games industry in terms of liquidity, profitability and debt. Companies that offer a wider range of products tend to dominate the electronic games sector. Marketing and product promotion contribute to better financial results, which translates into a higher position in the ranking of companies in the electronic games industry.
Goldmann and Zawadzki (2022)	The increase in energy prices was influenced by the high rate of economic growth and the so-called post-epidemic inflation. This, in turn, was reflected in the performance of companies in the energy sector, resulting in increased profitability. The research carried out by the authors confirmed that the sector financial indicators of energy enterprises with a dominant share of private capital are concentrated closer to the average value than enterprises with a dominant share of the State Treasury. The financial situation of coal power engineering companies is more stable than that of renewable energy companies.

S o u r c e : Goldmann & Zawadzki, 2022.

The subject of the research in this study are the financial indicators of companies listed on the WSE, both on the main market and the alternative NewConnect (NC) market. The time range includes reports for 2018-2022. The basis for qualifying the company for the study was the sector indicated for the company on the Biznesradar website (Biznesradar, 2023): IT. As of the survey date, 56 companies were listed on both markets (33-Main Market and 23-NC). The work uses the sector analysis method, which involves calculating descriptive statistics parameters for each of the analyzed indicators for the studied population. Table 2 presents the range of analyzed financial indicators.

Table 2. Financial indicators used in the research

Financial indicators				
Liquidity ratios	**Profitability ratios**	**Activity ratios**	**Debt ratios**	**Stock market ratios**
Cash liquidity ratio	Return on sales (ROS)	Receivables cycle	Total debt ratio	Price to Earnings ratio
Quick liquidity ratio	Gross profit margin ratio	Liabilities cycle	Debt to equity ratio	
Current liquidity ratio	Operating profit margin ratio	Cash conversion cycle (CCC)	Overall financial situation ratio	
Liabilities to receivables coverage ratio	Return on equity (ROE)	Total asset turnover ratio		
	Return on assets (ROA)			

S o u r c e : own study.

Based on data for individual entities downloaded from the Biznesradar website, an evaluation sheet was created, which included the values of individual financial indicators necessary for calculations. Then, descriptive statistics measures were calculated, which present the distribution of the studied variable and its variability. Statistical parameters such as median, top box, bottom box, skewness and kurtosis were selected to present the results. The analysis of the results was based on the industry trend at the median level.

The outcome of the research process and conclusions

In the IT sector, financial liquidity in the years 2018–2022 (table 3–5) measured by the median for the cash liquidity ratio increased, the quick liquidity ratio remains at a similar level, while the current liquidity ratio also remains at a similar level, but the tendency is more downward. Liquidity changes concern most of the analyzed enterprises, as evidenced by positive kurtosis values. The skewness in the examined period is right-sided, which means that in the examined years there are more entities that have higher financial liquidity than the sector average. Above the sector trend, the median for cash liquidity and quick

liquidity is more characteristic of companies listed on the main market. However, for companies listed on the NC, the median current liquidity is above the industry trend.

Table 3. Statistical parameters cash liquidity ratio in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	0.72	1.18	1.44	1.02	0.73
Median	**0.25**	**0.30**	**0.53**	**0.45**	**0.43**
Lower quartile	0.09	0.15	0.24	0.17	0.14
Skewness	6.58	4.93	5.44	6.42	7.25
Kurtosis	45.18	23.77	32.98	43.63	52.69
Median for the main market	**0.31**	**0.30**	**0.59**	**0.50**	**0.52**
Median for the parallel market	**0.14**	**0.60**	**0.49**	**0.45**	**0.35**

Source: own study.

Table 4. Statistical parameters quick liquidity ratio in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	1.84	2.54	2.75	3.73	2.02
Median	**1.40**	**1.37**	**1.46**	**1.34**	**1.37**
Lower quartile	0.89	0.98	0.96	0.90	0.78
Skewness	6.73	4.98	5.39	6.13	7.16
Kurtosis	46.97	24.60	32.65	40.36	51.78
Median for the main market	**1.46**	**1.35**	**1.47**	**1.51**	**1.43**
Median for the parallel market	**1.25**	**1.78**	**1.38**	**1.26**	**1.18**

Source: own study.

Table 5. Statistical parameters current liquidity ratio in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	3.25	2.94	2.85	3.39	2.62
Median	**1.67**	**1.75**	**1.68**	**1.69**	**1.57**
Lower quartile	1.26	1.18	1.20	1.25	1.13
Skewness	6.27	4.98	5.12	5.66	7.03
Kurtosis	41.59	24.58	29.19	34.81	50.38
Median for the main market	**1.48**	**1.41**	**1.55**	**1.67**	**1.52**
Median for the parallel market	**2.66**	**2.65**	**2.11**	**1.73**	**1.68**

Source: own study.

During the COVID-19 pandemic, an increase in financial liquidity can be observed in the IT industry for cash and quick liquidity ratios. The median in 2020 had the highest values for these indicators.

The analysis of sales profitability indicators shows that the highest median of the IT sector was during the pandemic, when the demand for IT services increased. For the ROS indicator, the median in the IT sector was the highest in 2020 (table 6), and for the indicators: gross profit margin and operating profit margin it was in 2021 (table 7–8). Changes in sales profitability concern most of the analyzed enterprises, as evidenced by positive kurtosis values. The sales profitability of most of the surveyed enterprises is below average, as indicated by negative skewness values.

Table 6. Statistical parameters return on sales (ROS) in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	7.91%	11.42%	13.97%	12.74%	8.07%
Median	**2.25%**	**3.02%**	**4.38%**	**3.75%**	**2.89%**
Lower quartile	0.57%	0.28%	0.11%	0.41%	0.04%
Skewness	-717.50%	-687.75%	720.77%	726.16%	-419.19%
Kurtosis	5163.31%	4818.60%	5196.71%	5282.14%	2039.28%

Table 6. Statistical...

Description	2018	2019	2020	2021	2022
Median for the main market	**4.07%**	**2.99%**	**5.58%**	**4.23%**	**3.97%**
Median for the parallel market	**1.06%**	**3.52%**	**3.53%**	**3.59%**	**1.64%**

Source: own study.

Table 7. Statistical parameters gross profit margin ratio in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	8.69%	11.39%	13.93%	12.07%	13.48%
Median	**3.62%**	**4.94%**	**4.56%**	**5.30%**	**3.63%**
Lower quartile	-2.01%	1.18%	-0.26%	0.68%	-1.99%
Skewness	-709.96%	-667.74%	-577.57%	-702.67%	-538.01%
Kurtosis	5093.19%	4586.93%	3632.73%	5032.21%	3371.99%
Median for the main market	**6.38%**	**4.92%**	**6.34%**	**7.90%**	**5.98%**
Median for the parallel market	**1.99%**	**4.95%**	**3.12%**	**4.32%**	**3.13%**

Source: own study.

Table 8. Statistical parameters operating profit margin ratio in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	9.10%	12.41%	17.69%	15.82%	13.71%
Median	**4.17%**	**5.18%**	**5.76%**	**6.34%**	**3.34%**
Lower quartile	0.75%	1.10%	1.51%	1.07%	0.85%
Skewness	-522.57%	-685.83%	-621.45%	727.04%	-473.50%
Kurtosis	2736.30%	4804.63%	4193.35%	5290.52%	2621.30%
Median for the main market	**6.32%**	**6.74%**	**7.00%**	**10.00%**	**4.86%**
Median for the parallel market	**2.20%**	**3.92%**	**5.27%**	**4.94%**	**2.79%**

Source: own study.

The median sales profitability in the analyzed period for companies listed on the primary market is above the industry trend at the median level, and for companies listed on the NC it was below.

As part of the ROA indicator, the IT sector had the highest median in 2020 (table 9) and the ROE ratio in 2021 (table 10). The trend for both indicators was variable in the analyzed years. Changes in the return on assets and equity concern most of the surveyed companies. The analysis divided into the main market and the parallel market did not reveal any significant differences.

Table 9. Statistical parameters return on assets (ROA) in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	7.18%	11.71%	16.68%	11.55%	10.00%
Median	**3.24%**	**4.27%**	**5.79%**	**5.35%**	**3.08%**
Lower quartile	-0.28%	0.06%	0.54%	0.89%	0.14%
Skewness	518.15%	-716.25%	727.88%	727.88%	-181.27%
Kurtosis	3771.42%	5150.27%	5298.69%	5298.74%	650.13%
Median for the main market	**4.60%**	**3.05%**	**6.20%**	**5.37%**	**4.39%**
Median for the parallel market	**0.70%**	**4.99%**	**4.35%**	**5.35%**	**2.29%**

Source: own study.

Table 10. Statistical parameters return on equity (ROE) in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	18.53%	25.07%	30.33%	23.28%	23.41%
Median	**8.11%**	**10.89%**	**9.74%**	**11.06%**	**8.75%**
Lower quartile	1.36%	1.89%	-0.26%	1.31%	2.52%
Skewness	259.08%	-705.06%	727.78%	-728.01%	-585.42%
Kurtosis	2213.85%	5047.04%	5297.69%	5299.99%	3762.05%
Median for the main market	**7.16%**	**9.86%**	**10.46%**	**9.57%**	**9.07%**
Median for the parallel market	**8.47%**	**15.58%**	**8.74%**	**12.92%**	**8.67%**

Source: own study.

The comparison of the median of the receivables cycle in days and the liabilities cycle in days shows: that in IT sector companies, receivables are collected first and then liabilities are settled (table 11-12). Both the trend of the receivables cycle and the liabilities cycle decreased during the period under review. Receivables were collected faster and liabilities were paid faster in enterprises listed on the NC than in enterprises listed on the main market. Kurtosis analysis shows: that changes affect most companies, especially in the liabilities cycle.

Table 11. Statistical parameters receivables cycle in days in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	120	99	103	92	97
Median	**77**	**72**	**72**	**71**	**72**
Lower quartile	61	55	53	52	52
Skewness	7	3	3	2	1
Kurtosis	52	13	8	6	0
Median for the main market	**78**	**76**	**75**	**74**	**75**
Median for the parallel market	**70**	**63**	**62**	**70**	**69**

Source: own study.

Table 12. Statistical parameters liabilities cycle in days in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	134	126	133	108	131
Median	**88**	**77**	**92**	**71**	**83**
Lower quartile	60	54	66	54	65
Skewness	7	6	7	7	4
Kurtosis	50	41	51	51	23
Median for the main market	**83**	**99**	**97**	**78**	**90**
Median for the parallel market	**98**	**69**	**76**	**67**	**81**

Source: own study.

During the COVID-19 pandemic, the median receivables cycle in days showed no differences. However, the median of the liabilities cycle ratio in days was the highest in 2020 and increased significantly compared to the previous period, which is confirmed by the lowest median of the current liquidity ratio and the liabilities to receivables coverage ratio (table 13).

Table 13. Statistical parameters liabilities to receivables coverage ratio in the IT sector in the years 2018–2022

Description for total company	2018	2019	2020	2021	2022
Upper quartile	1.28	1.30	1.05	1.16	1.06
Median	**0.98**	**0.94**	**0.75**	**0.91**	**0.81**
Lower quartile	0.60	0.58	0.53	0.66	0.49
Skewness	7.14	6.83	3.06	2.97	4.67
Kurtosis	51.29	47.85	10.84	9.22	21.95
Median for the main market	**0.95**	**0.91**	**0.75**	**0.89**	**0.79**
Median for the parallel market	**1.11**	**0.99**	**0.77**	**0.91**	**0.81**

Source: own study.

In 2020, the IT sector recorded the lowest median cash conversion cycle in the analyzed years (table 14). For enterprises listed on the primary market, the trend at the CCC median level was below the industry trend at the median level. However, for companies listed on the NC, above the industry trend at the median level. Positive kurtosis means that the changes concern most of the surveyed companies, and negative skewness until 2021 suggests. that there are fewer entities in this period. which have a lower CCC than the sector average.

Table 14. Statistical parameters cash conversion cycle (CCC) in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	48	33	33	40	33
Median	**15**	**10**	**6**	**11**	**11**

Table 14. Statistical...

Description	2018	2019	2020	2021	2022
Lower quartile	-4	-2	-13	-5	-12
Skewness	-5	-6	-6	-3	2
Kurtosis	26	35	34	20	15
Median for the main market	**8**	**4**	**1**	**6**	**-2**
Median for the parallel market	**30**	**26**	**21**	**31**	**29**

Source: own study.

The lowest median also occurred in 2020 for total asset turnover, which results from frozen investments in this period (table 15).

Table 15. Statistical parameters total asset turnover ratio in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	1.95	1.84	1.73	1.82	1.89
Median	**1.25**	**1.34**	**1.22**	**1.31**	**1.27**
Lower quartile	0.73	0.77	0.77	0.78	0.87
Skewness	0.19	0.68	0.98	0.73	0.82
Kurtosis	-0.88	0.36	0.98	0.15	0.81
Median for the main market	**1.24**	**1.14**	**1.19**	**1.20**	**1.30**
Median for the parallel market	**1.29**	**1.57**	**1.29**	**1.34**	**1.23**

Source: own study.

The industry trend for total debt ratio and debt to equity ratio comparing 2022 to 2018 has increased. which is probably the result of the development of the IT industry in recent years (table 16–17). During the COVID-19 pandemic, the median for these indicators increased compared to the previous year. Changes in overall debt and financial leverage apply to most of the surveyed companies.

Table 16. Statistical parameters total debt ratio in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	0.59	0.58	0.54	0.54	0.54
Median	**0.37**	**0.40**	**0.45**	**0.40**	**0.44**
Lower quartile	0.26	0.31	0.25	0.22	0.30
Skewness	2.84	7.14	7.28	0.59	1.89
Kurtosis	12.70	50.99	52.99	0.82	7.72
Median for the main market	**0.38**	**0.43**	**0.44**	**0.41**	**0.48**
Median for the parallel market	**0.36**	**0.40**	**0.45**	**0.35**	**0.37**

Source: own study.

Table 17. Statistical parameters debt to equity ratio in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	1.42	1.25	1.28	1.30	1.47
Median	**0.71**	**0.72**	**0.81**	**0.69**	**0.90**
Lower quartile	0.32	0.39	0.33	0.30	0.42
Skewness	-4.83	4.35	5.04	-2.36	3.81
Kurtosis	32.18	22.32	29.72	25.44	15.87
Median for GPW company	**0.63**	**0.71**	**0.81**	**0.67**	**0.94**
Median for NC company	**0.88**	**0.73**	**0.81**	**0.70**	**0.87**

Source: own study.

The industry trend at the median level for the overall financial situation ratio was stable in the analyzed period (table 18). Until 2019, the median was higher for companies listed on the NC, and in the following years the median was higher for companies listed on the primary market. It follows that since the pandemic, the overall financial situation of companies listed on the main market has improved more compared to companies listed on the parallel market.

Changes in the general financial situation concern most of the analyzed enterprises, as evidenced by positive kurtosis values.

Table 18. Statistical parameters overall financial situation ratio in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	1.33	1.30	1.29	1.14	1.24
Median	**0.97**	**0.99**	**0.99**	**0.98**	**0.99**
Lower quartile	0.72	0.89	0.81	0.65	0.70
Skewness	0.29	5.34	7.09	7.17	6.72
Kurtosis	18.44	35.34	50.54	51.63	46.58
Median for the main market	**0.97**	**0.99**	**1.00**	**1.02**	**1.01**
Median for the parallel market	**0.98**	**1.07**	**0.97**	**0.74**	**0.90**

Source: own study.

For the price to earnings ratio, the industry trend at the median level is growing and is significant when comparing 2022 to 2018 (table 19). This may be due to the increased interest of investors in the IT sector, its positive forecasts or good financial results of companies. The median price to earnings ratio in the analyzed period for companies listed on the main market is above the industry trend at the median level, and for companies listed on the NC market it is below. However, when analyzing the year 2022 to 2018, the change is more significant for companies listed on the NC. Changes in the price to earnings ratio concern most of the surveyed companies.

Table 19. Statistical parameters price to earnings ratio in the IT sector in the years 2018–2022

Description	2018	2019	2020	2021	2022
Upper quartile	16.68	17.04	19.32	32.36	29.81
Median	**10.11**	**10.02**	**12.99**	**15.82**	**16.78**
Lower quartile	5.48	6.83	7.32	8.55	12.55

Table 19. Statistical...

Description	2018	2019	2020	2021	2022
Skewness	5.90	4.84	5.53	3.88	5.40
Kurtosis	34.89	24.74	32.56	17.46	31.49
Median for the main market	**11.69**	**14.28**	**13.32**	**17.80**	**19.86**
Median for the parallel market	**5.87**	**7.84**	**12.58**	**13.79**	**15.20**

S o u r c e : own study.

Financial sector analysis focuses on assessing the financial and economic aspects of a given economic sector. It provides decision-makers with the information they need to make investment decisions, assess risk, identify potential areas of growth and adapt their financial strategy to changing market conditions. In this article, special attention is focused on sector analysis based on financial indicators.

The IT sector financial analysis carried out in 2018–2022 allowed to determine general trends in given analytical areas. The determined statistical parameters show that the COVID-19 pandemic had an impact on the financial situation of IT sector companies listed on the Stock Exchange. The IT sector, especially those listed on the primary market, has experienced a positive impact of the pandemic on financial aspects such as liquidity, profitability and investor interest, which proves the first thesis. The changes concern most of the analyzed enterprises, which also proves the second thesis. The obtained results indicate differences in the financial situation of IT sector companies listed on the main market compared to the parallel market in the period 2018–2022. The analysis of liquidity ratios shows that in this period, when the demand for IT services increased for companies on the primary market, the median cash liquidity exceeds the industry trend, while for companies on the NC market the median current liquidity remains above the industry trend. The analysis of the receivables cycle and liabilities cycle indicators suggests that companies on the NC settle their liabilities and service receivables more efficiently compared to companies on the primary market. In the area of general debt and financial leverage, upward trends are more noticeable for NC companies, which may result from more intensive financial involvement in this segment. The reasons for these differences may be related to different listing requirements, ac-

cess to capital or financial strategies used by companies on both markets. In general, the analysis indicates that companies on the primary market present better results in the areas of profitability and financial liquidity compared to companies listed on the parallel market, which may result from differences in their capital structure, access to investors and financial strategies undertaken, which proves the third thesis. The investment attractiveness of IT sector companies listed on the WSE, measured by the price to earnings ratio, increased in the analyzed period from 2018 to 2022, which proves the fourth thesis. The increase in price to earnings ratio, similarly to WIG-Info, may be the result of the dynamic development of the industry, intense demand for modern technologies and innovative IT services. Also, favorable trends on global markets and positive growth forecasts increase the market value of these companies, attracting the attention of investors.

The development prospects of the IT sector in Poland are promising, in particular thanks to well-qualified IT specialists, which constitutes a solid basis for the further development of the industry. Investments in research and innovation, supported by both the private and public sectors, have the potential to generate new technologies. Government policy, especially investments in technological infrastructure, IT education and promotion of entrepreneurship, can also significantly influence the development of the sector. Implementation of digital technologies in various sectors supported by global trends such as artificial intelligence and data analysis opens new opportunities for IT companies. This article is a starting point for further research in the field of IT sector analysis, including determining or changing the market position of individual enterprises.

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