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Impact of outsourcing on the productivity of Polish industrial enterprises

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Abstract: The ever-growing competitive requirements lead companies to introduce new solutions in their business. As a result, industrial companies are increasingly deciding to implement outsourcing. The aim of the article was to examine the impact of outsourcing on increasing the productivity of companies. The survey involved 170 industrial enterprises that are listed on the Warsaw Stock Exchange. The survey covers the period 2010–2018. Conducting the survey makes it possible to state that outsourcing has improved the productivity of Polish industrial companies. Using statistical tests, results were obtained that show that industrial companies are increasingly using solutions provided by external suppliers. The use of outsourcing in enterprises improves both their productivity and has a positive impact on the entire national economy. Outsourcing was measured on the basis of the number of external services, and productivity as an indicator of economic value added (EVA). It should be noted that there is some limitation in the interpretation of the results obtained. External services also include services that are not always outsourced, e.g. banking services. The study contains new information for Poland. It enables scientists to carry out more detailed outsourcing analyses.

Keywords: outsourcing, productivity, industrial companies, foreign services, economic value added

1. Introduction

In modern times a lot of firms operate in increasingly difficult conditions. The desire to win a client, a lot of competition and a series of dynamic changes taking place in the environment forces organizations to implement new management methods. More and more business units in Poland make a decision about implementation of outsourcing. In this way, it is becoming a popular management method. The term *outsourcing* is used in economics to indicate the share of external sources in the development of a company that has so far used its internal resources (Aalders, 2001). In other words, it

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is transfer of managerial responsibility to a third party for doing the service specified in the contract (Lysons and Gillinham, 2005).

It is believed that outsourcing as an individual strategy has existed since the industrial revolution and is an indispensable element that affects: cost reduction, work productivity and maintaining competitiveness. In companies where decisions are made in a decentralized way, decisions about outsourcing are made more often (Kavcic, 2014).

There are many forms of outsourcing, hence its adjustment to the type of business does not create a lot of problems. Colloquially, the most important reasons for its implementation are considered strategic motives. It allows the firm to focus on the business activity (Fill and Visser, 2000). Although more and more often departing from the typical understanding of outsourcing as a method aimed at only reducing some of the costs, it is still an important thing in the business entities' operations (Druica, 2012). This research was conducted by the American Management Association, focusing on both American and European companies. It resulted that only a few of the company's departments declared that they were motivated by a different motive rather than a reduction of costs. For example, for the Human Resources department the main reason for using outsourcing turned out to be: shortening the time of activity and significant improvement of quality (Greenburg and Canzoneri, 1997). Despite the fact that these studies were carried out some time ago, the results provided by the 2008 research do not show significant differences (HBR, 2008).

Corbett has defined other motives that companies decide to implement outsourcing. These include: continuous increase in the number and quality of services from suppliers (each new client increases the knowledge and abilities of service providers), access to modern technology and competitive pressure (Corbett, 2004).

It is interesting that as a result of outsourcing certain activities, companies can transform into virtual organizations. The growing tendency of companies to separate production and processes enables the creation of flexible networks, agile organizational structures. This is a specific and innovative solution (Yeo and Saboori-Deilami, 2017). Current competition in the areas of added value and innovation has changed the subject of outsourcing. Increasingly, contracts are signed with companies that provide global services. Whole production functions are assigned to third parties. At this point, the key moment of the supplier follows (Fera et al., 2017).

Of course, the implementation of outsourcing in the company is oriented to expectations of many benefits. An important result is the strive to improve the company's performance in the future. Therefore, it should be determined whether the use of outsourcing in companies from the industry sector is improving and how it affects the productivity of enterprises. While looking into the impact of outsourcing on the productivity there are still inconclusive research results. Therefore the aim of the paper is to identify the relation between outsourcing and the productivity of Polish industrial companies. Three research hypotheses were put in the article. In order to verify them the literature was examined, the financial data of companies listed on the Warsaw Stock Exchange and also aggregated data for the entire economy were collected.

The article consists of four parts. The following section discusses the problem given the growing popularity of outsourcing and its share in the performance of foreign enterprises. The second part focuses on the methodology and description of the sample being tested. The results of the study are presented in the third part. The last section is a summary and conclusions for Poland.

2. Productivity and outsourcing—literature review

Many factors influence the attractiveness of outsourcing. To meet the competition, firms need to show higher and higher productivity. Offered products should be delivered on time to the market and at as low prices as possible (Porter, 1980). It should be mentioned that many well-known scientists associate the increase in the popularity of outsourcing with the evolution of modern business. Gibson provided similar considerations. The results of Gibson's research, which concerned the use of outsourcing, indicated the growth of better opportunities and more efficient business models through the use of outsourcing (Gibson, 2004).

There is often a growing increase in production productive. This is proved by analysis conducted by Mann and Kirkegaard (Kirkegaard, 2004). Mann took the sample from companies operating on the market in the United States (Mann, 2003). It is worth mentioning that productivity growth is also noticeable in other countries. The results of the market research in China show that outsourcing has, inter alia, a relationship with productivity, trade, employment and innovation (Tingting, 2014). For example, Gorg and Hanley used data collected from the Irish sector (Gorg and Hanley 2005). On the other hand, some analyses suggest that the relationship between outsourcing and efficiency is not clearly defined. Kimura, while conducting research on Japanese companies, found no evidence of a positive relationship between the use of outsourcing and increased productivity (Kimura, 2002). Ellram, Bals, and E. Hartmann say that companies implement outsourcing as internal and external pressure increases, as part of adjusting to competition and reducing costs. In addition, companies achieve productivity improvements thanks to it (Tate et al., 2009).

When looking for research that analyzes the relationship between outsourcing and the performance of industrial companies, it is difficult to find specific information. Most of the published articles refer to international outsourcing. One example is Amiti and Wei (2006) but it focuses on outsourcing in the services sector, not the industry. The authors found a significant influence of outsourcing on productivity in the services sector (Amiti and Wei, 2006). Therefore, there may be some similarity in the industry sector. The positive effect of outsourcing on efficiency can also be found in international outsourcing. For example, Gorg and Hanley (2005) found its statistically significant positive effects (Gorg and Hanley, 2005).

Michela Pellicelli in her study shows that company management is already entering the next level of complexity through the waves of globalization and technological change. The researcher analyzes many studies indicating the growing role of outsourcing and offshoring. They play an important role in transforming companies into virtual organizations that outsource almost all activities. The growing role of outsourcing is revealed here (Pellicelli, 2018).

Looking at the benefits of outsourcing, the article checks how outsourcing is related to the productivity of Polish companies. Although there are analyzes based on the relation between outsourcing and productivity, this is new for Poland. This article brings new information about the growth of productivity of Polish industrial companies after the use of outsourcing.

3. Sample and methodology

The purpose of the article was to examine the impact of outsourcing on increasing productivity in Polish industrial companies. Polish companies that are listed on the Warsaw Stock Exchange have been analyzed in this article. Due to the specificity of the analysis, the research sample included 170 industrial companies. The choice of the 170 companies' sample that was ultimately analyzed looked like this: first from the pool of all companies I chose industrial companies, as the study concerns only this sector. I did it on the basis of descriptions of the characteristics of individual companies also available in this database. Due to the need for accurate calculations from the sample, companies were then selected for which all data needed to calculate productivity and data needed to determine outsourcing were provided. In this way I obtained my own database consisting of annual data for 170 companies from Poland. It consists of companies from many different industries.

Data for the study concerned the last nine years (2010–2018) and the identified sample was taken from publicly available annual consolidated financial statements published by companies on websites. Total number of observations is 1530 (firm-year). The sample was based on data provided by the Notoria database in 2019. This database contains financial statements of Polish companies.

Apart from individual data we use aggregated data for the entire economy. The data cover the period of 2010–2018. The source of information is Statistical Yearbook of the Republic of Poland (GUS, 2018).

In the literature there is a different approach to the essence of the company's performance and many possibilities of its evaluation. In the article, following the research of Levan Sabauri, the economic added value index (EVA) was used to determine the productivity of industrial companies. Levan Sabauri writes that other methods and estimates of a company's success are often inaccurate. It is necessary to use methods that in existing conditions would ensure the determination of the company's financial achievements. The EVA indicator is considered one of the best since the 1990s (Sabauri, 2014). The indicator was chosen because the company's valuation with this method is considered the most objective one. The economic added value index allows to assess the productivity of the company from the shareholders' point of view (from outside). This indicator takes into account historical financial results, current situation and predictions about the future of the company.

The economic value added was determined on the basis of own calculations because there is no EVA value data for the whole industry and for individual companies. Formula is used in the article:

$$\mathrm{EVA} = z \cdot (1 - T) - k \cdot K$$

where:

EVA—economic added value
z—operating profit
T—tax rate on income tax
k—weighted average cost of capital
K—total capital.

Data on the operating profit (z) of the sample is operating profit before interest and tax (EBIT). Data on EBIT come from financial statements. The tax rate on income tax (T) is constant over the period (2010–2018) and in Poland it is 19%. Weighted average cost of capital (k) was taken from financial statements and data published by brokerage houses. Total capital value (K) for the sample was determined on the basis of total liabilities.

The value of outsourcing was defined based on the value of external services. There is no industry data on the share of individual types of costs in total costs, so this article uses statistical tools. External services are a key factor that has a significant impact on the final result of the analysis. They are one of the elements of a generic cost arrangement.

First, we will check whether the productivity of industrial companies has increased. If so, it will be possible to look for the reasons for this improvement. Therefore, the first (initial) hypothesis is:

Hypothesis 1: The productivity of Polish industrial enterprises improved over the period considered.

The variables used in this part of the analysis were economic added value (EVA) which they achieved in the period from 2010 to 2018. In order to verify whether hypothesis 1 is true and whether it can be concluded that the productivity of companies increased, the non-parametric Wilcoxon test was used. It was used to compare data collected before and after (dependent samples) to see if there was a statistically significant change. Distributions of variables significantly differ from the normal distribution, which was proved by application of the Shapiro-Wilk test $p < 0.05$.

The next step was the proper part of the study—checking whether the use of outsourcing has a positive impact on the development of the industrial sector. Therefore, we will check the hypothesis:

Hypothesis 2: The use of outsourcing is related to the increase in productivity in industrial companies.

The variables used in this part of the analysis were productivity (economic added value, EVA) and outsourcing (as the value of external services), in order to verify whether hypothesis 2 is true and whether it can be concluded that the use of outsourcing in the industry has a significant relationship with the productivity of the industry. We used the non-parametric Spearman correlation test. The possibility of using the test confirms the fact that the distributions of both variables are significantly different from the normal distribution (application of the Shapiro-Wilk test $p < 0.05$).

Finally, it was verified how the use of outsourcing in industrial companies translates into the added value of the economy in Poland. Therefore, we will check the hypotheses:

Hypothesis 3a: The productivity of sample industrial companies have relationship with the gross value added achieved by Polish companies.

Hypothesis 3b: The use of outsourcing by sample industrial companies is related to gross value added achieved by Polish companies.

We compared individual data from the sample with aggregated data for the entire economy. The variables used in the analysis of hypothesis 3a were economic added value (EVA calculated on the basis of the listed industrial companies) and gross value added (reported by the Main Statistical Office for the entire economy). In order to verify whether the 3a hypothesis is true and whether it can be concluded that the productivity of listed industrial companies

has a significant relationship with gross value added of the entire economy, we used the parametric *r*-Pearson correlation test. The possibility of using the test confirms the fact that the distributions of both variables are normal distributions (using the Shapiro-Wilk test $p > 0.05$).

The variables used in the analysis of hypothesis 3b were outsourcing (value of external services) and gross value added for the entire economy. In order to verify whether the hypothesis 3b is true and whether it can be concluded that the use of outsourcing has a significant relationship with gross value added, we used the non-parametric Spearman correlation test. The possibility of using the test confirms that the distributions of both variables are different. The result of the test checking the normality of the distribution (Shapiro-Wilk test) was $p < 0.05$.

4. Results and their analysis

We can expect a differentiation in the share of external services because we are exploring the use of outsourcing by Polish listed industrial companies. This is proved because the industry consists of many departments so the specification of companies may differ from each other. Therefore, the value of external services for the sample of 170 industrial enterprises was averaged (2010−2018). All necessary data needed to determine the economic value added (EVA) is shown in Table 1 (operating profit, total capital and weighted average cost of capital). Basic descriptive statistics are also presented in Table 1.

Table 1. Basic descriptive statistics

(thou. PLN)	Mean	Median	Min	Max	St Dev
Operating profit (z)	2 510 506	19 959	–217 231 000	354 367 000	12 880 048
Total capital (K)	33 399 656	458 710	6 869	4 766 207 000	22 390 969
Weighted average cost of capital (k)	8.52%	8.00%	1.98%	15.70%	0.08%
External services for the sample of industrial companies from WSE	330 957	60 923	243	8 726 554	170 518
Productivity (EVA) for the sample of industrial companies from WSE	–660 415	–16 591	–489 147 750	286 746 835	6 725 771

S o u r c e: Author's own elaboration.

The research and verification of individual research hypotheses has led to such results:

1. The average result of operating profit in the examined sample is 2.51 million. The median value for the same sample is 19 959. The large difference between these values indicates the existence of outliers.
2. The sample also has a large difference between the minimum and maximum values. The sample is quite diverse. The observations deviate from the average value by more than 12.88 million.
3. In the total capital sample there is a big difference between the extreme values. The observations deviate from the average value by 22.39 million.
4. The average WACC value for the sample was 8.52% and the median was 8%. These values are very similar. The observations deviate from the mean value by less than 1%, this indicates no outliers.
5. There is a big difference in the mean and median value (mean 330 957, median 60 923). The value of external services deviates from the average value by 0,17 million. This confirms the large diversity of the sample.
6. Large discrepancies are in sample productivity. Observations deviate from the mean value by 6.73 million. Negative values in the sample indicate a lack of productivity. The smallest value is −0.49 million.

From the above statistics it can be concluded that the sample of 170 industrial companies is very diverse in terms of operating profit, total capital, external services and productivity. This is influenced by the nature of the business. Despite of this, the average of all tested elements shows positive values. This is a positive situation so we move on to hypothesis verification.

4.1. Verification of hypothesis 1

At the beginning, based on the statistical test (Wilcoxon test), the result can be considered as significant $p = 0.0007$ ($p < 0.001$). This means that we accept the hypothesis 1. It can be concluded that the productivity of industrial companies has improved significantly over the analyzed period.

4.2. Verification of hypothesis 2

The next step was to investigate whether the use of outsourcing has a positive relationship with the development of the industrial sector. Based on the statistical test (using the Spearman correlation test), it can be concluded that the correlation coefficients determined are significant for the test ($p < 0.05$). This means that we accept the hypothesis 2.

Table 2. The relationship between outsourcing on productivity

	Outsourcing (external services)	Productivity (EVA)
Outsourcing (external services)	1.00	
Productivity (EVA)	0.22618*	1.00

* Correlation coefficients are significant with $p < 0.05$.

S o u r c e: Author's own elaboration.

Analyzing the correlation coefficient $r = 0.226$, it can be concluded that there is a positive correlation ($|r| > 0$) between the productivity measured with EVA and outsourcing measured by the value of external services. This means that as the outsourcing increases, the productivity of industrial enterprises also increases. Taking into account hypothesis 2, it can be concluded that there is significant positive relationship between use of outsourcing and productivity growth in Polish industrial companies. Taking hypothesis 2, it can be concluded that the use of outsourcing has a significant and positive relationship with the productivity of Polish industrial companies.

4.3. Verification of hypothesis 3a

Next, it was examined whether the productivity of Polish listed industrial companies has a positive relationship with the productivity of the entire Polish economy. Based on aggregated data and using the statistical test (application of the *r*-Pearson correlation test) we say that the correlation coefficients determined are significant for the test ($p < 0{,}05$). This means that we accept the hypothesis 3a.

Table 3. The relationship between industry productivity and the productivity of the Polish economy

	Productivity (EVA) for the sample of industrial companies from WSE	Productivity of the Polish economy (gross value added)
Productivity (EVA) for the sample of industrial companies from WSE	1.00	
Productivity of the Polish economy (gross value added)—aggregated data	0.15544*	1.00

* Correlation coefficients are significant with $p < 0.05$.

S o u r c e: Author's own elaboration.

Analyzing the correlation coefficient $r = 0.1544$, it can be concluded that there is a positive correlation ($|r| > 0$) between the efficiency measured by the EVA index and the economy's

productivity measured by the gross value added. This means that as productivity of industrial companies listed on WSE increases, the productivity of the entire economy also increases. Assuming hypothesis 3a, it can be concluded that there is a relationship between the productivity of listed industrial companies and the productivity of the entire economy in Poland.

4.4. Verification of hypothesis 3b

Finally, it was examined whether the outsourcing of industrial listed companies has a positive relationship with the performance of the Polish economy. Based on the statistical test (using the Spearman correlation test), it can be concluded that the correlation coefficients determined are significant for the test ($p < 0.05$). This means that we accept the hypothesis 3b.

Table 4. The relationship between outsourcing in industrial listed companies and the productivity of the Polish economy

	Outsourcing (external services)	Productivity of the Polish economy (gross value added)
Outsourcing (external services) for the sample of industrial companies from WSE	1.00	
Productivity of the Polish economy (gross value added)—aggregated data	0.5554*	1.00

* Correlation coefficients are significant with $p < 0.05$.

S o u r c e: Author's own elaboration.

Analyzing the correlation coefficient $r = 0{,}5554$, it can be concluded that there is a positive strong correlation ($|r| > 0$) between outsourcing measured by the value of external services and the productivity of the Polish economy. This means that as the outsourcing (for the sample of 170 companies) increases, the efficiency of the entire economy also increases. Accepting the hypothesis 3b, it can be concluded that the use of external suppliers' services by industrial listed companies has a significant relationship with the productivity of the entire economy in Poland. For better illustration of the example, the values are shown in Figure 1.

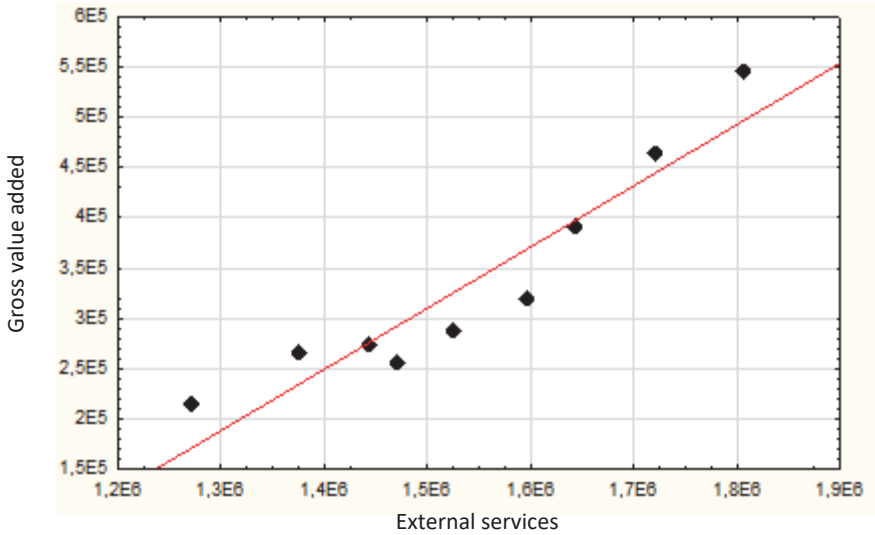

Figure 1. Correlation—relationship between external services and gross value added

S o u r c e: Author's own elaboration.

As previously written, the use of external suppliers' services has a relationship with the productivity of the entire economy in Poland. The correlation graph shows a positive statistically linear relationship. Along with the increase in the value of external services, the gross value added of the entire Polish economy grows. It also confirms that by using the services offered by external suppliers, the performance of enterprises and the entire national economy is increasing.

5. Conclusions

Polish companies that are listed on the Warsaw Stock Exchange have been analyzed. Due to the specificity of the conducted research, the research sample included 170 industrial enterprises over 2010–2018 period. The analysis of the sample taken from the industry sector made it possible to verify the adopted hypotheses. It can be concluded that the performance of companies has improved significantly over 2010–2018 period. Then, it was proved that the use of outsourcing by industrial listed companies has a significant positive relationship with their productivity. Finally, it was found that the increase in the productivity of listed industrial companies translates into the increase in the productivity of the entire economy in the country. Thus, overall results show that industrial listed companies are increasingly using solutions provided by external suppliers. It turns out that it is a good idea for them to develop their business. It has also positive effects on the whole economy.

This analysis has proved that although industrial companies use outsourcing to a lesser extent than companies from service sector the use of outsourcing in industry has grown significantly over the past years. These results proved to be in line with the assumptions of Axelrod (2004) who stated that outsourcing is an increasingly used management method.

However, there are further issues to consider. Since we already know how outsourcing affects the productivity of industrial companies, it is worth checking how outsourcing affects the productivity of service companies and what are the differences between them in the overall impact on the productivity of the Polish economy.

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Wpływ outsourcingu na produktywność polskich przedsiębiorstw przemysłowych

Abstrakt: Wciąż rosnące wymagania konkurencyjne skłaniają firmy do wprowadzania nowych rozwiązań w swojej działalności. W rezultacie firmy przemysłowe coraz częściej decydują się na wdrożenie outsourcingu. Celem artykułu było zbadanie wpływu wykorzystania outsourcingu na wzrost produktywności firm. W badaniu wzięło udział 170 przedsiębiorstw przemysłowych, które są notowane na Giełdzie Papierów Wartościowych w Warszawie. Badanie obejmuje okres 2010–2018. Przeprowadzenie badania umożliwia stwierdzenie, że outsourcing poprawił produktywność polskich firm przemysłowych. Dzięki testom statystycznym uzyskano wyniki, które pokazują, że firmy przemysłowe coraz częściej korzystają z rozwiązań dostarczanych przez zewnętrznych dostawców. Zastosowanie outsourcingu w przedsiębiorstwach poprawia ich produktywność, jak również wpływa pozytywnie na całą gospodarkę narodową. Outsourcing zmierzono na podstawie ilości usług obcych, a produktywność wskaźnikiem ekonomicznej wartości dodanej (EVA). Należy zaznaczyć, że istnieje pewne ograniczenie w interpretacji otrzymanych wyników. Usługi obce składają się również z usług, które nie zawsze są zlecane na zewnątrz, na przykład usługi bankowe. Opracowanie zawiera nowe informacje dla Polski. Umożliwia naukowcom przeprowadzanie bardziej szczegółowych analiz outsourcingowych.

Słowa kluczowe: outsourcing, produktywność, firmy przemysłowe, usługi zagraniczne, ekonomiczna wartość dodana