OUTSOURCING EFFECTS AND COMPANY SIZE – A COMPARATIVE ANALYSIS BETWEEN THE MANUFACTURING AND THE SERVICES SECTOR IN POLAND

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Introduction/background: The popularity of outsourcing as a management tool among Polish enterprises is increasing. Growing competition forces companies to look for new solutions for company management. Outsourcing is defined as a management tool to reduce costs in an enterprise.
Aim of the paper: The aim of the study was to check whether there is a relationship between outsourcing and the size of the company. In the study, I list large companies and SMEs. Compares the relationships between the manufacturing and services sectors.
Materials and methods: In this category, data from 250 companies from the Notoria database were used. In the first part of article, it compares the value of outsourcing across sectors using the Student T-test. In the next part of article, I examine the relationship between outsourcing and the size of companies. I compare the results between the vectors. Pearson's correlation test was used. It then compares the use of outsourcing between small and large companies. The student's T-test for independent programs was used.
Results and conclusions: The results say there are differences in the use of outsourcing between the manufacturing and service sectors. I noticed that industrial companies use much more solutions provided by external suppliers. Moreover, I can see that outsourcing has a greater impact in manufacturing than in the service industry. As the company grows, the use of outsourcing increases. It also shows that large companies use outsourcing to a greater extent than smaller companies.

Keywords: outsourcing, manufacturing, services, SME, companies.

1. Introduction

Outsourcing as a management tool is becoming more and more popular among Polish enterprises. The growing competition forces companies to look for new solutions. Outsourcing is defined as a management tool to reduce costs in an enterprise (Aalders, 2001). It is often referred to as an agreement with a third party to carry out a certain activity (Lysons, & Gillinham, 2003). As shown by the data, outsourcing is often used both in the US and Europe (Kakabadse, 2003). Outsourcing is also a key and important strategic solution in the operations

of companies. It is used in global supply chains. It is said to be the current business trend introduced by companies (Kweku et al., 2018).

There are many benefits of outsourcing. The literature is about reducing costs, improving profitability and management efficiency. Many more can be mentioned. Companies often use outsourcing to gain new knowledge or learn about new products appearing on the market (Dolgui, and Proth, 2013). Often researchers say that outsourcing improves the productivity of companies. This makes it a great tool to improve business performance. Recent studies on outsourcing, however, vary.

G. Lee et al in their study show that according to employees the impact of outsourcing on organisational performance is small. The authors also show the relationship between outsourcing and performance through the impact on job satisfaction (Lee et al., 2019). This study provides results for a market other than Poland.

In turn, the latest studies appear for Polish conditions. According to A. Maziarczyk, the use of outsourcing increased the profitability of industrial enterprises after the global economic crisis (2007-2009). This confirms the importance of using outsourcing in management in Poland (Maziarczyk, 2020). In addition, research on the performance of enterprises in Poland also confirms that it is a useful tool in the development of companies. The author notices the increase in the efficiency of companies after the introduction of outsourcing (Maziarczyk, 2020).

An examination of the existing literature shows that it is useful to supplement it with research on the comparison of outsourcing between sectors. This will enable the definition of outsourcing to be completed, which will be important for current business strategies.

This study has five parts. Part one shows the problem of considering the impact of company size on the use of outsourcing in foreign companies. In the next, I described the research trial. It also gives the characteristics of the sample. The next part describes in detail the methodology of this research. I also provide an explanation of the possibility of using statistical tests. The next part describes the results obtained in this study. In the last section, I draw and present conclusions for Polish enterprises.

2. Outsourcing, company development and company size – literature review

As we already know, outsourcing has become a popular management tool. More and more companies notice the benefits it brings. This prompts researchers to conduct research on outsourcing. Much research investigates the extent to which outsourcing affects the profitability of companies. It turns out that in most foreign studies one can see such a relationship. The authors also try to see important aspects in terms of the size of the companies.

S. Munjal et al. analysed the impact of various management tools on the improvement of the financial performance of companies in India. In the study, they distinguish between small, medium and large companies. As it turned out, outsourcing fared very favorably compared to other tools. The results confirm that outsourcing has a positive effect mainly in small companies (Munjal, 2019).

C. Sheehan and B.K. Cooper tested the impact of company size and human resources management on the use of outsourcing. Moreover, they checked the extent to which outsourcing influences an organisation's performance. The research was conducted on a sample of 441 observations from Australian companies collected through the survey. The results do not confirm that outsourcing in smaller organisations is used more often than in large companies. However, there is a link between the use of outsourcing and the improved performance of Australian companies (Sheehan, and Cooper, 2011). S. Bakhtiari sheds light on the decisions to introduce outsourcing in Australia. The author examines various forms that reduce the amount of overhead. The results show that outsourcing is a good management tool for companies changing from SME (Small and Medium Enterprises) to large companies. This demonstrates the impact of outsourcing on the size of the company (Bakhtiari, 2011).

On the other hand, A. Arbore et al. Studied the relationship of outsourcing and its determinants in SME. Based on the research, they conclude that the size of the company is very important in the use of outsourcing. Ultimately, they focus on SME companies. They show that the size of the company is also very important in this case. They conclude that outsourcing decisions alleviate the disadvantages related to the size of the company and its location (Arbore, 2006).

A similar study was conducted by M. Mohiuddin and Z. Su. They provide results on the impact of outsourcing on SME productivity in Canada. In the study, the authors say that companies that use outsourcing build a competitive advantage. The results show that not only large international companies but also SMEs that have implemented outsourcing achieve success and improve financial results (Mohiuddin, and Su, 2013).

J.I. Agburu and all conducted a survey of companies in the SME sector in Nigeria. The results of the study show that the introduction of outsourcing has a positive effect on the profitability and improvement of SME efficiency. The authors recommend that SMEs make greater use of outsourcing strategies to benefit from cost savings. SMEs should also make sure that the costs of managing the outsourcing process are not greater than the profits (Agburu, 2017).

Research results are not always unequivocal. Isaksson and Lantz (2015) analysed the outsourcing strategy of SMEs in Sweden. They investigated the relationship between outsourcing and return on equity (ROE) and return on investment. The authors conclude that outsourcing does not affect the profitability of SMEs (Isaksson, and Lantz, 2015).

A preliminary analysis of research conducted on outsourcing companies around the world does not give unequivocal results. The literature offers a range of studies on the impact of outsourcing on profitability. You can also find a detailed study for SMEs. The results, however, turn out to be contradictory. This means that it is worth carrying out further research and learning more about this management tool. However, I do not find a study of such a topic for Polish conditions. Therefore, I present the following research hypotheses:

H1) there are significant differences in outsourcing between manufacturing and services,

H2) there is a relationship between company size and outsourcing,

H3) large companies outsource significantly more than SMEs.

3. Sample

The listed companies participated in this study. The target sample included over 250 companies. The companies considered operate on the Polish market. The study includes a panel sample of 1000 observations. The research sample is divided into two groups: SMEs and large companies.

In the study, we use data from the Notoria database. The financial data included in this database cover the period 2010-2019. The sample was selected as follows. At the beginning, all the necessary data for calculations was downloaded from the database. The gaps that appeared were filled using the variable interpolation method. This method assumes the completion of the sample mean. This minimizes the error obtained in the results, and the total number of the tested samples remains unchanged. Data mining is then undertaken. All companies are categorised according to size and are placed into in one of two groups of companies, one for SMEs and another for large enterprises. Companies are distiguished according to the total assets held. Companies with over 43 million euro in toal assets[1] are classified as large. All the assets whose average value of assets for the analysed period is less than 43 million euro are classified as SMEs. In this way, the database with annual data was created. All calculations were made independently.

4. Method

Initially, the data was explored. All calculations for the assessment and verification of the hypotheses were made using the statistical module. Research was begun by checking whether

[1] Experts recognise this value for Polish conditions as a division into medium and large companies.

there are significant differences in the amount of outsourcing between manufacturing and services sectors. Based on world literature, I check the hypotheses this time with respect to the Polish market. The variables used in the first part of the study are presented in the table 1.

Table 1.
All variables used in this study

Variable	Description
Company size	Natural logarithm of firm's assets
Outsourcing	costs of external services divided by total costs (natural logarithm)

Source: author's own elaboration.

In this study, one decides to determine the size of the enterprise based on the value of the property. Based on other studies, it can be observed that this measure is often used. This variable is a logarithmic value. I do this to avoid possible inconsistencies in the values between sectors and between individual variables.

In this study, I define the value of outsourcing as the share of external service costs in the total costs. It should be noted that there is a certain limitation in the obtained results. The costs of external services may include costs that may not always be outsourced. Regardless of this, I take into account all the costs of external services, assuming that the deviations for the entire sample are so small that they do not need to be specified, such as the variable 'company size', the variable 'outsourcing' is a logarithmic value. The logarithm of the values brings the distribution of the variables closer to the normal distribution.

Taking into account the use of outsourcing as a method of company management by Polish companies, we can assume that there are differences in its use by the respective sectors. It is related to the specificity of the conducted activity. I ascertain whether there are significant differences in the use of outsourcing between sectors.

In this part of the study, two independent groups are compared. The variable 'outsourcing' is distributed close to the normal distribution. Therefore, the main assumptions for the application of the T-student test for independent samples were met (Cypryańska, and Bedyńska, 2012). The results are described in the next part of the study

Then I was looking for a relationship between company size and outsourcing. I check if there is such a relationship in the manufacturing and services sector. As it is assumed that there are differences between sectors in the use of outsourcing in management, I want to check how these differences are distributed among sectors. This will help determine how much the size of the company affects the implementation of outsourcing. It seems that the bigger companies are, the more they should use outsourcing for certain activities. Does such a relationship really exist in manufacturing and services? Or maybe the resulting dependencies are so small that small and medium or large companies should not pay much attention to outsourcing. I check if there is a relationship between the company's size and outsourcing.

In this part of the study, I examine the impact of company size on the implementation of outsourcing in the company and examine individual sectors for the strength of this relationship. I compare what these dependencies look like in manufacturing and services with use of the Pearson correlation (Scibor-Rylski, 2012). The assumptions for this test have been met. The variables are quantitative, the distribution is close to normal, and there are no outliers in the sample.

Then I did a regression analysis to determine the degree of influence of company size on the implementation of outsourcing in Poland. I also checked whether it is possible to predict the level of outsourcing based on the size of companies in a given sector.

Finally, I check whether large companies actually use outsourcing to a greater extent than do smaller companies. In this part of the study, I divide the sample into SME companies that are assigned a value of 0, and large companies that are assigned a value of 1. The analysis is broken down into sectors. I check whether large companies use outsourcing significantly more than SMEs.

This part of the study is a kind of summary. Large companies seem to rely more on external providers. In this way, they use management solutions and reduce employee service costs. Based on the literature analysis, it can be assumed that SMEs will show a greater impact. However, the question arises whether this fact is true for both manufacturing and services. I'm trying to check it out.

5. Results and their analysis

When examining the use of outsourcing as a management method by Polish companies, certain differences between sectors can be assumed. This is due to the specific nature of the company's activities. The research carried out on a sample of 250 companies in Poland led to the following preliminary results:

Table 2.
Descriptive statistics

Variable	**Manufacturing**				
	Mean	**Median**	**Minimum**	**Maximum**	**Std. dev**
Outsourcing	1,59	1,63	0,17	4,50	0,83
Companysize	12,95	12,71	9,15	17,98	1,65
	Services				
Outsourcing	1,12	1,05	0,06	5,60	0,97
Company size	12,44	12,32	9,73	16,67	1,46

Source: autor's own elaboration.

I start my research with the analysis of basic statistics. Manufacturing and service sectors are listed and analysed separately. Values after log transformation are discussed. There are significant differences between sectors.

At the beginning, taking into account outsourcing, it can be noticed that in manufacturing the mean is higher than in services (1.59 > 1.12). Moreover, that the mean and median for the variable 'outsourcing' in manufacturing and services are similar. This means that there are not many outliers in the sample that could distort the results. A greater maximum value of outsourcing was recorded in services. In both manufacturing and services, the results diverge from the average by less than 1.0. This is evidenced by the amount of the sample standard deviation. This means that on average, the results of outsourcing in manufacturing may reach values higher or lower by 0.83, and in services by 0.97. This is a large dispersion of values with respect to the mean value.

Looking at the average size of a company in manufacturing and services, it can be concluded that these values are similar. The manufacturing average is not much higher. Both in manufacturing and services the mean and median values are similar. This means that there are not many outliers in the sample. Thus, the results in further analyses will not be distorted. The standard error for 'company size' in manufacturing and services is small. This means that there is little dispersion of the variables in relation to the mean and there is little sample differentiation.

Based on the above statistics, it can be said that the sample of 250 Polish companies is diversified in terms of outsourcing. The nature of the business may have a significant impact on this. The next step is to verify the hypotheses.

5.1. Verification of hypothesis 1

In this part of the study, I check whether there are significant differences in the level of outsourcing between the manufacturing and services sectors. It is worth recalling that the assumptions for using the student's T-test have been met. This test was used because it compares two independent groups. The obtained results are presented in the table 3.

Table 3.
Results of the student's T-test for independent samples

Variable	Mean		t	df	p
	Manufacturing	Services			
Outsourcing	1,59	1,12	-4,10	248,00	**0,000**

* the results are statistically significant with $p < 0.05$.

Source: autor's own elaboration.

Based on the results obtained, it can be concluded that there are significant differences in outsourcing in manufacturing and in services. This is confirmed by the statistic value $p = 0.00$ ($p < 0.05$). Additionally, it can be seen that industrial companies use more outsourcing. The results of the student's T-test for independent samples are unambiguous and confirm that there are statistically significant differences between the sectors. The sectors differ significantly from each other in terms of the use of outsourcing. The average is higher in manufacturing than in services ($1.59 > 1.12$).

As there are differences in outsourcing, I am going to check whether the size of the company can affect the implementation of outsourcing. I check what it looks like in manufacturing and services.

5.2. Verification of the hypothesis 2

In this part of the study, I check whether there is a relationship between outsourcing and the size of companies in manufacturing and services. I check in which sector this relationship is stronger. I compare the results across sectors. The results of the Pearson correlation test are shown in the table 4.

Table 4.
Pearson's correlation results

Variable	**Company size**	
	Manufacturing	**Services**
Outsourcing	0,48 **p = 0,002**	0,23 **p = 0,025**

* the results are statistically significant with $p < 0.05$.

Source: autor's own elaboration.

Table 4 shows the results of the correlation test. It is worth recalling that the assumptions for the application of the Pearson test were met. The variables are close to normal, they are quantitative and there are not many outliers.

Based on the obtained results, it can be concluded that both in manufacturing and services there is a relationship between the use of outsourcing and the size of the company ($p < 0.05$). However, differences in the strength of this relationship between sectors can be noticed. In manufacturing there is a moderate positive relationship (0.48), while in services there is a weak positive relationship between outsourcing and company size. This means that the frequency of outsourcing implementation increases as the size of the company grows. Moreover, it is worth noting that union strength is higher in manufacturing than in the service sector. This also confirms the previous part of the study that industrial companies more often use outsourcing as a management practice.

5.3. Verification of the hypothesis 3

In this part of the research, I divide all companies into two groups: SMEs and big companies. Data of the student's T-test for independent samples are presented in the table 5.

Table 5.
Comparison of the use of outsourcing

Variable	Mean		t	df	p
	Big companies	SMEs			
Outsourcing	1,55	0,90	2,41	248	**0,021**

* the results are statistically significant with $p < 0.05$.

Source: autor's own elaboration.

Based on the obtained results, it can be concluded that there are significant differences in the level of introducing outsourcing as a management method in large companies and SMEs. This is confirmed by the value of the statistics $p = 0.021$ ($p < 0.05$). It can be seen that outsourcing is used more by large companies. The average is higher in manufacturing than in services ($1.45 > 0.90$). Large companies more often use outsourcing in enterprise management than SMEs.

6. Conclusions

The study examines the diversity of outsourcing in manufacturing and services depending on the size of companies. When analysing the differences between sectors, several conclusions can be drawn.

I note that there are significant differences in the use of outsourcing across sectors. This is due to the specific nature of the company. Industrial companies outsource many more services to external contractors than service companies. It is worth recalling that there is a certain limitation in the interpretation of the results, as not all external services have to be outsourced to external suppliers. The manufacturing shows significantly higher values of the use of outsourcing. Additionally, both in manufacturing and services, there is a relationship between outsourcing and the size of the company. It is therefore confirmed that as the size of the company grows, the use of outsourcing also increases. However, there are differences in the strength of the outsourcing link between industry and services. In the industrial industry, this relationship is much stronger.

In addition, a detailed list of SMEs and larger companies made it possible to compare the use of outsourcing depending not on the sector but on the size of the company. I notice that large companies use solutions from external suppliers much more often. The question arises

whether outsourcing is a good solution only for large companies and whether SMEs should be inclined to use other management tools.

T. here are new issues in this study that need to be exploredSince we know the relationship between outsourcing and the size of industrial and service companies, it is worth checking the determinants of outsourcing in small companies. Or do they use such a management tool? Another question that arises is whether outsourcing is a solution only for large and medium-sized companies in Poland? Other researchers can check it.

References

1. Aalders, R. (2001). *The IT Outsourcing Guide*. Chichester: Wiley, p. 37.
2. Agburu, J.I., Anza, N.C., Iyortsuun, A.S. (2017). Effect of outsourcing strategies on the performance of small and medium scale enterprises (SMEs). *Journal of Global Entrepreneurship Research, vol. 7, no. 26*, DOI:10.1186/s40497-017-0084-0.
3. Arbore A., Ordanini A. (2006). Broadband Divide Among SMEs: The Role of Size, Location and Outsourcing Strategies. *International Small Business Journal*, *vol. 24, no. 1*, DOI:10.1177/0266242606059781.
4. Bakhtiari, S. (2011). Size Evolution and Outsourcing: Theory and Evidence from Australian Manufacturing. *UNSW Australian School of Business Research Paper*, DOI:10.2139/ssrn.1984398.
5. Cypryańska M., Bedyńska S. (2012). *Testy t-Studenta i ich nieparametryczne odpowiedniki.* S. Bedyńska, M. Cypryańska (eds.). SEDNO: Warszawa, p. 163.
6. Dolgui, A., Proth, J.M., (2013). Outsourcing: Definitions and Analysis. *International Journal of Production Research*, *vol. 51*, no. 23-24, DOI:10.1080/00207543.2013.855338.
7. Kakabadse, A., Kakabadse, N. (2003). Outsourcing best practice: transformational and transactional considerations. *Journal of Corporate Transformation*, *vol. 10, no. 1*.
8. Kweku, A., Nyuur, R., Chima, M., Debrah, Y. (2018). *Offshore/Nearshore Outsourcing as a Strategic Competitive Posturing: Insights from Ghana*. BAM 2018 Conference Driving Productivity in Uncertain and Challenging Times. Bristol Business School, University of the West of England: UK, pp. 4-6.
9. Lee, G.R., Lee, S., Malatesta, D., Fernandez, S. (2019). Outsourcing and Organizational Performance: The Employee Perspective. *The American Review of Public Administration*, *vol. 49, no. 8,* pp. 973-986. DOI:10.1177/0275074019855469.
10. Lysons, K., Gillinham, M. (2003). *Purchasing and Supply Chain Management*. Prentice Hall, p. 351.

11. Maziarczyk, A. (2020). Global financial crises, profitability and outsourcing in industrial companies in Poland. *Organization and Management Scientific Quarterly*, *vol. 49, no. 1*, pp. 87-101, DOI:10.29119/1899-6116.2020.49.6.
12. Maziarczyk, A. (2020). Impact of outsourcing on the productivity of Polish industrial 13 enterprises. *The Małopolska School of Economics in Tarnów Research Papers Collection, vol. 1445, no. 1*, pp. 41-52. DOI:10.25944/znmwse.2020.01.4152.
13. Mohiuddin, M., & Su, Z. (2013). Manufacturing Small And Medium Size Enterprises Offshore Outsourcing And Competitive Advantage: An Exploratory Study On Canadian Offshoring Manufacturing SMEs. *Journal of Applied Business Research*, *vol. 29, no. 4*, DOI:10.19030/jabr.v29i4.7920.
14. Munjal, S., Requejo, I., Kundu, S.K. (2019). Offshore outsourcing and firm performance: Moderating effects of size, growth and slack resources. *Journal of Business Research*, *vol. 103*, pp. 484-494.
15. Notoria Serwis, https://ir.notoria.pl/.
16. Ścibor-Rylski, M. (2012). *Miary związku między zmiennymi – współczynniki korelacji.* S. Bedyńska, M. Cypryańska (eds.). SEDNO: Warszawa, pp. 199-201.
17. Sheehan, C., Cooper, B.K. (2011). HRM outsourcing: the impact of organisational size and HRM strategic involvement. *Personnel Review*, *vol. 40, no. 6*, pp. 742-760. DOI:10.1108/00483481111169661.