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Foreword

Economics, and management in particular, is a science whose main purpose and subject of research is to recognize the causes and value of things in economic phenomena and processes. The fundamental nature of these values can be justified in two ways: by indicating the model of a well-functioning enterprise, economy or the entire society on which it is based, or by diagnosing the way the economy is going and what it is lacking. So we have here theorizing and creative thinking on the one hand and analytical research on the other. Both activities are necessary for effective operation. The first determines the course of action, the second determines whether we are capable of taking it. The submitted works were dominated by a diagnostic and decision-making approach, limited in scope to selected areas of the activity of an enterprise or institution.

The journal is the work of our university's research and teaching staff as well as employees from other universities and research centres in the country, such as: University of Lodz, University of Szczecin, Maria Curie-Skłodowska University in Lublin, University of Rzeszów, Gdańsk University of Technology, Cracow University of Economics, and abroad: University of West Attica in Athens (Greece), Ternopil National Economic University (Ukraine).

In the content of the publication, several currents and research threads can be distinguished, namely: analysis of the effectiveness of contrarian strategies for investing in the capital market, employee remuneration strategy in various types of enterprises, the policy of educating students in accounting and entrepreneurship, including digital communication tools and processes, assessment of the effectiveness of tax administration instruments and policy in the area of remuneration settlements for employees, evaluation of the use of the management variable and work productivity indicator to assess an enterprise's bankruptcy risk, as well as the application of a new calculation formula for testing the effectiveness of housing cooperatives and the use of IT instruments and tools in customer relations management (CRM).

I hope that the articles and materials presented in the fourth issue of *The Małopolska School of Economics in Tarnów Research Papers Collection* this year will meet with great interest and goodwill from the academic community and participants of economic life. I trust that our University's scientific journal, which has regularly appeared for 20 years, will help a broad section of society to understand complex issues related to the economic and management issues of our country and region.

On behalf of the authors and myself, I would like to thank all those who contributed to the creation of this journal – Fellow Reviewers for substantive, important and often detailed comments, as well as the entire Editorial Team and group of collaborators.

Leszek Kozioł
Editor-in-Chief

ECONOMICS AND FINANCES

Reporting of financial indicators by Polish housing cooperatives—current state and own proposal

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Abstract: The article is the result of the author's empirical research covering the evaluation of the effectiveness and economic and financial condition of housing cooperatives by means of the indicator analysis of financial statements. The aim of the article is to identify and compare the scope of voluntary disclosures of financial indicators in management reports on the activity of housing cooperatives. It outlines the key differences between the housing company and the housing cooperative as regards the principles for the preparation and assessment of financial statements and the functioning of both entities. The financial statements of housing cooperatives were also evaluated in terms of their potential in the financial analysis, indicating the limitations resulting from the most common rules of their preparation. The study was based on a comparative analysis of the content of importing the activity. In total, the study covered the reports of 100 housing cooperatives operating in the West Pomeranian and Łódź Voivodeships. Apart from the restriction related to the area of activity, the selection of the sample was random. Out of the examined sample, only 27 evaluations presented the results of effectiveness of operations and economic and financial condition using the calculated financial indicators on the basis of data from financial statements. In the first phase of the study, the deduction method was used in a general way to determine the scope of disclosures in reports prepared and published by housing associations on websites. The induction method applied in the final stage of the research allowed to formulate general conclusions. In the conducted research, in particular, the methods of monographs, content analysis, descriptive analysis and comparative analysis were used. As a result of the conducted research it was found that housing cooperatives often make different choices regarding the type of indicators, calculation formulas used or the number of presented indicators. Liquidity ratios were most frequently presented. As a result of the conducted research, the current state of reporting of financial indicators by housing cooperatives was made, part of commonly used financial indicators used to evaluate companies was rejected and financial indicators were proposed that allow to assess the condition and effectiveness of specific units, such as housing cooperatives.

Key words: financial indicators, housing cooperatives, reporting

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1. Introduction

Housing cooperatives are a particular form of cooperative society which is a voluntary association of an "unlimited number of persons, with variable personal composition[1] and share capital, who, in the interest of their members, carry on a joint economic activity".[2] The specificity of housing cooperatives is that their primary objective is to maintain the housing stock managed by them in the best possible condition at the lowest possible cost and to ensure the comfort of living in appropriate conditions for their members. Although many cooperatives are not engaged in economic activities and only manage the housing stock, most of them are engaged in such activities in a similar way as the companies in which they are principally engaged. The management of the housing stock is a completely different activity from the economic activity and the main difference is that the housing association cannot make a profit from the management of the housing stock. If, in addition to the statutory activity, a housing association runs a business activity, it should make a profit from it, but use it to cover the costs of managing the housing stock. This means that even if a housing association makes a profit from its economic activities, it should not make a profit from its total activities. Housing cooperatives, although they are economic entities, often carrying out economic activity, have a completely different purpose of activity than companies for which tools for assessing the condition and effectiveness of operation have been developed. Considering that the assessment of the effectiveness of the functioning of a housing association is an important issue for the residents and members of the housing association, a question may be asked: can the indicative analysis of financial statements be useful in the assessment of the housing association? The literature analysis carried out by the authors points to a cognitive gap in the area of analysis and evaluation of financial indicators reporting by housing cooperatives. The literature review indicates that the subject of reporting financial indicators was dealt with in the context of listed companies (e.g. Krasodomska, 2013; Michalak, 2017; Skoczylas and Waśniewski, 2014; Andrzejewski et al., 2016; Masztalerz, 2019). However, there are no studies and research concerning the analysis and evaluation of financial indicators included in the reports of housing cooperatives used to assess the condition and effectiveness of housing cooperatives. The purpose of this Article is to identify and compare the scope of voluntary disclosure of financial indicators in management reports on the activities of housing associations. The implementation of the main objective is determined by the following detailed research questions:

- Are financial indicators presented in the audited activity reports?
- Which financial indicators are presented by the board of directors of housing cooperatives?
- Which indicators are most frequently reported?

In the next part of the article we will present: the importance of the indicator financial analysis in the assessment of companies, the indicator analysis of the liquidity and debt of the housing cooperative, the analysis of profitability indicators and rotation of the assets of the housing coopera-

[1] Pursuant to Article 15.1.1 of the Cooperative Law, "a cooperative shall comprise at least ten members and a cooperative of agricultural production and a cooperative referred to in Article 6.2.a, at least five members, unless the statute requires a greater number of members".

[2] Article 1 § 1 of the Law of 16 September 1982—Cooperative law (consolidated text: Journal of Laws of 2003, No. 188, item 1848, as amended).

tive, the current status of reporting financial indicators in the housing cooperative, proposals of financial indicators for the housing cooperative, the summary.

2. The importance of indicative financial analysis in the assessment of companies

Indicative analysis of financial statements is one of the quantitative methods of financial evaluation of an economic entity (Kowalak, 2008) and "presents relations of specific financial quantities, important from the point of view of their mutual relations" (Zaleska, 2005, p. 62). It consists in calculating appropriate financial indicators and comparing them with normative values defined for the industry in which a given unit operates.[3] It therefore complements the preliminary analysis of the financial statements and concerns the audit of relations between the various items of the financial statements. It is often treated as a generalization of a company's financial performance and is characterized by various aspects of its activities (Sierpińska, 2004). It is also defined as "the main instrument for the interpretation of financial statements" (Maćkowiak, 2005, p. 164). Its main advantage is its ease of use and the simplicity of measuring economic phenomena. The number of financial indicators (Grzenkowicz, 2007) used to evaluate the audited entity is unlimited, however, too much may eclipse the image of the audited entity (Jędrzejewski, 2012) and an incorrect selection of indicators may lead to erroneous conclusions. Therefore, it is very important to select financial indicators that affect the assessment of the entity due to its specific nature, mutual comparison of appropriate sizes and their proper interpretation. Drawing conclusions only on the basis of the values of financial ratios may prove to be risky, especially if these standards are developed for all companies operating in different industries, or if it is difficult to define ranges of indicated values of ratios for units from specific industries in a situation where entities within it may have completely different characteristics. The most typical range of areas of financial analysis is formed by the following indicators: liquidity, debt, efficiency and profitability. The determination of liquidity and debt allows to determine the stability of the entity and to determine the risk of bankruptcy in a relatively short period of time. Efficiency and profitability is the most common way to assess the effectiveness of the management board's operations.

However, it should be taken into account that the methods for the indicative analysis of the financial statements have been developed for companies which, from an economic point of view, differ significantly from housing associations. These differences may mean that the methods of assessing the performance of housing companies may not be useful for assessing the performance of housing cooperatives. The research carried out by the authors shows that, despite the similarities, housing associations are completely different in terms of the principles of functioning, purpose and preparation of financial statements, which are the source for their evaluation by means of index analysis. It follows that in order to assess the functioning of a housing association on the basis of the financial statements, it is necessary to know the specific characteristics of its activities.

[3] For a housing cooperative, other housing cooperatives could be units of a similar industry, assuming that all of them have similar characteristics (Siudek, 2004).

3. Indicative liquidity and debt analysis of a housing cooperative

The concept of liquidity in corporate finance is most often associated with the ability of an entity to timely regulate current monetary liabilities, i.e. to pay them within a year from the balance sheet date (Wędzki, 2009). According to T. Dudycz (2000), liquidity means positive cash balance in the entity or the level of covering the entity's liabilities with property. According to Gabrusewicz (2002), liquidity should be interpreted in terms of assets that may be more or less liquid, which means that they can be easily or hardly converted into cash. Regardless of how liquidity is determined, its behaviour provides a basis for the credibility of the entity in the marketplace by allowing it to meet its cash obligations in a timely manner. This feature determines the survival of the company and is very important for all interested parties (Sierpińska and Jachna, 2007). In the case of housing associations, it is possible to interpret this group of financial indicators, but their interpretation is strongly influenced by the specificity of housing associations.

In the case of a housing association, the values of this group of indicators do not have a very high cognitive value, as many housing associations raise funds for future renovations or other targeted tasks. This results in a high level of short-term investments, which have a significant impact on the level of liquidity ratios. In the liabilities of the balance sheet, these funds should be shown as accrued repair funds in special funds in the group of short-term liabilities at exactly the same amount. It happens, however, that cooperatives present the calculated repair fund as a component of their own funds. This results in a significant increase in the value of liquidity ratios and, in the case of companies, it could suggest over-liquidity. Another reason for misinterpretation of the liquidity ratios may be the level of liabilities resulting from the fact that a component of the rent for a dwelling with a significant share of the rent is the heating fee, which in the last month of the year is often much higher than in the previous month. In many cooperatives, this component is accounted for upon receipt of an invoice from the heat supplier which gives rise to a liability in the month to which it relates, while the rent is calculated in the following month. As a result, the receivable[4] that would increase the level of liquidity ratios becomes the receivable at the beginning of the next period. In such a situation, the level of liquidity ratios may be very low, which in the case of companies would suggest the impossibility of timely payment of current liabilities. This example of rent component settlement is one of many used by housing associations and the variety of settlements used means that the values of the indicators can vary considerably, even within a housing association, depending on the settlement methods used.

The debt of housing cooperatives is directly linked to liquidity and should be treated somewhat differently from the debt of companies. When analyzing debt ratios, it should be taken into account that the housing stock, which is the main asset of a housing association, can be financed in many ways, but in many cases the security of liabilities is the private property of the inhabitant (in the form of a flat). In "young" housing associations the debt may be close to the value of the fixed assets and in older housing associations very often the debt of the

[4] The resulting liability should, in accordance with the matching principle, also be presented as an accrued expense; however, when calculating the increased liquidity ratio, this value is excluded from the quotient counter, causing a significant decrease in its value.

fixed assets is not present and the housing stock is financed by the construction contributions of the members of the housing association. It happens that a housing cooperative finances its own renovation expenditure from the resources financed by a resource fund or a construction fund. These may also include funds derived from the transformation of the tenant's right to premises into the ownership right to premises.[5] These measures are financed by equity capital, which reduces the cooperative's debt to receivables. In some housing cooperatives, the difference is shown as a short-term trade receivable with a repayment term of more than 12 months. Therefore, in the case of a housing cooperative, there should be no negative assessment of low debt, while debt ratios indicating that the level of liabilities is higher than the value of assets should be clearly negative. A deposit paid by tenants of commercial premises is often presented in commitments and should be secured with cash on bank accounts or deposits. This should also be taken into account when analyzing the indebtedness of a housing association.

4. Analysis of profitability ratios and asset turnover of housing cooperatives

The financial result usually allows to assess the effectiveness of the company's core business and its profitability, i.e. it reflects the effectiveness of decisions taken earlier (Skoczylas, Niemiec and Waśniewski, 2011).

The ROS calculated for companies should have a positive value, and the higher it is, the greater the profitability is, since it covers the costs of running a business and provides the means for further growth.

Such conclusions should not be drawn in the indicative analysis of housing cooperatives, as they should not make a profit from the management of their own housing stock. The core operating activities of housing associations most often concern the management of the housing stock and often involve the cooperative in the assumption of a loss which is covered by other operating activities. This means that a phenomenon that would be clearly negative in a housing company is a deliberate measure and should be assessed differently from a profit-making company. In the case of a housing cooperative, the result on the total activity should be close to zero and high profitability in other operating activity may be assessed positively most often, although the level of result in this segment of activity should not be assessed in comparison to another housing cooperative but only within the same unit, as its level may be affected not only by the management's activity, but also by the attractiveness of the cooperative's real estate location or the number of commercial premises. However, most often the higher result in other operating activities in the following years should be assessed positively, as it allows to reduce the costs of property maintenance.

Similarly, it is difficult to assess the result obtained in the financial activity of a housing cooperative, but its positive level is beneficial for the members of the cooperative. It is most often caused by late payments made by residents for rent. Although a higher level is apparently beneficial to members making timely contributions, a higher level may be indicative of

[5] Such transformation was possible until mid-2007 and although it is no longer possible, many housing cooperatives have significant cash resources created on this account.

late contributions, which may have an impact on liquidity problems. The high level of financial income from bank deposits should be clearly assessed as positive. It should be remembered, however, that their level is most often affected by the amount of cash on bank accounts and their amount should be assessed in relation to their level. Financial costs in the case of a housing cooperative most often do not occur and their appearance in the profit and loss account most often means that the cooperative does not meet its financial obligations on time, which should be assessed negatively.

Some financial indicators from the group of rotation indicators have a significantly limited cognitive value when analyzing the financial statements of a housing association. This is due to the fact that, in principle, there are no inventories in these entities and, when they do, they are of a different nature than in the case of manufacturing companies, as they are most often used to maintain the housing stock or are materials collected for future renovations. They are receivables which, like inventories, are of a different nature because most of them are secured with a housing contribution. In addition, their level is greatly affected by seasonality and thus the amount of income in previous periods, and therefore on this basis it becomes impossible to assess the work of the management board. This seasonality also has an impact on cash levels.

5. The current state of reporting on financial indicators in the housing cooperative

In the first stage of the research procedure, entities for research were separated. Housing cooperatives located in the West Pomeranian and Łódź Voivodeships were selected for analysis. Therefore, 100 housing associations were further examined in accordance with the criteria adopted. The second stage of the research procedure consisted in collecting research material, the selection of which was determined by the achievement of the article's objective. For each of the 100 housing cooperatives, the website: ekrs.ms.gov.pl, downloaded the Management Board's report on the activity for 2018, in which the financial information was audited. In the third stage of the research procedure, the content of the collected material necessary to answer detailed research questions (presented in the introduction) was analyzed, using content analysis, descriptive analysis, comparative analysis and induction methods to generalize cognitive results.

In the surveyed population, 27 housing cooperatives presented financial indicators (see Table 1). The comparison shows that the most popular is the financial liquidity index (70% of housing cooperatives), followed by debt repayment indexes (about 11% of housing cooperatives) and the lowest—long-term debt indexes, equity participation index in the total capital and the golden rule of financing (which constitutes 4% of the surveyed housing cooperatives).

Table 1. Turnout of financial indicators reported by housing cooperatives—arranged according to the share of %

No.	Name of the indicator	Number of cooperatives	Percentage
1.	Financial liquidity ratio II	19	70%
2.	Level I financial liquidity ratio	18	67%
3.	Receivables collection period	12	44%
4.	Level III immediate liquidity ratio	12	44%
5.	Total liquidity ratio	11	41%
6.	Commitment repayment period	10	37%
7.	Overall debt ratio	7	26%
8.	Ratio of financing fixed assets with a fund	7	26%
9.	Net profitability	7	26%
10.	Return on assets (ROA)	6	22%
11.	The immobilization rate of the assets	5	19%
12.	Financing structure sustainability indicator	5	19%
13.	Return on equity (ROE)	5	19%
14.	Inventory turnover rate	5	19%
15.	Gold balancing rule	5	19%
16.	Self-financing ratio of current assets	2	7%
17.	Debt to equity ratio	2	7%
18.	The golden rule for financing	1	4%
19.	Equity to total capital ratio	1	4%
20.	Long-term debt ratio	1	4%

S o u r c e: Authors' own calculations.

The indicators in the activity report could also be seen, prepared by the persons drawing up the report (see Table 2).

Table 2: Indicators specific to the housing cooperatives sector

No.	Indicator	Formula	Number of cooperatives	
			No.	%
1.	Debt on dwellings (1)	$\frac{\text{debt as at the balance sheet date}}{\text{monthly average over the reporting period}}$	4	15
2.	Debt on dwellings (2)	$\frac{\text{debt as at the balance sheet date}}{\text{the amount of the fees for December of the current year}}$	3	11
3.	Debt on dwellings (3)	$\frac{\text{debt as at the balance sheet date}}{\text{sales dimension in the reporting period}}$	2	7
4.	Debt on commercial premises	$\frac{\text{dimension of sales in the period the state of arrears of commercial premises}}{\text{the annual utility charges for commercial prem}}$	2	7

S o u r c e: Authors' own calculations.

One cooperative also presented additional indicators such as: commercial creditworthiness, payment capacity, asset productivity, fixed asset productivity, capital ratio, share of long-term liabilities in fixed capital, share of long-term liabilities in foreign capital.

Identification of indicators and their formulas presented in the report on the activity of housing cooperatives indicate the individualization of applied solutions. The results of the research showed that housing cooperatives make various choices with respect to the presented financial measures in the report on the management board's activity. The analysis of the applied calculation formulas showed that in the case of indicators there are significant differences in the methods of calculation between the studied housing cooperatives. The conducted research has some cognitive limitations, however, determining potential further directions of research. It should be emphasized that the research subjects are narrowed down to two selected voivodeships, motives and determinants of the choice of specific indicators.

6. Proposals for financial indicators for housing cooperatives

On the basis of liquidity ratios, it is often difficult to determine the ability of a housing cooperative to settle its financial obligations in a timely manner or to determine whether the cooperative does not over-invest its resources in its current assets. A much more effective way of assessing the occurrence of difficulties in timely settlement of monetary liabilities is to assess the level of income and expenses from financial activities. It is relatively common for housing associations to take out loans to renovate or invest in the production of housing stock, and it is normal for these loans to bear interest and commission expense. These costs in the case of enterprises are financial costs. In the case of housing associations, they are very often added to tenants as a component of rent and are not recorded as financial expenses of the housing association. In some housing cooperatives, they are reported as financial costs and the burden on tenants is reported as financial income. In such a situation, financial costs should be equal to financial revenues. Therefore, the financial income and

expense ratio (financial interest income[6]/ financial interest expense) should be equal to unity. If a housing cooperative fails to meet its obligations on time, it bears the costs of default interest and then the value of the ratio may be lower than the unity. A limitation of this method may be that tenants are not paying their rent on time, which results in a cooperative charging interest while at the same time not paying its payments on time, which in turn results in interest being charged by suppliers. In such a situation, the value of the indicator may also be close to unity. Therefore, this indicator should always be considered in relation to the amount of credit,[7] cash and receivables. A low level of credit and cash and a high level of receivables (very often growing) most often indicate that a housing cooperative does not pay its debts on time, which may lead to its insolvency.

The long-term debt ratio may be useful for the indicative analysis of the financial statements of a housing association. Liabilities under construction or renovation loans should be covered by receivables from residents. In a situation where a cooperative financed renovation or construction expenditures with a loan and not with contributions made by residents, the value of the long-term debt ratio (long-term liabilities due to loans or borrowings/ long--term receivables) should be close to unity. If it is lower than one, it may indicate difficulties with loan repayment, and if it is higher than one, it may mean that a part of outlays was financed by the housing cooperative with its own funds other than those of tenants. The latter situation may indicate the stable situation of cooperatives. It is also worth checking the level of short-term debt (short-term liabilities/ [short-term receivables—trade receivables with a repayment period of more than 12 months]), but always in connection with the costs incurred in the last month. The level of the indicator significantly exceeding one may mean that cooperatives have difficulty in settling their current liabilities, which may be caused by incorrect calculation of rent rates, but also by other factors. Therefore, in such a situation, and in particular when the cooperative has a low level of cash, the reason for the high value of the ratio should be checked.

Given that, in the case of a housing association, a negative result on the underlying result should not be viewed negatively, this application of the ROSs developed for the companies is far from the objective and, if applied, should be interpreted in a completely different way. However, it is advisable to assess the result on financial activities in relation to the amount of funds accumulated on the accounts. Calculation of the financial effectiveness index (interest income/ average level of cash) will allow to determine the source of income. If the indicator value is close to the average interest rate offered by banks, it may be suspected that the source of income is bank interest and this should be considered positively. A level well above the interest rate offered by banks, but also lower than the statutory rate for late payments, may suggest that some (or all) are from tenants or renters. If the value of the ratio is higher than the statutory interest rate, it may mean that the cooperative applies the cash method of interest calculation and in a given year a significant part of overdue receivables was repaid.

[6] It should be borne in mind that in most housing associations, some tenants are late in paying their rent, with the result that the housing association should charge interest on late payments, in which case the value of the index should be greater than unity.

[7] It should be presented in the liabilities of the balance sheet as a liability.

In the assessment of the effectiveness of operations, the analysis of accruals turnover ratios is of significant importance, because in these items the financial result from the housing economy is often "hidden". Prepayments and accruals should be considered when analyzing these items. In a situation when a housing cooperative presents the result from the management of housing resources in accordance with the Accounting Act in the profit and loss account, the turnover ratio of accruals ([deferred expenses—accruals and deferred income]/ result of basic activity) will allow to determine the degree of freezing of the financial result in accruals and deferred income. In a situation where the result is close to unity, the entity does not freeze the result from previous years in prepayments and accruals. In the situation when it is larger than unity,[8] the cooperative has uncovered losses in previous years and in the situation when it is lower than unity, the cooperative collects results from previous years, which will probably become a source of financing of higher costs of property maintenance at the unchanged level of rent.

7. Conclusion

The financial statements of a housing cooperative may be used to assess its economic and financial condition by means of an indicator financial analysis. However, although this issue is widely described in the literature, the developed indicators are used to evaluate companies that are entities with different characteristics than a housing cooperative. The most important differences between a housing company and a housing cooperative are the different objectives of their operation, but also the different form of ownership is not insignificant. Those differences result in different methods of presenting economic values in the financial statements being used in both entities. This means that the conclusions drawn from the assessment of the financial statements using financial indicators for both types of entities are often different. The scope of the analysis also varies, meaning that different economic values in the financial statements should be assessed or interpreted differently from those of enterprises. The most important phenomenon occurring in housing cooperatives, which may lead to an incorrect assessment of the calculated profitability ratios, is the requirement that the cooperative does not benefit at the expense of its members, who are at the same time the main suppliers of income from the core business. The result achieved in other business segments should reduce revenues from core operations. This means that in the case of housing cooperatives, a negative result on sales is most often intended and should not be assessed negatively. Significant differences can also be seen in the information value of liquidity, turnover and debt ratios. The specificity of a housing association results in the fact that some of the indicators from these groups—effective in the assessment of the companies—in the case of a housing association have little information value or may lead to erroneous conclusions.

Despite the discrepancies between the compared entities, the conducted research shows that the methods of indicator analysis of financial statements developed for the companies, at least in part, are possible to apply in the assessment of the effectiveness of functioning and

[8] For the purpose of assessing this indicator accurately, it should be taken into account that accruals may also include other deferred income or expense that should not be taken into account. However, it can be assumed that in the case of housing cooperatives this level is most often negligible and its main share is asset insurance.

condition of housing cooperatives. However, due to the different approach to their preparation within one type of entity, it is necessary to familiarize oneself with the accounting policy adopted by the housing association before analyzing it. The presented differences and specificity of housing associations mean that for the purpose of indicative analysis of financial statements other financial indicators should be developed and although the method of indicative analysis itself seems to be an effective tool for evaluation of housing associations, other values included in financial statements should be evaluated than in the case of evaluation of companies and the obtained results of calculations should be often interpreted in a different way than in the case of companies.

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Raportowanie wskaźników finansowych przez polskie spółdzielnie mieszkaniowe – stan obecny i propozycja własna

Abstrakt: Artykuł jest efektem autorskiego badania empirycznego obejmującego problematykę oceny efektywności działania i kondycji ekonomiczno-finansowej spółdzielni mieszkaniowych za pomocą wskaźnikowej analizy sprawozdań finansowych. Celem artykułu jest identyfikacja i porównanie zakresu dobrowolnych ujawnień wskaźników finansowych w sprawozdaniach zarządu z działalności spółdzielni mieszkaniowych. Przedstawiono w nim kluczowe różnice pomiędzy przedsiębiorstwem a spółdzielnią mieszkaniową w odniesieniu do zasad sporządzania sprawozdań finansowych i ich oceny oraz funkcjonowania obu podmiotów. Dokonano również oceny sprawozdań finansowych spółdzielni mieszkaniowych pod względem ich możliwości w analizie finansowej, wskazując ograniczenia wynikające z najczęściej spotykanych zasad ich sporządzania. Badanie polegało na analizie porównawczej zawartości sprowadzania działalności. Łącznie badaniem objęto sprawozdania 100 spółdzielni mieszkaniowych działających na obszarze województw zachodniopomorskiego i łódzkiego. Poza ograniczeniem związanym z obszarem działalności dobór próby był przypadkowy. Z badanej próby tylko 27 ocen prezentowało wyniki efektywności działania i kondycji ekonomiczno-finansowej z zastosowaniem wyliczonych wskaźników finansowych na podstawie danych pochodzących ze sprawozdań finansowych. W badaniach w pierwszej fazie wykorzystano metodę dedukcji, w sposób ogólny wyznaczając zakres ujawnień w sprawozdaniach sporządzanych i publikowanych przez spółdzielnie mieszkaniowe na stronach internetowych. Zastosowana w końcowej fazie badań metoda indukcji pozwoliła sformułować ogólne wnioski. W przeprowadzonych badaniach w szczególności wykorzystano metody monografii, analizy treści, analizy opisowej, analizy porównawczej. W wyniku przeprowadzonych badań ustalono, że spółdzielnie mieszkaniowe dokonują często odmiennych wyborów odnośnie do rodzaju wskaźników, stosowanych formuł obliczeniowych czy ilości prezentowanych wskaźników. Wskaźniki płynności były najczęściej prezentowane. W wyniku przeprowadzonych badań dokonano obecnego stanu raportowania wskaźników finansowych przez spółdzielnie mieszkaniowe, odrzucono część wskaźników finansowych powszechnie stosowanych do oceny przedsiębiorstw i zaproponowano wskaźniki finansowe pozwalające ocenić kondycję i efektywność specyficznych jednostek, jakimi są spółdzielnie mieszkaniowe.

Słowa kluczowe: wskaźniki finansowe, raportowanie, spółdzielnie mieszkaniowe

The analysis of efficiency of selected contrarian strategies on the Warsaw Stock Exchange in the years 2014–2018

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Abstract: Capital multiplication is the main goal of investors and for many years they have been looking for methods and strategies that would enable them to achieve it to the greatest possible extent. Due to the fact that the expectations and characteristics of investors, including those concerning the investment period, are diverse, multiple strategies have emerged. One of such strategies, mainly long-term in nature, is the so-called contrarian investment, consisting in building the portfolio on the basis of selected shares with prices that have not been increasing recently, which has resulted in undervaluation in the context of otherwise relatively positive development prospects of the company. The aim of this article is to examine the efficiency of selected contrarian strategies on the Polish capital market in the years 2014–2018. The analysis was conducted for large companies, i.e. those included in the WIG30 index, and portfolios were constructed using 20% of companies with the lowest P/E and P/BV ratios. The efficiency of the strategy was examined on the basis of the value of portfolios and cumulative rates of return. It has been shown that investments made in accordance with contrarian strategies generate higher rates of return than the allocation of cash in the WIG30 index, which was the benchmark. Among the two investment strategies, much better results were achieved using the P/BV ratio.

Key words: financial investments, investing in value, contrarian strategies

1. Introduction

One of the key issues for investors is the possibility of outperforming the market, i.e. obtaining rates of return higher than those provided by market benchmarks. On the one hand, given the efficient market theory, this task is impossible in the long term. As a result, passive investment techniques have started to appear on the market, reflected i.a. by ETF funds, achieving rates of return similar to those of stock exchange indices. On the other hand, however, it appears that the markets fail to comply not only with the strong form of the efficiency hypothesis but also, fairly frequently, with its semi-strong version. As a consequence, within the framework of the behavioural

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finance trend, research has appeared on the occurrence of various anomalies (e.g. seasonal, fundamental or associated with overreactivity of the market) enabling the achievement of above-average rates of return (more information see: Zielonka, 2008; Szyszka, 2009; Czerwonka, Gorlewski, 2012). The discovery of these anomalies contributed to the development of appropriate investment strategies. One of them is the contrarian strategy. In the simplest terms, they consist in buying shares which have not been very popular among investors (and therefore are undervalued) and selling them when they find investors' recognition.

The main aim of this article was to examine the efficiency of contrarian strategies on the Polish capital market in the years 2014–2018. The analysis was conducted for large companies, i.e. those included in the WIG30 index, and portfolios were constructed using 20% of companies with the lowest P/E and P/BV ratios. The efficiency of the strategy was examined on the basis of the value of portfolio at the end of the period of analysis, as well as on the basis of the cumulative rates of return.

The study has been divided in the way described below. In addition to the introduction, a review of Polish and foreign literature on contrarian investment was presented. Then, the results of the author's own research, together with the methodology and conclusions, were presented. The final part is a summary.

2. Literature review

Contrarian investing can be short- and long-term in nature. The efficiency of the short-term contrarian strategies has been repeatedly verified both positively (Antoniou, Galariotis and Spyrou, 2006; Aspergen and Kahm, 2006, p. 26; Chou, Wei and Chung, 2007; Shi, Jiang and Zhou, 2015; Gharaibeh, Alown and Al Eitan, 2016) and negatively (Conrad, Gultekin and Kaul, 1997; Lee, Chan, Faff and Kalev, 2003). However, this paper focuses on long-term contrarian strategies that are consistent with the value investment trend. In the case of these concepts, investments are most often selected on the basis of the lowest values of market indicators showing the relation of market value to specific financial results and data. P/E and P/BV indicators or their reversals are used most frequently for these purposes. In more advanced, so-called eclectic contrarian strategies when selecting shares for a portfolio, apart from market indicators, other variables—reflecting the development prospects of companies—are also taken into account.

The first research on the effect of the P/E ratio on the American market known to the authors was carried out by S. F. Nicholson (1960). It showed that companies with lower values of this measure generate in the long run much higher rates of return than companies with high levels of P/E ratio. Other studies confirming the efficiency of contrarian strategies on the American market have been published i.a. by S. Basu (1977), E. Fama and K. French (1992), J. Lakonishok, A. Shleifer and R.W. Vishny (1994), and D. Dreman (1998), who also launched contrarian investment funds. The profitability of these strategies has been positively verified also in many other markets outside the USA (Brouwer, van der Put and Veld, 1996; Fama and French, 1998; Anderson and Brooks, 2006; Kadoya, Kuroko and Namatame, 2008; Truong, 2009; Sezgin, 2010; Aravind, 2016, pp. 103–106). Moreover, several Polish studies also confirmed the efficiency of contrarian strategies (Łętocha, 2001 as in: Zielonka, 2006; Kowerski, 2006; Prusak, 2008; Czechowski and Pochmara, 2014; Mościborska, 2015; Lewandowicz and Borowski,

2015).[1] Nevertheless, it should also be mentioned that both in Poland and abroad analyses were carried out which showed that these strategies did not work (Banz and Breen, 1986; Buczek, 2005; Tedeschi, Ribeiro and Eid Jr., 2009; Sekuła, 2015; Alajbeg, Bubaš and Švajhler, 2016).[2]

The above review of literature studies shows that the results obtained with contrarian strategies are not unambiguous, however in most cases the possibility of obtaining above-average rates of return using them has been positively verified.

3. The efficiency of selected contrarian strategies on the Warsaw Stock Exchange—own research

3.1. The methodology of research

The main objective of the study is to assess the efficiency of selected contrarian strategies in the Polish capital market. Efficiency is in this paper understood as the ability to obtain higher rates of return from the so-called benchmark, i.e. the reference base. Only large companies listed on the Warsaw Stock Exchange were taken into account in the research. Due to the fact that the WIG20 index covers a relatively small number of companies, attention has been focused on those included in a broader index, i.e. WIG30. Considering that the WIG30 index is quoted starting from 23 September 2013 and the analysis takes into account only annual time intervals, the years 2014–2018 were assumed as the research period (from 30 December 2013 to 28 December 2018). The rate of return on the WIG30 index was used as a benchmark to assess the efficiency of contrarian strategies. Taking into account the research conducted so far in Poland and abroad, the following research hypothesis has been proposed: "The application of selected contrarian strategies to investments in large listed companies generates a higher rate of return than the benchmark, i.e. the WIG30 index."

In the case of contrarian strategies, two variants have been used. They differed as regards the criterion of selecting companies for the portfolio. In the first variant, shares in companies with the lowest non-negative P/E ratio were selected, calculated as a relation of the closing price as at the last session day of a calendar year to the annual net profit (obtained in the period from the fourth quarter of the previous year to the third quarter of the given year) per share. The second variant assumed the selection of shares based on the lowest possible P/BV ratio, i.e. the ratio of the closing price as at the last session day of a calendar year to the company's book value as at the end of the third quarter. The survey takes into account data available at the end of the third rather than fourth quarter of a given year, as the latter are available only in the following calendar year. While applying the contrarian strategies, regardless of the variant, 20% of companies included in the WIG30 index, fulfilling the adopted selection criterion to the greatest extent, were invested in. Such analyses often

[1] The efficiency of contrarian strategies built on the basis of P/E and P/BV indicators was confirmed only for some periods in the paper entitled *Relationship between P/E ratio, P/BV ratio and market capitalization and common stock returns: The evidence for the Warsaw Stock Exchange* (Zarzecki, Byrka and Kozłowska-Nalewaj, 1998). The research conducted by Czekaj, Woś and Żarnowski (2001, pp. 116–131) showed the occurrence of above-average rates of return when using the P/E ratio to build a portfolio, while the use of the P/BV market measure failed to bring the expected positive results.

[2] A detailed description of the results of research on the efficiency of contrarian strategies in Poland and abroad was presented in the book entitled *Wskaźniki rynku kapitałowego – zastosowanie w wycenach przedsiębiorstw oraz strategiach inwestycyjnych* (Prusak, 2012, pp. 102–129).

assume the level of 10% but due to the limited number of companies included in the WIG30 index, a decision was made to increase it. Choosing the 10% threshold would result in the selection of only 3 companies for the portfolio, which would, on the one hand, involve high risk, and on the other hand, could be largely accidental in nature. The investment portfolio was rebalanced every year.

In both variants, both at the beginning of the investment and at each portfolio rebalancing, an equal distribution of free funds between the purchased assets was sought. The initial investment amount is 100,000 PLN. After the five-year investment period, the assets held were sold. A commission of 0.3% was taken into account for each purchase and sale transaction.

The analysis was based on the closing prices published on the WSE website and the BiznesRadar.pl portal, as well as on the information on the book value and net profit of companies provided by the Bankier.pl. and BiznesRadar.pl financial portals.

3.2. Results and conclusions

First of all, the analysis was carried out using the P/E ratio as the criterion for selecting companies for the portfolio. Its results are presented in Tables 1 to 5. Each table presents the value of the price/ earnings parameter, the number of shares of individual companies, the value of shares of a given entity at the beginning and at the end of the investment stage covering one year, as well as the total value of the entire portfolio and the financial result.

Table 1 presents the structure of the portfolio in the first year of investment. Shares of the following six companies were purchased: Tauron Polska Energia S.A., Polskie Górnictwo Naftowe i Gazownictwo S.A., KGHM Polska Miedź S.A., Grupa Azoty S.A., Enea S.A. and PGE Polska Grupa Energetyczna S.A. At the end of the investment stage, a profit of about 3,800 PLN was recorded.

Table 1. Investment results according to the contrarian strategy using the P/E ratio in the first year of the analysis (2014)

Company	P/E	Volume [pcs.]	Price [PLN/ piece] 30.12.2013	Value [PLN] 30.12.2013	Price [PLN/piece] 30.12.2014	Value [PLN] 30.12.2014	Result [PLN]
TAURONPE	5.46	3,802	4.37	16,614.74	5.05	19,200.10	2,585.36
PGNIG	7.15	3,225	5.15	16,608.75	4.45	14,351.25	–2,257.50
KGHM	7.38	141	118.00	16,638.00	108.85	15,347.85	–1,290.15
ENEA	7.77	1,221	13.60	16,605.60	15.20	18,559.20	1,953.60
GRUPA AZOTY	8.20	266	62.50	16,625.00	63.30	16,837.80	212.80
PGE	8.90	1,020	16.28	16,605.60	18.89	19,267.80	2,662.20
			Free funds [PLN]	3.22	—	3.22	—
			Total [PLN]	99,700.91	—	103,567.22	3,866.31

S o u r c e: Authors' own elaboration.

Table 2 presents the structure of the portfolio in the second year of investment. Shares in Polskie Górnictwo Naftowe i Gazownictwo S.A., Grupa Azoty S.A. and PGE Polska Grupa Energetyczna S.A. were sold, and shares in Energa S.A., Asseco Poland S.A. and Kernel Holding S.A. were purchased. The value of Kernel Holding S.A. shares increased by approximately 11,500 PLN, however at the end of this investment stage a total loss of approximately 13,500 PLN was observed. The portfolio's rate of return was at the level of –10.25%.

Table 2. Investment results according to the contrarian strategy using the P/E ratio in the second year of the analysis (2015)

Company	P/E	Volume [pcs.]	Price [PLN/piece] 30.12.2014	Value [PLN] 30.12.2014	Price [PLN/piece] 30.12.2015	Value [PLN] 30.12.2015	Result [PLN]
ENEA	7.60	1,221	15.20	18,559.20	11.30	13,797.30	–4,761.90
TAURONPE	7.77	3,802	5.05	19,200.10	2.88	10,949.76	–8,250.34
KGHM	8.79	141	108.85	15,347.85	63.49	8,952.09	–6,395.76
ENERGA	9.93	726	23.03	16,719.78	12.64	9,176.64	–7,543.14
ASSECOPOL	10.58	328	51.00	16,728.00	56.80	18,630.40	1,902.40
KERNEL	11.07	587	28.46	16,706.02	48.10	28,234.70	11,528.68
			Free funds [PLN]	4.44	—	4.44	—
			Total [PLN]	103,265.39	—	89,745.33	–13,520.06

S o u r c e: Authors' own elaboration.

Table 3 presents the structure of the portfolio in the third year of investment. Shares in Asseco Poland S.A. were sold and shares in Lubelski Węgiel Bogdanka S.A. were included in the portfolio. At the end of this investment stage, a profit of about 28,600 PLN was observed, and the value of the portfolio amounted to almost 118,300 PLN. Among the six companies comprising the portfolio, the most significant price increase was observed in the case of Lubelski Węgiel Bogdanka S.A.

Table 3. Investment results according to the contrarian strategy using the P/E ratio in the third year of the analysis (2016)

Company	P/E	Volume [pcs.]	Price [PLN/piece] 30.12.2015	Value [PLN] 30.12.2015	Price [PLN/piece] 30.12.2016	Value [PLN] 30.12.2016	Result [PLN]
KERNEL	3.94	587	48.10	28,234.70	63.85	37,479.95	9,245.25
TAURONPE	4.17	3,802	2.88	10,949.76	2.85	10,835.70	–114.06
BOGDANKA	4.84	557	33.21	18,497.97	69.50	38,711.50	20,213.53

ENEA	5.49	1,221	11.30	13,797.30	9.50	11,599.50	–2,197.80
ENERGA	6.02	726	12.64	9,176.64	9.10	6,606.60	–2,570.04
KGHM	6.69	141	63.49	8,952.09	92.48	13,039.68	4,087.59
			Free funds [PLN]	25.48	—	25.48	—
			Total [PLN]	89,633.94	—	118,298.41	28,664.47

S o u r c e: Authors' own elaboration.

Table 4 presents the structure of the portfolio in the fourth year of investment. Shares in Lubelski Węgiel Bogdanka S.A., Tauron Polska Energia S.A., Enea S.A., Energa S.A. and KGHM Polska Miedź S.A. were sold. Subsequently, the portfolio was updated to include shares in Globe Trade Centre S.A., PGE Polska Grupa Energetyczna S.A., Bank Millennium S.A., Polski Koncern Naftowy Orlen S.A. and mBank S.A. At the end of this investment stage, a return rate of 35.55% was recorded. The annual profit was about 17,700 PLN. The most advantageous was the investment in Bank Millennium shares, which increased the value of the portfolio by about 11,600 PLN. In this year, Kernel Holding S.A. was the only company to bring a loss. It amounted to less than 9,600 PLN.

Table 4. Investment results according to the contrarian strategy using the P/E ratio in the fourth year of the analysis (2017)

Company	P/E	Volume [pcs.]	Price [PLN/ piece] 30.12.2016	Value [PLN] 30.12.2016	Price [PLN/ piece] 29.12.2017	Value [PLN] 29.12.2017	Result [PLN]
GTC	6.46	1,959	8.20	16,063.80	9.80	19,198.20	3,134.40
KERNEL	6.81	587	63.85	37,479.95	47.52	27,894.24	–9,585.71
PGE	8.93	1,538	10.45	16,072.10	12.05	18,532.90	2,460.80
MILLENNIUM	10.18	3,096	5.19	16,068.24	8.94	27,678.24	11,610.00
PKNORLEN	10.76	188	85.30	16,036.40	106.00	19,928.00	3,891.60
MBANK	11.47	48	335.25	16,092.00	465.00	22,320.00	6,228.00
			Free funds [PLN]	2.54	—	2.54	—
			Total [PLN]	117,815.03	—	135,554.12	17,739.09

S o u r c e: Authors' own elaboration.

Table 5 presents the portfolio structure in the fifth, i.e. last, year of the investment. The shares in Kernel Holding S.A., Bank Millennium S.A. and mBank S.A. were sold. Tauron Polska Energia S.A., Jastrzębska Spółka Węglowa S.A. and Enea S.A. were qualified for the portfolio. At this stage of investment, a loss of more than 24,500 PLN was incurred. At the end of the last year of investment, the value of the portfolio amounted to approximately 110,500 PLN.

Table 5. Investment results according to the contrarian strategy using the P/E ratio in the fifth year of the analysis (2018)

Company	P/E	Volume [pcs.]	Price [PLN/piece] 29.12.2017	Value [PLN] 29.12.2017	Price [PLN/ piece] 28.12.2018	Value [PLN] 28.12.2018	Result [PLN]
TAURONPE	4.18	8,462	3.05	25,809.10	2.19	18,531.78	–7,277.32
PGE	5.22	1,538	12.05	18,532.90	10.00	15,380.00	–3,152.90
JSW	5.42	268	96.27	25,800.36	67.26	18,025.68	–7,774.68
ENEA	5.67	2,245	11.50	25,817.50	9.90	22,225.50	–3,592.00
GTC	6.53	1,959	9.80	19,198.20	8.19	16,044.21	–3,153.99
PKNORLEN	6.62	188	106.00	19,928.00	108.15	20,332.20	404.20
			Free funds [PLN]	2.10	—	2.10	—
			Total [PLN]	135,88.16	—	110,541.47	–24,546.69

S o u r c e: Authors' own elaboration.

After the five-year investment period, all the shares were sold. The value of the portfolio constructed according to the contrarian strategy using the P/E ratio amounted to 110,209.85 PLN. The rate of return on investment was 10.21%. The total amount of the commissions was 1993.26 PLN.

In the next stage, an analysis was carried out assuming the selection of companies using the P/BV ratio. Its results are shown in Tables 6 to 10. Each table presents the price/ book value ratio for each company, the number of shares, the value of shares of individual entities at the beginning and at the end of the investment stage covering one year, as well as the total value of the entire portfolio and the financial result.

Table 6 presents the structure of the portfolio in the first year of investment. Shares of the following six companies were purchased: Tauron Polska Energia S.A., Grupa Lotos S.A., Enea S.A., Polski Koncern Naftowy Orlen S.A., PGE Polska Grupa Energetyczna S.A. and Asseco Poland S.A. At the end of this investment stage, a profit of about 7,500 PLN was observed.

Table 6. Investment results according to the contrarian strategy using the P/BV ratio in the first year of the analysis (2014)

Company	P/BV	Volume [pcs.]	Price [PLN/piece] 30.12.2013	Value [PLN] 30.12.2013	Price [PLN/ piece] 30.12.2014	Value [PLN] 30.12.2014	Result [PLN]
TAURONPE	0.45	3,803	4.37	16,619.11	5.05	19,205.15	2,586.04
LOTOS	0.51	469	35.45	16,626.05	25.50	11,959.50	–4,666.55
ENEA	0.53	1,223	13.60	16,632.80	15.20	18,589.60	1,956.80
PKNORLEN	0.66	405	41.00	16,605.00	48.92	19,812.60	3,207.60

PGE	0.70	1,021	16.28	16,621.88	18.89	19,286.69	2,664.81
ASSECOPOL	0.73	361	45.97	16,595.17	51.00	18,411.00	1,815.83
			Free funds [PLN]	0.89	—	0.89	—
			Total [PLN]	99,700.90	—	107,265.43	7,564.53

S o u r c e: Authors' own elaboration.

Table 7 presents the structure of the portfolio in the second year of investment. The shares in Asseco Poland S.A., PGE Polska Grupa Energetyczna S.A. and Polski Koncern Naftowy Orlen S.A. were sold and the proceeds from such sale were allocated for the purchase of shares in Kernel Holding S.A., Jastrzębska Spółka Węglowa S.A. and Globe Trade Centre S.A. The annual profit was about 100 PLN. At the end of this investment stage, the rate of return at the level of 7.03% was achieved.

Table 7. Investment results according to the contrarian strategy using the P/BV ratio in the second year of the analysis (2015)

Company	P/BV	Volume [pcs.]	Price [PLN/piece] 30.12.2014	Value [PLN] 30.12.2014	Price [PLN/piece] 30.12.2015	Value [PLN] 30.12.2015	Result [PLN]
JSW	0.25	1,138	16.75	19,061.50	10.65	12,119.70	–6,941.80
LOTOS	0.38	469	25.50	11,959.50	27.00	12,663.00	703.50
TAURONPE	0.49	3,803	5.05	19,205.15	2.88	10,952.64	–8,252.51
ENEA	0.56	1,223	15.20	18,589.60	11.30	13,819.90	–4,769.70
KERNEL	0.69	670	28.46	19,068.20	48.10	32,227.00	13,158.80
GTC	0.74	3,531	5.39	19,032.09	7.15	25,246.65	6,214.56
			Free funds [PLN]	5.37	—	5.37	—
			Total [PLN]	106,921.41	—	107,034.26	112.85

S o u r c e: Authors' own elaboration.

Table 8 presents the structure of the portfolio in the third year of investment. Shares in Kernel Holding S.A., Grupa Lotos S.A. and Globe Trade Centre S.A. were sold. On the other hand, shares in Lubelski Węgiel Bogdanka S.A., KGHM Polska Miedź S.A. and PGE Polska Grupa Energetyczna S.A. were qualified for the portfolio. The annual profit amounted to approximately 93,400 PLN, and the entity that brought the best result was Jastrzębska Spółka Węglowa S.A., the shares of which increased their value by slightly more than 64,000 PLN during this stage of investment.

Table 8. Investment results according to the contrarian strategy using the P/BV ratio in the third year of the analysis (2016)

Company	P/BV	Volume [pcs.]	Price [PLN/piece] 30.12.2015	Value [PLN] 30.12.2015	Price [PLN/piece] 30.12.2016	Value [PLN] 30.12.2016	Result [PLN]
JSW	0.19	1,138	10.65	12,119.70	66.90	76,132.20	64,012.50
TAURONPE	0.27	3,803	2.88	10,952.64	2.85	10,838.55	–114.09
ENEA	0.39	1,223	11.30	13,819.90	9.50	11,618.50	–2,201.40
BOGDANKA	0.45	700	33.21	23,247.00	69.50	48,650.00	25,403.00
KGHM	0.49	366	63.49	23,237.34	92.48	33,847.68	10,610.34
PGE	0.59	1,816	12.79	23,226.64	10.45	18,977.20	–4,249.44
			Free funds [PLN]	11.50	—	11.50	—
			Total [PLN]	106,614.72	—	200,075.63	93,460.91

S o u r c e: Authors' own elaboration.

Table 9 contains the structure of the portfolio in the fourth year of investment. Shares in Jastrzębska Spółka Węglowa S.A., Lubelski Węgiel Bogdanka S.A. and KGHM Polska Miedź S.A. were sold, while shares in Energa S.A., Orange Polska S.A. and PKP Cargo S.A. were purchased. The shares in all the companies increased their value, which resulted in an annual profit of about 38,800 PLN.

Table 9. Investment results according to the contrarian strategy using the P/BV ratio in the fourth year of the analysis (2017)

Company	P/BV	Volume [pcs.]	Price [PLN/piece] 30.12.2016	Value [PLN] 30.12.2016	Price [PLN/piece] 29.12.2017	Value [PLN] 29.12.2017	Result [PLN]
TAURONPE	0.31	3,803	2.85	10,838.55	3.05	11,599.15	760.60
ENEA	0.35	1,223	9.50	11,618.50	11.50	14,064.50	2,446.00
ENERGA	0.43	5,778	9.10	52,579.80	12.73	73,553.94	20,974.14
PGE	0.47	1,816	10.45	18,977.20	12.05	21,882.80	2,905.60
ORANGEPL	0.61	9,540	5.51	52,565.40	5.79	55,236.60	2,671.20
PKPCARGO	0.67	1,118	47.00	52,546.00	55.10	61,601.80	9,055.80
			Free funds [PLN]	1.22	—	1.22	—
			Total [PLN]	199,126.67	—	237,940.01	38,813.34

S o u r c e: Authors' own elaboration.

Table 10 presents the portfolio structure in the fifth, i.e. last, year of the investment. Shares in Orange Polska S.A. were sold. Asseco Poland S.A. took its place in the portfolio and these were the only securities that brought a profit at this stage of investment. The total annual loss amounted to less than 41,000 PLN. At the end of the fifth year, the value of the portfolio was approximately 196,700 PLN.

Table 10. Investment results according to the contrarian strategy using the P/BV ratio in the fifth year of the analysis (2018)

Company	P/BV	Volume [pcs.]	Price [PLN/piece] 29.12.2017	Value [PLN] 29.12.2017	Price [PLN] 28.12.2018	Value [PLN] 28.12.2018	Result [PLN]
TAURONPE	0.30	3,803	3.05	11,599.15	2.19	8,328.57	–3,270.58
ENEA	0.40	1,223	11.50	14,064.50	9.90	12,107.70	–1,956.80
PGE	0.49	1,816	12.05	21,882.80	10.00	18,160.00	–3,722.80
ENERGA	0.57	5,778	12.73	73,553.94	8.91	51,481.98	–22,071.96
ASSECOPOL	0.65	1,248	43.98	54,887.04	46.12	57,557.76	2,670.72
PKPCARGO	0.75	1,118	55.10	61,601.80	43.90	49,080.20	–12,521.60
			Free funds [PLN]	20.41	—	20.41	—
			Total [PLN]	237,609.64	—	196,736.62	–40,873.02

S o u r c e: Authors' own elaboration.

After the five-year investment period, all the shares were sold. The value of the portfolio constructed according to the contrarian strategy using the P/BV ratio amounted to 196,146.47 PLN. The rate of return on investment amounted to 96.15%. The total amount of commissions was 2932.14 PLN.

Figure 1 shows the comparison of the values of portfolios constructed according to two variants of the contrarian strategy and the WIG30 index as a benchmark. During the first two years of the period under examination, the values of the two contrarian portfolios were close to the initial amount and the return on variant P/BV, unlike the return on variant P/E, remained positive. In 2016 and 2017, there was a rapid increase in the value of the portfolio constructed according to the variant taking into account the P/BV ratio, resulting mainly from approximately 64,000 PLN of profit on the shares of Jastrzębska Spółka Węglowa S.A., over 25,000 PLN of profit on the shares of Lubelski Węgiel Bogdanka S.A. and almost 21,000 PLN of profit on the shares of Energa S.A. During this period, the value of the portfolio taking into account the P/E ratio was also characterized by an upward trend, although weaker than in the case of the P/BV variant—it was caused primarily by the allocation of capital in the shares of Lubelski Węgiel Bogdanka S.A. and Bank Millennium S.A. Both portfolios reached their maximum value at the end of 2017. For the first variant it amounted to about 135,500 PLN, and for the second variant it amounted to almost 238,000 PLN. In 2018

there was a decrease in the value of portfolios, as a result of which, at the end of the investment period and upon the sale of the securities, the value in the variant assuming the selection of companies using the P/BV ratio amounted to approximately 196,000 PLN, while the value in the variant taking into account the P/E ratio amounted to approximately 110,000 PLN. At the end of the five-year investment period both portfolios were characterized by a positive rate of return, while the variant using the P/BV ratio as a criterion for selecting companies generated a much higher profit than the variant taking into account the P/E ratio.

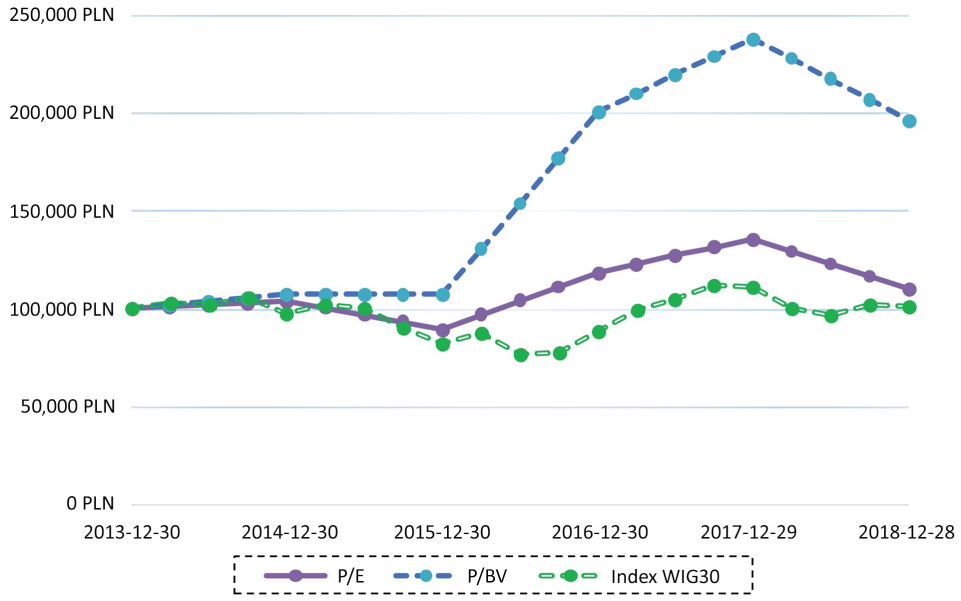

Figure 1. The comparison of the value of portfolios constructed according to selected contrarian strategies and the WIG30 index

S o u r c e: Authors' own elaboration.

While comparing the contrarian strategies developed on the basis of P/E and P/BV indicators to the benchmark, it can be noticed that the results obtained using the former are only slightly better than the rate of return brought by the WIG30 index. Significantly higher rates of return were generated using the strategy based on the P/BV ratio. It may also be noted that none of the readings of the cumulated annual rates of return in the case of the contrarian strategies was lower than the rate of return from the benchmark.

4. Conclusion

Investing in value over a longer period of time using contrarian strategies usually generates higher rates of return than market benchmarks. The research carried out and presented in this article allowed us to confirm the research hypothesis presented in this paper. Both selected

contrarian strategies generated higher rates of return in the period considered in relation to the WIG30 benchmark. However, the P/BV strategy proved to be more efficient, as it resulted in a much higher rate of return. It should also be noted that contrarian investment usually works well in longer periods, whereas in short intervals it can generate rates of return lower than those of the relevant benchmark. It is therefore a strategy that requires from the investor patience and high resilience, as well as readiness to accept losses in short periods of time. It is worth noting that most studies assume the application of contrarian strategies based on taking long positions (betting on the increase in stock prices). In the future, consideration could also be given to studies in which the opposite strategy is assumed, i.e. profiting from falling stock prices (taking a short position). Then, instead of shares in undervalued companies, one should look for those that are overvalued, i.e. characterized by high values of P/E and P/BV ratios and at the same time not very favourable growth forecasts. Other issues requiring in-depth research include: determination of the time interval of portfolio rebalancing; the problem of portfolio diversification and taking into account the growth forecasts of the analyzed companies (low or high values of market indicators may result from the fact that the growth prospects of companies are different and not from the fact that some companies are undervalued and others overvalued).

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Analiza skuteczności wybranych strategii kontrariańskich na warszawskiej GPW w latach 2014–2018

Abstrakt: Pomnażanie kapitału jest głównym celem inwestorów i od wielu lat poszukują oni metod oraz strategii, które w jak największym stopniu pozwolą im zrealizować ten cel. W związku z tym, iż oczekiwania oraz charakterystyki inwestorów, między innymi co do okresu inwestycji, są zróżnicowane, pojawiło się wiele strategii. Jedną z takich strategii, głównie długookresowych, jest inwestowanie przeciwstawne, czyli kontrariańskie, polegające na wyborze do portfela takich akcji, których ceny w ostatnim okresie nie wzrastały i są one niedowartościowane, a z drugiej strony perspektywy ich rozwoju są względnie pozytywne. W niniejszym artykule za cel postawiono sobie zbadanie skuteczności strategii kontrariańskich na polskim rynku kapitałowym w latach 2014–2018. Analiza została przeprowadzona dla dużych spółek, tj. wchodzących w skład indeksu WIG30, a portfele były konstruowane przy wykorzystaniu 20% przedsiębiorstw o najniższych wskaźnikach P/E i P/BV. Skuteczność strategii została zbadana na podstawie wartości portfeli oraz skumulowanych stóp zwrotu. Wykazano, że inwestycje dokonywane według strategii kontrariańskich generują wyższe stopy zwrotu niż alokacja środków pieniężnych w indeks WIG30, który stanowił benchmark. Spośród dwóch strategii inwestycyjnych znacznie lepsze wyniki uzyskano przy wykorzystaniu wskaźnika P/BV.

Słowa kluczowe: inwestycje finansowe, inwestowanie w wartość, strategie kontrariańskie

Split payment mechanism in the economy of small and medium-sized enterprises

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Abstract: The size and stability of VAT revenues is extremely important for conducting financial policy. European countries take various initiatives, due to the overall amount of tax fraud. The purpose of the discussion conducted in the article is to analyze the essence of the split payment mechanism (SPM) as an instrument to combat tax fraud and evaluate it from the point of view of: construction of tax regulations and benefits in connection with its use by business units and from the perspective of the small and medium-sized enterprises. The article uses a critical analysis of legal acts and the method of structured interviews with owners of small and medium enterprises. The conclusion of these considerations is that SPM is negatively assessed by most of the units surveyed and causes practical problems in their functioning. Solutions that the legislator can introduce to make the split payment mechanism more attractive for Polish entrepreneurs were presented. In November 2019, a mandatory split payment for selected goods and services will be introduced, and so far the VAT amendment causes problems with financial fluidity of enterprises. It also turns out that the tax incentives proposed by the legislator are not adequate in relation to the problems encountered when performing split payment operations. The experiences of other European countries in combating tax fraud by introducing SPM were recalled. Further analysis of the effectiveness of this solution should take into account its impact on the functioning and financial fluidity of enterprises.

Key words: split payment, VAT, SME sector, tax gap

1. Introduction

Tax on goods and services is the largest source of income for the Polish budget. The amount and stability of revenue from this tax is essential for conducting responsible financial policy. The VAT system, although based on self-control of taxpayers, has proved to be vulnerable in terms of tax fraud due to, among others, a complex mechanism of settling taxpayers with tax authorities, which significantly reduces its efficiency (Neal, 2007). The topic of the tax gap in the Eu-

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ropean perspective is also a matter of concern for the European Commission, which pays particular attention to the core of the problem and calls for decisive steps to be taken in order to reduce its scale (European Commission, 2016). In Poland, certain solutions designed to counteract the widening VAT gap began to be introduced starting from 2015. They were supposed not only to stop but also to significantly reduce this negative phenomenon. However, both in Poland and many other European Union countries, the practice of applying a single solution, e.g. reverse charge mechanism, has shown that tax fraudsters continue to resort to other services or goods which are not covered by this mechanism. (Szlęzak-Matusewicz, 2015). In 2016, an additional obligation to report VAT registers in the standardized Standard Audit File for Tax format was introduced. A package of organized data concerning business transactions is forwarded to the tax administrative body every month in an electronic form, with the data downloaded directly from the financial and accounting systems of the given business unit. From July 1, 2018, a split payment mechanism (further referred to in this paper as SPM) started to be applied in Poland, assuming that the acquirer of goods or services transfers to the seller's ordinary account only the net value of the payment. The equivalent of tax on goods and services goes to the VAT account of the taxpayers, from which they pay the contractor's due tax, and settles with the tax office.

The purpose of the discussion conducted in this paper is to analyze the essence of the split payment mechanism as a means to fight tax fraud and to evaluate it from two points of view:

- the construction of tax regulations and benefits resulting from its application by business entities;
- small and medium-sized enterprises sector.

For the abovementioned purposes of the article, the following hypotheses were adopted:

- the majority of the surveyed entities from the SME sector negatively evaluate the split payment mechanism as an instrument to fight tax fraud;
- split payment mechanism causes real-life problems in the functioning of small and medium enterprises;
- tax incentives proposed by the legislator are not adequate in proportion to the problems encountered when performing split payment operations.

The article consists of a theoretical part, which includes a review of the literature related to the essence of tax fraud and split payment mechanism, and an empirical part, in which the research area is characterized, followed by the results of the research: problems encountered when applying the SPM and their possible implications. To date, no such studies have been carried out. As a conclusion to the considerations, the article summarizes the literature review as well as the most significant research results and offers proposals of actions that the legislator may apply to improve the split payment system

2. VAT fraud — the core of the problem

In Polish law, the concept of the VAT gap has not been defined. The term is only of a scholarly nature; its scope and methodology have been developed by individual tax administrations or international organizations (International Monetary Fund, OECD). According to the Financial Policy Institute of the Ministry of Finance of the Slovak Republic, "the tax gap is

the difference between the tax which is actually paid and the tax that would have been paid if all natural persons and corporate entities had declared their activities and transactions in a proper way, in accordance with the letter of the law and the intention of the employer (the spirit of law)" (Sarnowski and Selera, 2018). The gap consists of losses incurred by the state budget as a result of the development of the grey area and fraudulent practices of VAT refunds in intra-community transactions. The ones who pay the price are the State Treasury and honest employers, who must keep up with enterprises making profits from illegal trading.

Budget analysis based on recent years allows us to conclude that revenues from VAT constitute over 40% of Polish budget (Prokop [ed.], 2018, p. 20). Over the years, revenue from VAT was the following: in 2015—PLN 123 million, in 2016—PLN 127 million, in 2017—PLN 157 million (NIK, 2018). As a rule, VAT, first introduced in 1954 in France, is uncomplicated in its design. Its simplicity and the relatively easy way to distort the mechanism of collecting the tax have led to a rapid increase in VAT fraud in the entire European Union (Prokop [ed.], 2018, p. 21). Poland belongs to a group of member states in which the VAT gap has stayed at a high level in recent years. Within the framework of the Tax Administration Gap Analysis Program and the technical support provided to Poland, the International Monetary Fund has estimated the level of the VAT gap in 2010–2016 using its own RA-GAP methodology. It is based on a top-down analysis of potential VAT revenue using data from national accounts. According to this method, the VAT gap in Poland resulting from not obeying tax regulations increased from 21% of potential incomings to a peak value of 27% in 2013, and then fell to about 21% in 2016 (Kanar and Thackray, 2018). According to the European Commission report, 2012 was a year when the largest amount of the tax gap was recorded in Poland: PLN 43.1 billion, while in 2016 it decreased to PLN 34.9 billion (Sarnowski and Selera, 2018). According to a report from the Directorate General for Taxation and Customs (TAXUD), it was calculated that the VAT gap in 2015 in the entire European Union totalled to EUR 151.5 billion, which corresponds to 12.77% of lost revenues across the EU (Prokop [ed.], 2018, p. 23). The smallest level of tax gap was recorded in Sweden, and the largest in Romania, where the tax gap was 37% of potential revenues (Mitran, 2017).

In December 2016, the Ministry of Finance in Poland introduced a package of sealing solutions in terms of tax compliance. Among others, the package included extension of the reverse charge mechanism by further industries, electronic submission of VAT returns, increasing the sanctions for tax fraud, monthly summaries of intra-community summaries submitted electronically, and termination of quarterly returns (excluding small taxpayers). What is more, the legislator introduced the obligation to submit purchase and sale records electronically, the so-called Standard Audit File for Tax (SAF-T). The transaction records aid the tax authorities in calculating the amount of tax liabilities and automatically compare the value of input tax, based on the deduction for which the buyer of the service or goods is applying, with the relevant declaration on the tax due by the seller (Kanar and Thackray, 2018). Also, the mechanism of the so-called joint and several liability has been added to the legislative changes aimed at preventing tax fraud. According to this mechanism, in the case of supplying goods or services, the buyer is responsible for the seller's tax arrears in the proportionate tax falling on the suppliers on their behalf (PwC Polska, 2015).

3. Split payment mechanism

3.1. The essence of the split payment and its legal basis

Another tool designed to seal the tax system and increase the efficiency of VAT collection is the split payment mechanism. SPM was introduced with the act amending the act on tax on goods and services and some other acts (Act [Ustawa] of 15 December 2017). It allows buyers to pay the part of payment corresponding to VAT to the sellers special account. When making a business transaction with the purpose of tax extortion, the supplier cannot disappear quickly and withhold for his own benefit the VAT which is due to the tax office. In order to introduce the split payment mechanism, the provisions of Article 108a–108d were added to the Act on goods and services on 1 July 2018. In the light of these provisions, the use of the split payment mechanism is voluntary (Brzozowska, 2018). The VAT account is a special account opened by a bank or a cooperative savings and credit union together with the entrepreneur's business account. Natural persons doing business as sole traders and using checking and saving accounts will not have VAT accounts. The bank or the cooperative savings and credit union provides a VAT sub-account free of charge and no payment card is issued for this account (Bartosiewicz, 2018).

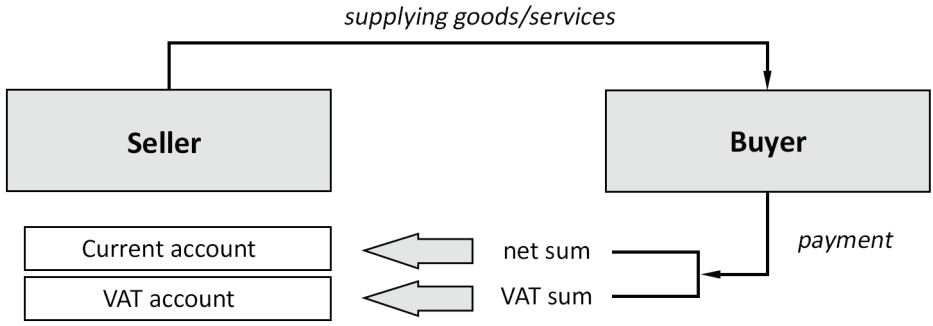


Figure 1. Split payment mechanism

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

Split payment mechanism in Poland (Bartosiewicz, 2018):
- is voluntary (except for industries dealing with sensitive goods and services—from November 2019);
- applies only to B2B transactions;
- applies only to transactions where VAT is charged on the invoice;
- applies only to transactions in the Polish currency;
- is used for individual invoices.

The law regulating SPM also introduced minor changes in the Accounting Act. In Annex 1 to the Act, in "Additional information and clarification" in section 1, point 18 has been added, which provides information on funds accumulated on the VAT account (PwC Polska, 2018).

The purpose of the introduction of regulations is to combat tax (such as carousel fraud) by reducing the risk of taxpayers disappearing together with the tax paid but not going to the state budget. Carousel fraud is also a major tax offense in other European Union countries. They cause significant budgetary losses. Enterprises performing carousel fraud do not pay VAT due or extort input VAT return. The intention of split payment mechanism is to protect honest taxpayers and liberate them from the risk of becoming involved in schemes that aim to extort the tax (Bartosiewicz, 2018). Also, SPM is a solution designed to ensure greater tax security, stability in running a business and maintaining competition rules.

3.2. Consequences and benefits of using split payments

According to the Polish Economic Institute, the use of split payment mechanism leads to a significant reduction the cost-effectiveness of carousel fraud and in the next few years will also lead to a complete disappearance of VAT fraud by means of fictitious transactions. It is estimated that within 10 years, the budget will gain about PLN 80 billion (Sarnowski and Selera, 2018). Despite the effects on the Treasury are positive, split payment mechanism has a negative impact on the financial liquidity of enterprises. This is mainly due to the limited ability to use the funds that are on the VAT account. In order to prevent taxpayers' negative attitude towards split payment mechanism, the legislator suggested a number of incentives to use this solution.

The first one is an accelerated tax refund—within 25 days from submitting the application. Obviously, the refund goes to the VAT account. An accelerated refund is provided at the taxpayer's request, which is submitted together with the tax declaration, and the application is valid if item 68 in the VAT-7 or VAT-7K declaration is ticked (Prokop [ed.], 2018, p. 124). Therefore, there is no need to submit a separate document. Despite the accelerated date of tax return, the fact of receiving it to the VAT account means a limited possibility of using these funds. The solution may be potentially profitable for entrepreneurs for whom, in a given period, a surplus of input VAT overdue tax is incidental. Such a taxpayer will be able to spend the amount accumulated on the VAT account to pay the VAT liability to the tax office. Nevertheless, a much simpler solution will be to transfer the excess tax amount to be settled to the following period. The result will stay the same, but the entrepreneur will be able to avoid administrative obligations, such as those related to making transfers. The benefits of accelerated VAT returns will not be felt by taxpayers for whom the surplus of input VAT overdue tax does not occur and for whom the largest group of expenses is, among others, purchasing goods and services exempt from VAT. The taxpayer may also submit an application for transferring funds from the VAT sub-account to the current business account. The decision concerning the possibility of transferring funds is discretionary, which means that the head of a given tax office may refuse such an operation. The decision has to be made by the tax authority within 60 days from submitting the application to transfer funds to the current business account. The deadline may be extended by verification of the validity of the return application (Prokop [ed.], 2018, p. 126).

Another "privilege" of taxpayers using the split payment mechanism is eliminating the possibility of applying VAT sanctions against these companies up to the amount corresponding to the amount of tax on the invoice that was paid using this mechanism. A single payment for a good or service in a split payment system is not equivalent to a general VAT exemption. Split payment also protects against the so-called 100% sanction. This sanction does not apply to arrears corresponding to the amount of tax resulting from a specific invoice paid in a split payment system. What does this mean? If entrepreneurs pay a "dummy invoice" using the split payment mechanism, they will avoid an additional 100% sanction. If they did not use this mechanism to pay such an invoice, even if they had paid all the other invoices in the split payment system, then this one invoice will result in an additional obligation—a 100% sanction (Prokop [ed.], 2018, pp. 128–131).

When paying to the VAT account, the taxpayer will not be jointly and severally liable for the contractor's tax debts. This may be essential for new or uncertain suppliers. The solution cannot be applied to an entrepreneur who was aware that the invoice paid using split payment was issued by a non-existent entity, was an apparent or invalid transaction, or states amounts inconsistent with reality. Therefore, if the purchasers are aware of fraud, they will not avoid joint and several liability.

Another benefit for the entrepreneur following the new VAT regulations is eliminating the application of the sanctioned interest rate. The condition for applying increased interest is that the tax authority identifies arrears as a result of control activities. Split payment is crucial in this respect. If the entrepreneur pays at least 95% of the value of VAT (shown in the declaration for a given settling period as input tax), then, as a rule, in the case of a possible disclosure of tax arrears for that period, increased sanction interest will not apply. However, it may apply if the tax arrears exceed twice the value of the input tax indicated in the submitted declaration and if the taxpayer was aware of committing tax fraud. The tax authority must prove that the taxpayer knew about the unreliability of invoices (Bartosiewicz, 2018, pp. 31–32).

Yet another advantage is the new method of calculating the liability to the tax office, if the liability is paid in full from the VAT account at an earlier date than the deadline for tax payment. The amount which the entrepreneur will be able to deduct from the tax will depend on the moment of paying VAT to the tax office. The sooner the tax is paid, the greater the reduction in tax will be. Unfortunately, benefiting from a small reduction requires more work from taxpayers, who will be obliged to submit a VAT declaration as soon as possible, and therefore—summarize their sales and collect invoices from suppliers, as well as have enough funds on the VAT sub-account to pay the tax to the authority in full.

In order to benefit from the split payment mechanism, a number of conditions must be met. First of all, taxpayers must continue to verify their supplier—among others, check the VAT taxpayers register or the data in the National Court Register. Businesses must remain vigilant and adapt to the changing environment of VAT compliance. To benefit from the privileges, more work on the VAT declaration is required. The advantages of an early settlement of obligations towards the tax office do not match the amount of work the payer has to do. Currently, the payment of PLN 10,000 VAT 10 days earlier will only save PLN 4 (the amount is calculated based on the formula provided in the tax regulations) (Chorzępa-Starosta, 2019). Nevertheless, taxpayers using the split payment mechanism will be able to prove due diligence much more easily.

3.3. Obligatory split payment

In July 2019, the Sejm (Polish Parliament) accepted a draft act on the mechanism of split payment. From 1 November 2019, the obligatory split payment in selected goods and services comes into force. SPM will be applied to 150 product and service groups defined in accordance with the Polish Classification of Products and Services (2008), such as construction services, electronics, coal, steel products, trade in parts for cars and motorcycles, precious metals and non-ferrous metals (PwC Polska, 2019). The obligation to apply the split payment will only apply to transactions of PLN 15,000 or more. For transactions below 15,000 general rules will apply—without the need for split payment (Maj, 2019). Entrepreneurs will be obliged to put on the invoices the record: "split payment mechanism". Noticing the problem of the decreasing liquidity of Polish enterprises, the legislator also proposes in the amendment to the Act that the entrepreneur could spend funds from the VAT account to pay income tax, excise tax and ZUS (Social Insurance Institution) contributions (Węgielska, 2019).

4. Split payment mechanism in the economy of small and medium-sized enterprises—survey conducted in Subcarpathian and Lesser Poland Voivodeships

The survey was conducted in July 2019 among small and medium enterprises from the Subcarpathian and Lesser Poland Voivodeships. The questionnaire was sent to a total of 60 enterprises from various industries in both voivodeships, and 35 entities (owners or persons responsible for finance and accounting of the business, e.g. the main accountant) replied. The research group was selected at random in order to increase the reliability of the study and achieve a complete picture of the problem being investigated. The survey does include natural persons conducting business who do not have a business account. Entrepreneurs with only a personal current account are not able to receive a split payment, and cannot pay their liabilities through split payment. For this reason, the responses of 5 natural persons running a business but not having a business account were not taken into account. Therefore, in order to verify research hypotheses, the answers of 30 entities that pay or receive payments in the split payment system are presented. Table 1 presents information on the surveyed entities and their size.

Table 1. Information about enterprises

Size of enterprise	Number of enterprises
Micro	7
Small	10
Medium	13

S o u r c e: Author's own elaboration based on conducted research.

In the survey questionnaire, respondents were asked the questions included in Table 2.

Table 2. Split payment mechanism in the economy of small and medium-sized enterprises

Questions	Do you settle payments in the split payment system?		Do other contractors pay you using the split payment mechanism?	
Possible answers	Yes	No	Yes	No
Number of responses	15	15	19	11

S o u r c e: Author's own elaboration based on conducted research.

Half of the surveyed business entities declared that they pay their liabilities in the split payment system, while 19 enterprises receive transfers from their contractors in the split payment system. The respondents were also asked for their opinion on the functioning of the split payment mechanism in the area of their business activities. The entrepreneurs' answers are presented in Figure 2.

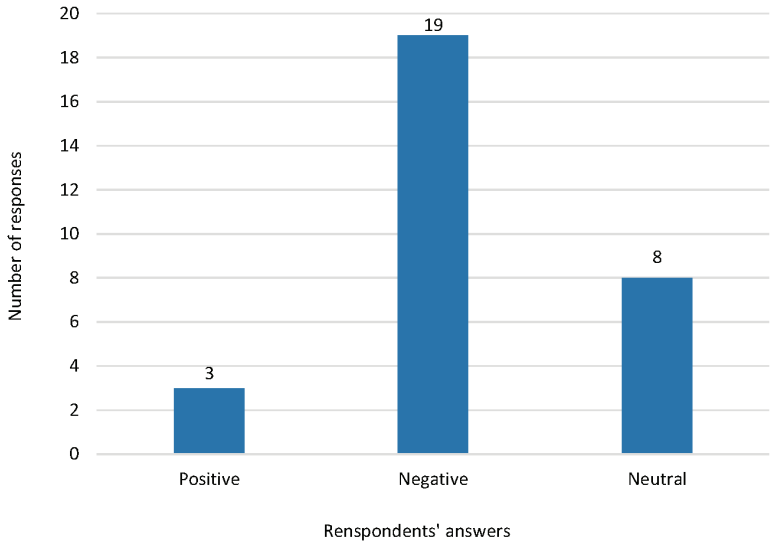
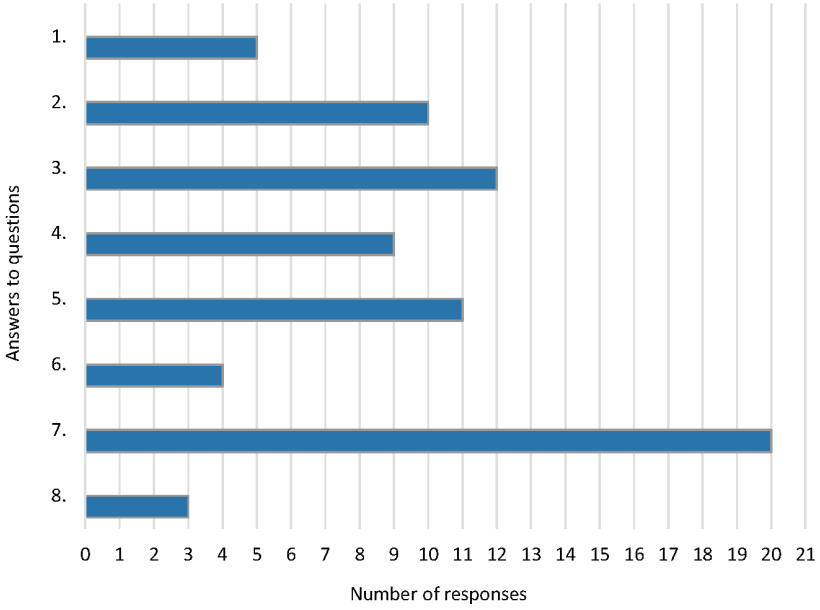


Figure 2. Opinions of the surveyed units on the split payment mechanism

S o u r c e: Author's own elaboration based on conducted research.

19 out of 30 enterprises surveyed assessed the split payment model negatively, 8 entities had a neutral attitude towards the changes, and 3 enterprises assessed the change positively. The result of the survey thus confirms the hypothesis that the majority of entities surveyed in the SME sector negatively assess the split payment mechanism as a tool to fight tax fraud. In the EY report from August 2018, the respondents' answers were similar, but the survey was

conducted before the VAT amendment. Over two thirds of respondents[1] were also negative about the changes (EY, 2018). As it has been mentioned earlier, the application of split payment results in many benefits after meeting a number of conditions, reduces tax fraud and gives competitive leverage to honest entrepreneurs. Still, SPM causes problems for entrepreneurs, which are presented in Figure 3. Business owners could indicate several difficulties related to split payment, if they encountered any of them.



Explanations for the chart (answers):
1. Adaptation of the IT and accounting system
2. Disturbance of the mechanism in the case of a number of operations, e.g. factoring, compensation, invoice corrections, bailiff seizures
3. No possible option of collective payment for several invoices
4. Concern of making a wrong transfer
5. Increased workload for making and booking transfers
6. Hardly readable bank statement
7. Limitation of available financed financing (disturbance of fluidity)
8. No problems were encountered

Figure 3. Problems encountered in applying the split payment mechanism.

S o u r c e: Author's own elaboration based on conducted research.

The first problem that was indicated most often when using split payments is the restricted use of the funds. The tax amount shown on the invoice is paid to the VAT account and cannot be used to settle any current liabilities other than VAT. The entrepreneur cannot allocate the money for investment or other expenses (e.g. paying off a loan) related to the company's operations.

[1] The research was conducted in June and July 2018 among 150 people who have an influence on the company's finances/ accounting.

Funds from this account may be transferred to the current account of the business, but only following the consent of the head of the tax office who has 60 days from submitting the relevant application to make a decision. Although payment in this system is voluntary, the decision is made by the purchaser of the service or goods, while the seller gets a split payment transfer regardless of whether he wants to use the system or not. Thus, it can be stated that the use of this mechanism is only seemingly voluntary. Restricting the funds results in a decrease of financial liquidity. Split payment deprives the entrepreneur of a certain part of the funds, and if a VAT payer applies a 23% rate, it constitutes more than one fifth of the value to settle their obligations. The use of split payment limits for three months the possibility to take a credit with the tax amount for small business entities settling accounts on a quarterly basis.

The split payment mechanism is only applicable to individual invoices, which means an increase in the number of transfers made. This problem was indicated by 12 surveyed enterprises. The result is an increase in the costs of handling obligations due to the fact that each transfer in the split payment system must be sent separately instead of sending them in the package of transfers as before. The legislator should think about the possibility of incoming and outgoing collective transfers, which would reduce the costs and time spent making payments and encourage the use of mechanism.

In order to apply the split payment model, certain modifications should also be made to the way of booking operations related to the crediting and debiting of the VAT account. It is recommended to create an account in the accounting books of a given company, which would be used for making transfers using the split payment mechanism, and which would record VAT operations. Also, greater expenditure on accounting services is to be expected. This results from the need to monitor incoming transfers to the VAT account and from possible corrections in case of incorrectly made transactions. Split payment transfers on a bank statement are reflected in two banking operations: posting the gross amount on the current account and transferring the tax amount to the VAT account. For this reason, the bank statement may be unclear which makes identification difficult.

If the entrepreneur makes a mistake by entering the wrong VAT amount in the transfer, the bank is not obliged to correct this amount. Therefore, in the event of a mistake in the amount of the transfer, it will be carried out in accordance with the data indicated in the transfer order. However, the transfer will not be carried out by the bank if it turns out that the entrepreneur does not have a VAT sub-account. In this case, the funds will be returned to the account of the person making the transfer.

The result of this study consists in the confirmation of the hypothesis that SPM causes practical problems in the functioning of small and medium-sized enterprises. According to research conducted among entrepreneurs in the SME sector in November 2018 by the economic information office BIG InfoMonitor, split payment mechanism, together with the uniform control file, is currently the most oppressive legal and tax regulation. As much as 58% of small and medium enterprises have not decided to use this solution (Otto, 2018). The biggest drawback of the new solution is a decrease in financial liquidity by limiting the possibility of using the funds on the VAT sub-account freely. It also turns out that the tax-related incentives proposed by the legislator are not proportionate to the problems encountered when performing split payment operations (Guziejewska and Zajączkowski, 2018, p. 142).

5. Conclusion

The VAT gap indicates effectiveness of VAT enforcement and compliance with its obligations. It provides approximate data on the amount of losses resulting from tax fraud, avoidance and tax evasion, bankruptcies, insolvency or mistakes in calculation (Tratkiewicz, 2016). The problem of tax fraud affects honest taxpayers who operate in the sectors afflicted with the largest scale of tax fraud. The grey area has a negative impact on market prices and reduces the credibility of entities operating in a given industry. In 2018, in order to fight tax fraud, the Ministry of Finance introduced a split payment system to the Polish economy. Based on previous analyses, SPM has great potential in terms of reducing the VAT gap (Deloitte, 2017). Unfortunately, it causes many problems for small and medium enterprises, and the surveyed entities from the Subcarpathian and Lesser Poland Voivodeships assess tax changes negatively. The system requires a number of improvements that would encourage its use. First of all, real-life inconveniences should be removed, such as the need to create separate transfers for each invoice. Many companies pay several hundred or thousands of invoices a day, using transfer packages. Therefore, such possibility needs to be offered to companies using split payment and to enable them to make collective transfers. This would save companies time and banking costs. Small enterprises make payments manually instead of using integrated systems, which are simply expensive. This significantly increases the waiting time. The problem lies in carrying out payments by small business owners themselves, as, unfortunately, the awareness of the importance of split payments is low and mistakes often occur. SPM should also be extended to settlements in foreign currencies and to pay VAT and customs duties on imported goods from the tax account. The current regulations also do not allow for free transfers of funds accumulated in VAT accounts, which are in different banks. If this inconvenience was removed, the financial liquidity of entrepreneurs would be improved. Another necessary improvement is also the combination of financial and accounting systems with a central taxpayer database and a central invoice database (Tratkiewicz, 2017). When starting to make a transfer, the system would automatically indicate whether the seller is a VAT payer and whether the invoice is actually in the database. Current regulations for those taxpayers who use the split payment mechanism assume 25 days for a tax refund to the VAT account. In order to encourage the use of SPM, the legislator should definitely shorten this period. To sum up the considerations presented in this paper, in order for the mechanism to be more encouraging for enterprises, they should be able to make collective transfers and settlement in foreign currencies in the split payment system, pay VAT and customs duties from the VAT sub-account, and freely transfer the funds accumulated on the VAT accounts in various banks. It is necessary to shorten time of the tax refund to the VAT account as much as possible and to combine financial and accounting systems with a central taxpayer and invoice base. These tools will improve the financial liquidity of enterprises, reduce the time of carrying out transfers, and thus encourage the use of SPM. This will bring mutual benefits for the state budget as well as for business entities.

The split payment mechanism has been applied in various ways and has achieved different results in European countries (Mitran, 2017). It is worth mentioning the experiences of Bulgaria, which in 2003 introduced a split payment as a tool to combat tax fraud, and then after

3 years began to withdraw from this reform. Taxpayer privileges in connection with the use of the mechanism instead of encouraging use have facilitated the development of fraud. Then again, positive budgetary effects of introducing split payments occurred in Italy (Tratkiewicz, 2017). Further analysis concerning the effectiveness of the split payment solution in Poland should first of all take into account its impact on the condition and financial liquidity of enterprises.

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Mechanizm podzielonej płatności w praktyce gospodarczej małych i średnich przedsiębiorstw

Abstrakt: Wielkość i stabilność wpływów z podatku VAT jest niezwykle istotna dla prowadzenia polityki finansowej. Państwa europejskie podejmują różne inicjatywy, by zmniejszyć skalę nadużyć podatkowych. Celem rozważań prowadzonych w artykule jest analiza istoty mechanizmu *split payment* jako instrumentu do zwalczania oszustw podatkowych oraz jego ocena z punktu widzenia: konstrukcji przepisów podatkowych i korzyści w związku z jego stosowaniem przez jednostki gospodarcze oraz z perspektywy sektora małych i średnich przedsiębiorstw. W opracowaniu posłużono się analizą aktów prawnych oraz zastosowano metodę ustrukturyzowanych wywiadów z właścicielami małych i średnich przedsiębiorstw. Wnioskiem niniejszych rozważań jest to, że mechanizm podzielonej płatności (MPP) jest oceniany negatywnie przez większość badanych podmiotów oraz sprawia praktyczne problemy w ich funkcjonowaniu. Przedstawiono rozwiązania, jakie może wprowadzić ustawodawca, by MPP był dla polskich przedsiębiorców bardziej atrakcyjny. W listopadzie 2019 roku zostanie wprowadzona obowiązkowa podzielona płatność dla wybranych towarów i usług, a dotychczas nowelizacja VAT powoduje problemy z płynnością finansową przedsiębiorstw. Okazuje się również, że zaproponowane przez ustawodawcę zachęty podatkowe nie są adekwatne w stosunku do problemów napotkanych przy dokonywaniu operacji *split payment*. W rozważaniach przywołano doświadczenia innych państw europejskich w zwalczaniu oszustw podatkowych poprzez wprowadzenie MPP. Przy dalszych analizach nad efektywnością rozwiązania powinno się uwzględnić jego wpływ na funkcjonowanie i płynność finansową przedsiębiorstw.

Słowa kluczowe: podzielona płatność, podatek VAT, sektor MŚP, luka podatkowa

Who expects high salaries? A pilot survey of salary expectations and academic achievements of Accounting and Controlling students*

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Abstract: University graduates are entering the labour market and they expect to be rewarded for their accumulated knowledge and skills. The levels of these assets vary. Students also differ in their salary expectations. The aim of the paper is to investigate the relationship between salary expectations of Accounting and Controlling students and their current educational achievements. The research methods used in this paper include: analysis and critique of literature, statistical tests (Shapiro–Wilk W test, Wilcoxon signed-rank test, Spearman rank correlation), econometric modelling (models are estimated by OLS and Huber/White robust standard errors are used to assess statistical significance of each parameter). We conduct a survey among full-time Accounting and Controlling students from Cracow University of Economics. Our pilot sample comprises of 59 respondents who are second year students. The analysis of our econometric models reveals that GPA and language certificates are significantly associated with expected salary. However, there is a puzzle which manifests itself in a negative relationship between expected salary and GPA, even after controlling for holding a foreign language certificate.

Key words: salary expectations, educational achievements, GPA, language certificate

1. Introduction

Tertiary education provides professional training in all fields of study, e.g. accounting, business, management, law, pharmacy, medicine. It is not an exaggeration to claim that university-level education allows to gain comprehensive training—starting at the basic level (bachelor), going through the intermediate level (master), and ending at the most advanced level (doctorate).

It is believed that employers reward professional knowledge and skills. Therefore university graduates may expect to receive a fair salary that would be adequate to their education and professional experience—compare Dobija (2011), Hołda and Ren-

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kas (2015), Kozioł (2011), Kozioł and Mikos (2019), Renkas (2013), Sulich (2015). By the same token current students may expect that they would receive such a salary after graduation. It is reasonable to assume that current students directly project their salaries through observation and expectation. The former are the observed salaries of the most recent graduates. These salaries are provided to current students by their older colleagues from the university and/ or by institutions preparing salary reports. The latter are current students' expectations of salaries for most recent graduates. These salaries are merely a guess, which may be an accurate or an inaccurate one.

Current students differ in terms of salary expectations for current graduates, as these are just suppositions and they cannot be identical among all students. However, some groups of students expect higher salaries than other groups. Salary expectations are subjective assessments of students self-worth at the labour market—the worth that is relevant to their knowledge and skills. The concept of self-esteem might incorporate—*inter alia*—the perception of employability.

The aim of the paper is to investigate the relationship between salary expectations of Accounting and Controlling students and their current educational achievements.

The research methods used in this paper include: (1) analysis and critique of literature; (2) statistical tests (Shapiro–Wilk W test—test for normality, Wilcoxon signed-rank test—test for the differences between medians, Spearman rank correlation—test for correlation between variables); (3) econometric modelling (regression analysis with Huber–White robust standard errors). The following software was used: *Stata/IC 14.1* for statistical tests and econometric modelling and *Microsoft Office Excel 2013* for initial data filtering and descriptive statistics.

We contribute to the scientific debate by measuring and explaining the relationship between Accounting and Controlling students' salary expectations and their educational achievements. In our research we include variables that were not investigated in Polish literature. Furthermore, we analyze the most recent data, which is important because of recent significant changes at the labour market. Our pilot survey findings are contrary to the current state of knowledge that better performers (i.e. students with higher GPA) should demand and expect higher salaries. We find out that students with higher GPA have lower salary expectations than students with lower GPA. This puzzle that emerges from the pilot survey requires further detailed studies, plans for which we outline at the end of the paper. We also find that students who hold a foreign language certificate demand and expect higher salaries, which would confirm the current state of knowledge that better performers (i.e. holders of foreign language certificates) should demand and expect higher salaries.

Results of our research are important for numerous groups of readers. Scientists who are examining salaries at the labour market may be interested in knowing the expectations of students. Current students may be interested in positioning their salary expectations compared to the group in which they are studying. Current students may be also interested in comparing the expectations of the whole group to the offers at the labour market. Employers may be interested in knowing the level of salaries expectations.

The paper is organized as follows: section 1 covers introduction, section 2 contains brief literature review, section 3 includes research methodology, section 4 describes data, section 5 analyzes results, and section 6 concludes. List of references follows the last section.

2. Related literature

A number of research studies confirm a positive correlation between self-esteem and academic performance[1] (Baumeister, Campbell, Krueger and Vohs, 2003, p. 10). Similarly, there is an evidence for a positive relationship between self-esteem and earnings (Drago, 2011, p. 480). Therefore it is reasonable to expect a positive correlation between academic performance and earnings. Research studies confirm such an association (Oehrlein, 2009, p. 22). GPA is a measure of academic performance. It is also known that GPA is a valid predictor of job performance (Roth, BeVier, Switzer III and Schippmann, 1996, p. 553). Roth and Clarke (1998, pp. 387–388) recall a number of reasons why grades should be related to salary. An interesting review of literature on the relationship between college grades and adult achievement is presented by Hoyt (1965). Interestingly, Thibadoux, Scheid and Teffeteller (2014, p. 143) argue that there are no significant differences between higher and lower GPA accounting graduates in regard to job and career satisfaction.

Poteralski (2008) analyzes students salary expectations from the first job and confronts these with threshold salary and satisfying salary. Salary expectations were not related to students achievements.

Jakubiak (2012) analyzes salary expectations in various conditions: just after graduation, 10 years after graduation, currently if a student quits university without graduation, 10 years after quitting studies without graduation. The author differentiates salaries expectations between genders, level of mother's education, level of father's education, material status. However, no econometric model was constructed.

Stańdo-Górowska (2014) confronts salary expectations with theoretical salary derived from the human capital theory. Similarly to other authors, Stańdo-Górowska did not relate salary expectations to students achievements.

Another analysis of students salary expectations was conducted by Sulich (2015), who researched a group of students from Wrocław University of Science and Technology. He noticed that respondents differ in their salary expectations depending on their faculty. The author did not relate salary expectations to students achievements.

Renkas (2018, pp. 32–35) analyzes expected salaries among people who were seeking employment in Ukraine. This author finds an association between expected salary (dependent variable) and age and years of professional education (independent variables).

3. Research methodology

The brief literature review leads us to the hypothesis that there should be observable positive relationship between salary expectations and academic achievements of Accounting and Controlling students. We operationalize the research hypothesis by measuring salary expectations and academic achievements of students and then evaluating the relationship among the variables. In order to measure the variables, we present students with a particular scenario and then ask them a number of questions. In order to measure salary expectations of students, we show them the following scenario and ask them a set of questions:

[1] Other noncognitive predictors of academic success are some of the Big Five personality factors. For example conscientiousness correlates with grades (Trapmann, Hell, Hirn and Schuler, 2007, p. 132).

A student graduates from Cracow University of Economics in 2019. The student has a full--time contract of employment. According to you what should be the minimum net salary that would be adequate to educational background and professional experience of a:

a) *graduate with a bachelor's degree in Accounting and Controlling without any professional experience in accounting, controlling or finance?*
b) *graduate with a bachelor's degree in Accounting and Controlling with three years of professional experience in accounting, controlling or finance?*
c) *graduate with a master's degree in Accounting and Controlling without any professional experience in accounting, controlling or finance?*
d) *graduate with a master's degree in Accounting and Controlling with three years of professional experience in accounting, controlling or finance?*

It is important to note that survey participants are current students of Accounting and Controlling major. Therefore, we may anticipate that the provided salaries are expectations of their future salaries that are given in current values (not to confuse it with present value or future value).

We measure educational achievements by two proxies: grade point average (GPA) and holding a foreign language certificate. GPA is the arithmetic average of all grades from the previous academic year. At Cracow University of Economics the following grading system scale is in force: one failing grade (2.0) and six passing grades (3.0, 3.5, 4.0, 4.5, 5.0, 5.5). If a student receives a failing grade, s/he has to retake the course and eventually has to receive a passing grade.

To empirically verify our general hypothesis, we set out four simple econometric models and four extended econometric models in which we control for holding a foreign language certificate, which is also one of the measures of student's commitment towards education. We present these models in Table 1.

Table 1. Econometric models

Simple models	
Simple Model 1a	$Salary\ B/NE=\beta_0+\beta_1\ GPA+\varepsilon$
Simple Model 2a	$Salary\ B/E=\beta_0+\beta_1\ GPA+\varepsilon$
Simple Model 3a	$Salary\ M/NE=\beta_0+\beta_1\ GPA+\varepsilon$
Simple Model 4a	$Salary\ M/E=\beta_0+\beta_1\ GPA+\varepsilon$
Extended models	
Extended Model 1b	$Salary\ B/NE=\beta_0+\beta_1\ GPA+\beta_2\ Certificate+\varepsilon$
Extended Model 2b	$Salary\ B/E=\beta_0+\beta_1\ GPA+\beta_2\ Certificate+\varepsilon$
Extended Model 3b	$Salary\ M/NE=\beta_0+\beta_1\ GPA+\beta_2\ Certificate+\varepsilon$
Extended Model 4b	$Salary\ M/E=\beta_0+\beta_1\ GPA+\beta_2\ Certificate+\varepsilon$

N o t e s: Salary B/NE—expected net salary for the graduate who completed Accounting and Controlling bachelor studies and does not have any professional experience (in PLN), Salary B/E—expected net salary for the graduate who completed Accounting and Controlling bachelor studies and has three years of professional experience (in PLN), Salary M/NE—expected net salary for the graduate who completed Accounting

and Controlling bachelor and master studies and does not have any professional experience (in PLN), Salary M/E—expected net salary for the graduate who completed Accounting and Controlling bachelor and master studies and has three years of professional experience (in PLN), GPA—grade point average, Certificate—holding a foreign language certificate (1—yes, 0—no).

S o u r c e: Authors' own deliberations.

4. Data description and initial analysis

The survey was conducted on 1 October 2019 among full-time students who studied Accounting and Controlling major at Cracow University of Economics (bachelor studies, second year, third semester). In total 100 questionnaires were distributed among participants of the Financial Accounting course. All of the students returned the questionnaires, however, not all of the questionnaires were fully filled out. There were 59 questionnaires which contained all required information that was necessary for this pilot research (41 questionnaires lacked some of the relevant answers, such as GPA).

Table 2 presents descriptive statistics (minimum, maximum, average, standard deviation—SD, coefficient of variation—CV, first quartile—Q1, median, third quartile—Q3, skewness, kurtosis, number of observations—n) for each of the variable in the analyzed sample. Salaries are given in PLN. Table 3 presents the outcome of normality test (Shapiro–Wilk W test) for all of the variables in the analyzed sample. All but one of the variables are not normally distributed. As one might expect it is GPA, which is normally distributed.

Table 2. Descriptive statistics of variables

Variable	Salary B/NE	Salary B/E	Salary M/NE	Salary M/E	GPA	Certificate
Minimum	2000	2500	2500	3000	3.44	0
Maximum	5000	8000	8000	15,000	5.11	1
Average	2954	4069	4164	5832	4.20	0.10
SD	671	1154	1023	2264	0.34	0.30
CV	22.7%	28.4%	24.6%	38.8%	8.1%	297.2%
Q1	2500	3500	3500	4500	4.00	0.00
Median	3000	4000	4000	5700	4.20	0.00
Q3	3000	4500	5000	7000	4.40	0.00
Skewness	1.0	1.3	1.0	2.2	0.0	2.7
Kurtosis	1.6	1.9	2.2	7.4	−0.2	5.5
n	59	59	59	59	59	59

N o t e s: Salary B/NE—expected net salary for the graduate who completed Accounting and Controlling bachelor studies and does not have any professional experience (in PLN), Salary B/E—expected net salary for the graduate who completed Accounting and Controlling bachelor studies and has three years of professional experience (in PLN), Salary M/NE—expected net salary for the graduate who completed Accounting and Controlling bachelor and master studies and does not have any professional experience (in PLN), Salary M/E—ex-

pected net salary for the graduate who completed Accounting and Controlling bachelor and master studies and has three years of professional experience (in PLN), GPA—grade point average, Certificate—holding a foreign language certificate (1—yes, 0—no). Descriptive statistics for Salaries are rounded to the nearest currency unit, whilst descriptive statistics for GPA and Certificate are rounded to two digits after a comma.

S o u r c e: Authors' own computations.

Table 3. Shapiro–Wilk W test results for variables

Variable	Salary B/NE	Salary B/E	Salary M/NE	Salary M/E	GPA	Certificate
p-value	0.00338	0.00025	0.00520	< 0.00001	0.96394	< 0.00001
Normality	Rejected	Rejected	Rejected	Rejected	Not rejected	Rejected

S o u r c e: Authors' own computations.

Average expected net salary for the graduate who completed Accounting and Controlling bachelor studies and does not have any professional experience equals to PLN 2954 (median equals to PLN 3000). Average expected net salary for the graduate who completed Accounting and Controlling bachelor studies and has three years of professional experience equals to PLN 4069 (median equals to PLN 4000). Average expected net salary for the graduate who completed Accounting and Controlling bachelor and master studies and does not have any professional experience equals to PLN 4164 (median equals to PLN 4000). Average expected net salary for the graduate who completed Accounting and Controlling bachelor and master studies and has three years of professional experience equals to PLN 5832 (median equals to PLN 5700).

All of the respondents valued professional experience[2] and education (compare Table 4). The difference between the expected salary for the graduate who completed Accounting and Controlling bachelor studies and has three years of professional experience and the expected net salary for the graduate who completed Accounting and Controlling bachelor studies and does not have any professional experience was positive and on average equalled to PLN 1115 (median difference equalled to PLN 1000 and was statistically significant at 1%). The difference between the expected salary for the graduate who completed Accounting and Controlling master studies and has three years of professional experience and the expected net salary for the graduate who completed Accounting and Controlling master studies and does not have any professional experience was positive and on average equalled to PLN 1668 (median difference equalled to PLN 1000 and was statistically significant at 1%). The difference between the expected salary for the graduate who completed Accounting and Controlling master studies and does not have any professional experience and the expected net salary for the graduate who completed Accounting and Controlling bachelor studies and does not have any professional experience was positive and on average equalled to PLN 1210 (median difference equalled to PLN 1000 and was statistically significant at 1%). The difference between the expected salary for the graduate who completed Accounting and Controlling master studies and has three years of professional experience and the expected net

[2] Contrary to our findings, H. Stańdo-Górowska (2014, p. 58) concludes that students do not value professional experience.

salary for the graduate who completed Accounting and Controlling bachelor studies and has three years of professional experience was positive and on average equalled to PLN 1763 (median difference equalled to PLN 1500 and was statistically significant at 1%). Surprisingly, respondents do not value education more than professional experience. The difference between the expected salary for the graduate who completed Accounting and Controlling master studies and does not have any professional experience and the expected net salary for the graduate who completed Accounting and Controlling bachelor studies and has three years of professional experience was positive and on average equalled to PLN 95. However, the median difference equalled to PLN 0 and was not statistically significant at 10%. In the analyzed sample: 29 respondents valued master studies with no professional experience more than bachelor studies with three years of professional experience, 19 respondents valued master studies with no professional experience less than bachelor studies with three years of professional experience, and 11 respondents valued master studies with no professional experience at the same level as bachelor studies with three years of professional experience.

Table 4. Mean and median differences for net salaries

Variable 1 less Variable 2	Mean difference	Median difference (p-value)
Experience vs. No experience		
Salary B/E less Salary B/NE	PLN 1115	PLN 1000 (p-value < 0.0001)
Salary M/E less Salary M/NE	PLN 1668	PLN 1000 (p-value < 0.0001)
Master vs. Bachelor		
Salary M/NE less Salary B/NE	PLN 1210	PLN 1000 (p-value < 0.0001)
Salary M/E less Salary B/E	PLN 1763	PLN 1500 (p-value < 0.0001)
Master no experience vs. Bachelor experience		
Salary M/NE less Salary B/E	PLN 95	PLN 0 (p-value = 0.1959)

N o t e s: Wilcoxon signed-rank test was used to verify statistical significance of median differences.

S o u r c e: Authors' own computations.

Table 5 presents rank correlation coefficients between variables accompanied by their statistical significance levels. All Spearman rank correlation coefficients for salaries are positive and highly statistically significant, which is an expected outcome for obvious reasons. It is, however, important that GPA is negatively correlated with all expected salaries and Certificate is positively correlated with all expected salaries. Correlations between GPA and all salaries (B/NE, B/E, M/NE, M/E) are statistically significant and correlations between Certificate and three salaries (B/E, M/NE, M/E) are statistically significant.

Table 5. Spearman rank correlation coefficients ρ

	Salary B/NE	Salary B/E	Salary M/NE	Salary M/E	GPA	Certificate
Salary B/NE	1	—	—	—	—	—
Salary B/E	$\rho = 0.8730^{***}$ < 0.0001	1	—	—	—	—
Salary M/NE	$\rho = 0.6657^{***}$ < 0.0001	$\rho = 0.7462^{***}$ < 0.0001	1	—	—	—
Salary M/E	$\rho = 0.6527^{***}$ < 0.0001	$\rho = 0.8532^{***}$ < 0.0001	$\rho = 0.7740^{***}$ < 0.0001	1	—	—
GPA	$\rho = -0.2646^{**}$ 0.0429	$\rho = -0.2238^{*}$ 0.0885	$\rho = -0.2825^{**}$ 0.0302	$\rho = -0.2631^{**}$ 0.0441	1	—
Certificate	$\rho = 0.1912$ 0.1469	$\rho = 0.2607^{**}$ 0.0461	$\rho = 0.3644^{***}$ 0.0045	$\rho = 0.2498^{*}$ 0.0564	$\rho = -0.2358^{*}$ 0.0722	1

N o t e s: First number represents Spearman rank correlation coefficient ρ. Second number represents p-value (*—statistically significant at 10%, **—statistically significant at 5%, ***—statistically significant at 1%).

S o u r c e: Authors' own computations.

5. Extended analysis of results

In this section we verify eight specific econometric models: four simple and four extended (in extended models we control for holding a foreign language certificate). Table 6 presents the results of the econometric modelling—simple econometric models. In all cases independent variable GPA is statistically significant, has a negative sign and magnitude between −537 (model 1a) and −2190 (model 4a). These results are puzzling, because students with higher GPA provide lower minimum net salaries that would be adequate to educational background and professional experience of a graduate from the same major, i.e. Accounting and Controlling. It is challenging to find a plausible explanation for this phenomenon. On the other hand, there are a number of reasons why the contrary outcome would be more likely. High GPA students are more conscientious and therefore should be more informed about the current labour market situation, which shows a deficit of employees in Poland (including Lesser Poland Voivodeship) in the area of accounting and bookkeeping (WUP Kraków, 2018, pp. 19, 24, 30). Furthermore, high GPA students should have a higher level of self-esteem and therefore they should expect higher salaries. A number of studies show a positive relationship between self-esteem and academic performance (Arshad, Zaidi and Mahmood, 2015, p. 161; Rosli, Othman, Ishak, Lubis, Saat and Omar, 2012, p. 582).

Table 6. Basic econometric models—results of estimation

Model	Simple Model 1a	Simple Model 2a	Simple Model 3a	Simple Model 4a
Variables	Dependent variable Salary B/NE	Dependent variable Salary B/E	Dependent variable Salary M/NE	Dependent variable Salary M/E
Independent variable GPA	**−537**** (247) p-value = 0.0337	**−858*** (454) p-value = 0.0638	**−911**** (361) p-value = 0.0146	**−2190**** (1051) p-value = 0.0416
Constant	5210*** (1063) p-value < 0.0001	7670*** (1970) p-value = 0.0003	7988*** (1567) p-value < 0.0001	15028*** (4605) p-value = 0.0019
n	59	59	59	59
R^2	0.0741	0.0637	0.0914	0.1079
F	F(1, 57) = 4.74** p-value = 0.0337	F(1, 57) = 3.57* p-value = 0.0638	F(1, 57) = 6.35 p-value = 0.0146	F(1, 57) = 4.34** p-value = 0.0416

N o t e s: for Independent variables and Constant rows the first number represents the estimated coefficient (the estimation was conducted with the OLS method) which is bolded for independent variables if the variable is statistically significant (*—statistically significant at 10%, **—statistically significant at 5%, ***—statistically significant at 1%), the second number shown in parentheses represents Huber–White robust standard errors and the third number represents p-value, n is the number of observations, R^2 is the coefficient of determination, F is the value of statistics F (below is the p-value).

S o u r c e: Authors' own computations.

Table 7 presents the results of the econometric modelling—extended econometric models. In all cases independent variable GPA has a negative sign, however, only in 3 out of 4 cases it is statistically significant (models 1b, 3b, 4b). In all cases independent variable Certificate has a positive sign, however, only in 2 out of 4 cases it is statistically significant (models 2b and 3b). Only in model 3b both GPA and Certificate are statistically significant. The results are similar to those presented in Table 6.

Summing up, the results visible in extended econometric models also suggest that students with higher grade point average on average expect lower net salary compared to students with lower grade point average—for example in case of model 3b, an increase in GPA by 1 point is on average associated with the decrease in the demanded net salary by PLN 684. On the other hand, students holding a foreign language certificate on average tend to expect higher net salary compared to students without a foreign language certificate—for example in case of model 3b, holding a foreign language certificate is on average associated with the increase in the demanded net salary by PLN 1383.

Table 7. Extended econometric models—results of estimation

Model	Extended Model 1b	Extended Model 2b	Extended Model 3b	Extended Model 4b
Variables	Dependent variable Salary B/NE	Dependent variable Salary B/E	Dependent variable Salary M/NE	Dependent variable Salary M/E
Independent variable GPA	**−437*** (239) p-value = 0.0723	−652 (432) p-value = 0.1365	**-684**** (318) p-value = 0.0359	**−1826*** (957) p-value = 0.0615
Independent variable Certificate	610 (394) p-value = 0.1275	**1254*** (638) p-value = 0.0541	**1383**** (528) p-value = 0.0113	2221 (1348) p-value = 0.1049
Constant	4729*** (1009) p-value < 0.0001	6680*** (1846) p-value = 0.0006	6897*** (1359) p-value < 0.0001	13275*** (4182) p-value = 0.0024
n	59	59	59	59
R^2	0.1471	0.1680	0.2527	0.1929
F	F(2, 56) = 2.66* p-value = 0.0788	F(2, 56) = 3.15* p-value = 0.0505	F(2, 56) = 6.31 p-value = 0.0034	F(2, 56) = 3.14* p-value = 0.0509

N o t e s: for Independent variables and Constant rows the first number represents the estimated coefficient (the estimation was conducted with the OLS method) which is bolded for independent variables if the variable is statistically significant (*—statistically significant at 10%, **—statistically significant at 5%, ***—statistically significant at 1%), the second number shown in parentheses represents Huber–White robust standard errors and the third number represents p-value, n is the number of observations, R^2 is the coefficient of determination, F is the value of statistics F (below is the p-value).

S o u r c e: Authors' own computations.

6. Conclusions, limitations and guidance for further research

We conducted a pilot survey among full-time students who studied Accounting and Controlling major at Cracow University of Economics (bachelor studies, second year, third semester). The analyzed sample comprised of 59 student-questionnaires (out of 100 distributed student-questionnaires).

We asked survey participants a number of questions concerning the minimum net salary that would be adequate to educational background and professional experience of a graduate with a bachelor's/ master's degree in Accounting and Controlling with/ without professional experience in accounting, controlling or finance.

Surprisingly, we found a puzzle by measuring a relationship between academic performance and expected salary. We observed that students with higher GPA provide lower minimum net salaries that would be adequate to educational background and professional experience of a graduate from the same major compared to students with lower GPA. An increase in GPA by 1.0 is on average associated with a decrease in expected net salary of PLN 437 for a graduate with a bachelor's degree in Accounting and Controlling without any professional

experience in accounting, controlling or finance, PLN 684 for a graduate with a master's degree in Accounting and Controlling without any professional experience in accounting, controlling or finance, PLN 1826 for a graduate with a master's degree in Accounting and Controlling with three years of professional experience in accounting, controlling or finance. Our research hypothesis that there should be an observable positive relationship between salary expectations and academic achievements of Accounting and Controlling students is in question. The obtained results are contrary to our initial conjectures. However, we also found that students who hold a foreign language certificate provide higher minimum net salaries that would be adequate to educational background and professional experience of a graduate from the same major compared to students who do not hold a foreign language certificate. These differences equal on average PLN 1254 for a graduate with a bachelor's degree in Accounting and Controlling with three years of professional experience in accounting, controlling or finance, and PLN 1383 for a graduate with a master's degree in Accounting and Controlling without any professional experience in accounting, controlling or finance.

The major limitation of our research findings is that it is just a pilot study and a limited number of students were surveyed. That leads us to the guidance for further research, which is to extend the research into a greater number of students and to include additional explanatory variables into the models, such as gender and professional experience.

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Kto oczekuje wysokich płac? Badanie pilotażowe oczekiwań płacowych i dokonań akademickich studentów rachunkowości i controllingu

Abstrakt: Absolwenci studiów wyższych oczekują adekwatnego wynagrodzenia do uzyskanych przez nich wiedzy i umiejętności, które różnią się pomiędzy studentami. Studenci różnią się także pomiędzy sobą oczekiwaniami płacowymi. Celem tego artykułu jest zbadanie zależności pomiędzy oczekiwaniami płacowymi studentów rachunkowości i controllingu a ich osiągnięciami akademickimi. W artykule zastosowano następujące metody badawcze: analiza i krytyka piśmiennictwa, testy statystyczne (test Shapiro-Wilka oraz test znakowanych rang Wilcoxona, korelacja rang Spearmana), modelowanie ekonometryczne (modele są estymowane metodą OLS, a statystyczna istotność parametrów jest określana z wykorzystaniem odpornych błędów Hubera-White'a). Przeprowadziliśmy badanie ankietowe wśród dziennych studentów kierunku rachunkowość i controlling z Uniwersytetu Ekonomicznego w Krakowie. Nasza pilotażowa próba badawcza obejmuje 59 respondentów, którzy są studentami drugiego roku. Analiza modeli ekonometrycznych ujawniła, że średnia ze studiów i fakt posiadania certyfikatu językowego są istotnie związane z oczekiwaniami płacowymi. Ciekawe jest jednak, że występuje negatywna współzależność pomiędzy oczekiwaniami płacowymi a średnią ze studiów, nawet przy zastosowaniu zmiennej kontrolnej, jaką jest posiadanie certyfikatu językowego.

Słowa kluczowe: oczekiwania płacowe, osiągnięcia akademickie, średnia ze studiów, certyfikat językowy

Accounting education, technology and entrepreneurship: Current trends and future outlook

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Abstract: The present study explores current accounting and business research focusing on the accounting technology that leads the accounting profession in new directions. Also it discusses whether and how accounting education can support the development of employability skills of graduates and the creation of competent entrepreneurs through old and new technological advancements and applications. Research insight reveals that future entrepreneurs either in business or in accountancy should be aware of a number of additional elements such as human factors and emotions, communication strategy, safety issues, business structure, budget requirements, and other issues that may impact their decision making in a digitally transformed world. The paper aims to highlight current trends and future outlook of digital tools, processes and applications which are at the disposal of accounting and other practitioners and may allow for an interactive communication process between the interested parts.

Key words: accounting education, technology, developing professional skills, social media, entrepreneurship

1. Introduction

Researchers from various disciplines are exploring the relationship between skills, Higher Education (HE) curricula and employability (Harvey, 2001; Mason, Williams and Cranmer, 2009; Asonitou, 2015a). Higher Education Institutions (HEIs) are assumed to have increased responsibility for preparing graduates to become "employable". In this context, accounting education and entrepreneurship education have been gaining impetus since the 1980s (Russell et al., 1999; Von Graevenitz, Harhoff and Weber, 2010; Farhangmehr, Goncalves and Sarmento, 2016). Scholars have examined employability in relation to the enterprise skills that business owners should possess. They argue for a growing recognition of the difference between the "old" and "new" employability

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skills sets required to compete in an increasingly flexible labour market, which seeks for capable entrepreneurs (Hartshorn and Sear, 2005). Rae et al., (2012) argue that leadership and flexibility are among the "new" employability and essential skills needed for entrepreneurship. Either through curricular changes that create interdisciplinary programmes or through the emphasis given on developing specific skills in a range of disciplines like accounting and marketing, the academic world recognizes the importance to build new talented entrepreneurs (North, 2015). The aim of this paper is to present an insight in the literature which shows how accounting education studies can make use of and accentuate technological tools which promote entrepreneurial spirit in accounting and business students.

2. Literature review

Accounting academics and accounting practitioners have repeatedly expressed the necessity to include into the accounting curricula diverse professional skills and competences that will create gifted graduates either as knowledgeable entrepreneurs or as skilled and promising future accountants to work in the strategic management teams of businesses. Among the professional competences the so-called entrepreneurial competences fall into 3 broad categories: (a) Business Readiness Skills that include communications, team skills, and critical thinking, information literacy and research skills, career or professional preparation; (b) Entrepreneurial Skills that include unique traits, behaviours and processes that differentiate an entrepreneur from an employee or manager; and (c) Business Functional Skills that include the traditional business activities performed in starting and running a business like Financial Management, Resource Management, Information Management, Marketing Management, Operations Management, Risk Management, and Strategic Management (Consortium for Entrepreneurship Education, 2004).

These standards explain in the broadest terms what students need to become successful self-employed or to create and grow a new venture. Evidently, entrepreneurship education coexists with the generalized business and accounting curriculum and with other skills deemed critical to entrepreneurial success, such as communication and teamwork (Freeman, 2012). Accounting Education Change Committee (AECC 1993), International Management Accountants (IMA, 1999), the Pathways Commission (2012), the American Institute of Certified Public Accountants (AICPA, 2017), and Chartered Global Management Accountant (Farrar, 2019) have long ago called for a broad accounting education that would prepare graduates for the highly competitive and digitally transformed business world of the future.

3. Research methodology

This is a study that explores literature and trends in three different sectors: (a) accounting education; (b) entrepreneurship; and (c) current technologies in accounting and business. The scope of the research, apart from presenting current research, has also been to create a list with elements that future entrepreneurs should focus with regards to the business and accounting technological tools. The authors searched related databases such as Science Direct, Scopus, Emerald and Eric for available literature and search engines such as Google Scholar and Science Direct. The specific key words under examination were the ones which were as-

sociated with entrepreneurship, accounting technology, accounting education and business communication channels, spanning a period approximately from 2012–first quarter of 2019. Textbooks, doctorate and master thesis and working papers were excluded from this analysis for two reasons: firstly, academics and practitioners alike most often use journals and conference papers to acquire information on new projects and disseminate new findings, and secondly, for purposes of manageability. In phase one of the study 230 articles were chosen for satisfying the initial criteria. In phase two these articles were carefully reviewed and 42 of them were finally approved for further content analysis as agreed by both authors. Results and conclusions were drawn based on the analysis of the literature review of these 42 papers. Further analysis of the relevant literature revealed that the papers were published steadily since 2012 and onwards with a considerable increase in 2015 (Table 1). It can be concluded that there is a continuous research interest on how technology affects business, entrepreneurship and accounting practice. The analysis revealed four broad emerging themes: "Technology influence on business, accounting practice and entrepreneurship", "Processes and Digital applications", "Communication channels in business and accounting" and "Accounting education and employability skills" (Table 2). The specific research focus of each study is found in Table 3.

Table 1. Year of publication

Year	Author
2012	1. Chandler, R.
	2. Mahdi, S., Palmer, G.
2013	3. Boedker, C., Chua, W.
	4. Goretzki, L., Strauss, E., Weber, J.
	5. Ross, P., Blumenstein, M.
2014	6. Alexander, R., Gentry, J.
	7. Dimitriu, O., Matei, M.
	8. Prasad, A., Green, P., Heales, J.
	9. Villiers, C., Rinaldi, L., Unerman, J.
	10. Whitehouse, T.
2015	11. Curran, Ch., Puthiyamadam, T., Sviokla, J., Verweij, G.
	12. Rao, A.
	13. Parham, A. G., Moorney, J. L., Cairney, T. D.
	14. Asonitou, S., Vitouladiti, O.
	15. Alamin, A., Yeoh, W., Warren, M., Salzman, S.
	16. Alon, A.
	17. Asonitou, S. (a)

2015	18. Asonitou, S. (b)
	19. Babaei, M., Gholami, Z., Altafi, S.
	20. Bititci, U., Cocca, P., Ates, A.
	21. Earley, C.
	22. North, A.
	23. Pries, K., Dunnigan, R.
	24. Prokofieva, M.
	25. Tysiac, K.
	26. Uyar, A., Boyar, E.
	27. Vasarhelyi, M. A., Kogan, A., Tuttle, B.
2016	28. Coyne, J., Coyne, E., Walker, K.
	29. Erevelles, S., Fukawa, N., Swayne, L.
	30. Farhangmehr, M., Goncalves, P., Sarmento, M.
	31. Singh, K., Best, P.
2017	32. van Laar, E., van Deursen, A., van Dijk, J. A. G. M., de Haan, J.
	33. AICPA (American Institute of Certified Public Accountants)
2018	34. Al-Htaybat, K., von Alberti-Alhtaybat, L., Alhatabat, Z.
	35. Bandera, C., Collins, R., Passerini, K.
2019	36. Farar, M. (for CGMA—Chartered Global Management Accountant)
	37. Asonitou, S., Hassall, T.
	38. AACSB
	39. IFAC
	40. Kotb, A., Abdel-Kader, M., Allam, A., Halabi, H., Franklin, E.
	41. Asonitou, S., Kottara, C.
	42. Rebele, E. J., St. Pierre, K. E.

S o u r c e: Authors' own elaboration.

Table 2. Assigned papers to emerged themes

Emerging theme	Author
Technology influence on business, accounting practice and entrepreneurship	1. Goretzki, L., Strauss, E., Weber, J. 2. Curran, Ch., Puthiyamadam, T., Sviokla, J., Verweij, G. 3. Parham, A. G., Moorney, J. L., Cairney, T. D. 4. Tysiac, K. 5. van Laar, E., van Deursen, A., van Dijk, J., de Haan, J. 6. Bandera, C., Collins, R., Passerini, K.
Processes and digital applications	1. Chandler, R. 2. Boedker, C., Chua, W. 3. Ross, P., Blumenstein, M. 4. Dimitriu, O., Matei, M. 5. Prasad, A., Green, P., Heales, J. 6. Alamin, A., Yeoh, W., Warren, M., Salzman, S. 7. Alon, A. 8. Babaei, M., Gholami, Z., Altafi, S.
Communication channels in business and accounting	1. Mahdi, S., Palmer, G. 2. Alexander, R., Gentry, J. 3. Villiers, C., Rinaldi, L., Unerman, J. 4. Whitehouse, T. 5. Rao, A. 6. Bititci, U., Cocca, P., Ates, A. 7. Earley, C. 8. Pries, K., Dunnigan, R. 9. Prokofieva, M. 10. Uyar, A., Boyar, E. 11. Vasarhelyi, M. A., Kogan, A., Tuttle, B. 12. Erevelles, S., Fukawa, N., Swayne, L. 13. Singh, K., Best, P.
Employability skills in business and accounting	1. North, A. 2. Asonitou, S., Vitouladiti, O. 3. Coyne, J., Coyne, E., Walker, K. 4. Asonitou, S. (a) 5. Farhangmehr, M., Goncalves, P., 6. Asonitou, S. (b) 7. Sarmento, M. 8. AICPA (American Institute of Certified Public Accountants) 9. Al-Htaybat, K., von Alberti-Alhtaybat, L., Alhatabat, Z. 10. Farrar, M. (for CGMA—Chartered Global Management Accountant) 11. Asonitou, S., Hassall, T. 12. AACSB 13. IFAC 14. Kotb, A., Abdel-Kader, M., Allam, A., Halabi, H., Franklin, E. 15. Asonitou, S., Kottara, C. 16. Rebele, E. J., St. Pierre, K. E.

S o u r c e: Authors' own elaboration.

Table 3. Specific focus of research

Author	Focus of research
Chandler, R.	Cloud accounting
Mahdi, S., Palmer, G.	Social media and investors
Boedker, C., Chua, W.	Employees' emotions
Goretzki, L., Strauss, E., Weber, J.	Changing role of accountants
Ross, P., Blumenstein, M.	Cloud computing and strategy
Alexander, R., Gentry, J.	Social media and communication
Dimitriu, O., Matei, M.	Cloud computing—directions for accounting
Prasad, A., Green, P., Heales, J.	Cloud computing and corporate governance
Villiers, C., Rinaldi, L., Unerman, J.	Integrated reporting and applicability
Whitehouse, T.	Big data and auditing
Curran, Ch., Puthiyamadam, T., Sviokla, J., Verweij, G.	Digital leaders
Rao, A.	Social media and market needs
Parham, A. G., Moorney, J. L., Cairney, T. D.	Big data transform accountancy
Asonitou, S., Vitouladiti, O.	Core Skills for the tourism sector
Alamin, A., Yeoh, W., Warren, M., Salzman, S.	Human factors and adoption of technology in accountancy
Alon, A.	Accounting and business communication through IAS
Asonitou, S. (a)	Employability skills of accountants
Asonitou, S. (b)	Barriers to the teaching of skills in accountants
Babaei, M., Gholami, Z., Altafi, S.	ERP and challenges for large organizations
Bititci, U., Cocca, P., Ates, A.	Visual performance management systems
Earley, C.	Data analytics in auditing—skills required
North, A.	Skills required from entrepreneurs

Pries, K., Dunnigan, R.	Big data and management
Prokofieva, M.	Social media and business communication
Tysiac, K.	Internal audit and technology risk
Uyar, A., Boyar, E.	Social media and decision making of executives
Vasarhelyi, M. A., Kogan, A., Tuttle, B.	Challenges and obstacles from big data use by accountants
Coyne, J., Coyne, E., Walker, K.	Incorporation of technology development issues in accounting curricula
Erevelles, S., Fukawa, N., Swayne, L.	How big data affects marketing
Farhangmehr, M., Goncalves, P., Sarmento, M.	The responsibility of entrepreneurship education in developing employability skills
Singh, K., Best, P.	Visual analysis supports business
van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., de Haan, J.	Digital and employability skills for young entrepreneurs
AICPA	Core competencies for accountants
Al-Htaybat, K., von Alberti-Alhtaybat, L., Alhatabat, Z.	Accounting education in developing employability skills
Bandera, C., Collins, R., Passerini, K.	ICT affects students' entrepreneurial characteristics
Farrar, M. (for CGMA—Chartered Global Management Accountant)	Accounting education in developing knowledge and employability skills
Asonitou, S., Hassall, T.	Accounting education in developing knowledge and employability skills
AACSB	Employability skills required by the accreditation process
IFAC	Accounting education in developing knowledge and employability skills
Kotb, A., Abdel-Kader, M., Allam, A., Halabi, H., Franklin, E.	Accounting education in developing knowledge and employability skills
Asonitou, S., Kottara, C.	Soft skills requirements for the tourism sector
Rebele, E. J., St. Pierre, K. E.	Barriers to the teaching of skills in accountants

S o u r c e: Authors' own elaboration.

4. Findings

This section aims at a thorough presentation of the papers assigned to the four emerged themes, namely: "Technology influence on business, accounting practice and entrepreneurship", "Processes and digital applications", "Communication channels in business and accounting" and "Accounting education and employability skills".

Technology influence on business, accounting practice and entrepreneurship

Organizations are nowadays struggling to digitize their operations and according to Price Waterhouse Coopers (Curran, Puthiyamadam, Sviokla and Verweij, 2015) the Digital IQ (intelligence quotient) leader businesses are those that are more thoughtful in their digital strategy, innovation and execution. Technological trends are evolving, like intelligent systems, data mining, BYOD (Bring Your Own Device), predictive analytics, social media and crowdsourcing which transform the operational and the interpretative elements of accountancy (Parham, Moorney and Cairney, 2015). Opportunities from social media do not come without risks. The first step for firms in order to protect themselves is to reconsider how and who shares information within the firm and, secondly, they should consider who will be responsible for social media activities and whether, how, and which executives will actively participate. The ten top risks related to technology according to the Institute of Internal Auditors are: cybersecurity, information security, IT systems development projects, IT governance, outsourced IT services, social media use, IT skills among internal auditors, emerging technologies, board and audit committee technology awareness (Tysiac, 2015). Technology has transformed both the everyday practicing of the accounting profession (Goretzki, Strauss and Weber, 2013) as well as the image and the talents of the accountants (AICPA, 1999). Most accounting systems are now computerized and thus, accountants must understand software and system processes to effect and evaluate systems of internal control while at the same time, to be able to report and communicate financial results.

Business administration and accounting (BAA) students after their graduation will be employed either as business executives or as self-employed entrepreneurs. In both cases they will need a set of skills to help them survive in a highly technological environment. They must be able to use computing technologies to perform standard business tasks effectively and competitively, including promoting tasks (e.g., maintain a web and social media presence) and basic accounting activities (e.g., maintain a digital ledger with invoice, payroll, and tax accounting). Young entrepreneurs should be able to use effectively a range of tools for computing, online communication and business clouding technologies (van Laar et al., 2017). Research has shown that students' entrepreneurial characteristics positively impact their willingness to take risks, and this relationship between learner characteristics and risk is moderated by students' perceptions of the usefulness of Information and Communication Technology (ICT) (Bandera, Collins and Passerini, 2018).

Processes and digital applications

This category presents the most up-to-date tools, processes and applications which are at the disposal of accounting and other practitioners and may allow for an interactive communication process between the interested parts.

A major challenge that is under way is the compilation of IFRS which is a continuous procedure due to the new transaction processes in the evolving business environment. Since globalization has intensified the need for effective communication between businesses, the International Accounting Standards Board (IASB) has been issuing appropriate accounting standards aiming at the creation of a common business language for interpreting and presenting financial transactions (Alon and Dwyer, 2014). Traditional Accounting Information Systems (AIS) include three main parts: (a) Transaction Processing Systems (TPS) that support daily business operations; (b) Gen-

eral Ledger System and Financial Reporting System (GLS.FRS) and; (c) the Management Reporting System (MRS) that offers internal stakeholders the necessary financial reports needed for decision-making such as variance or budgeting reports. AIS may be incorporated into Enterprise Resource Planning (ERP) systems that support in an integrated manner all essential functions of an enterprise. More and more accounting software interoperates with other functions of the business such as Human Resource Management, Customer Relationship Management (CRM) and Supply Chain Management, Dashboards and other reporting applications (Alamin et al., 2015).

Technology rapid advancements, globalization of trading and the need for standardization have created the new concept of "cloud computing". Cloud computing enables the Information Technology Outsourcing (ITO) whereby computing resources are purchased over the Internet using a pay-per-use model (Ross and Blumenstein, 2013). The main characteristic of the "online accounting" is the use of the accounting service without the cost of buying and installing any software or hardware infrastructure. Cloud accounting allows users to store data and use applications through different devices located in several locations (Dimitriu and Matei, 2014). Some benefits of the cloud accounting include reduced costs for equipment and expert staff, online instantaneous access for managers having access to documents from any device (mobile, ipad), sharing of information in real time and making use of automated backup to secure data (Chandler, 2012). Proper use of cloud computing suggests the need for proper corporate governance structure. Proper structure should have a chief cloud officer, a cloud management committee, a cloud service facilitation centre, and a cloud relationship center (Prasad, Green and Heales, 2014).

Human factors are very important since they may influence technology adoption decisions and therefore should be well investigated before final decisions are reached. Recent studies focus on the human or emotional factors that may affect the adoption of new technology (Alamin et al., 2015), the impact of technologies on the emotions of employees (Boedker and Chua, 2013), and the lack of human resources that may prevent the successful implementation of an ERP system in developing countries (Babaei, Gholami and Altafi, 2015).

Communication channels in Business and Accounting

Social listening is about social space and should become the focus of finance people. Social listening is to hear what people say publicly in the entire online social space (sites like Twitter, Facebook, or LinkedIn and others). Companies should think critically what the words mean for the business. Social media can help executives to exploit opportunities to better respond to customers' needs or identify a competitive niche, to identify political moves that may indicate risks (Rao, 2015). Executives may get instant feedback from stakeholders and change accordingly their decision making process (Uyar and Boyar, 2015). An interesting issue for corporate reporters is that around 50% of professional investors in the US regularly use blogs and follow each other on Twitter and Stock Twits, and more than 60% of institutional investors say that social media will become increasingly important to them (Mahdi, Palmer, 2012). Firms should be aware that they will need to budget for increased personnel, IT support, training, and legal fees to ensure ongoing compliance with Regulation Fair Disclosure, the rule that aspires to prevent selective disclosure by public companies to market professionals and certain shareholders. Use of social media enhances transparency and accessibility and will add credits to firms' executives who will be seen as media relevant and

knowledgeable, as well as to the firms themselves in terms of reputation and market value (Alexander and Gentry, 2014). Prokofieva (2015) argues that while corporate announcements are publicly available, dissemination of corporate announcements through Twitter allows companies to attract investors' attention and further decrease information asymmetry.

Big data is associated with high volume of information processing and management systems that contribute so that information is categorized, managed and distributed (Pries and Dunnigan, 2015). Big data; volume, variety, velocity, value and veracity are the "V" notions that define big data (Erevelles, Fukawa and Swayne, 2015). Big data influences both the financial and the auditing part of accounting and accountants need to learn about the potential benefits as well as the expected challenges and obstacles from the utilization of non-traditional sources of data (Vasarhelyi, Kogan and Tuttle, 2015).

Visual management systems can serve effectively the businesses strategy development and implementation, can enable peoples' engagement and largely improve internal and external communication (Bititci, Cocca and Ates, 2015). The graphic representation of accounts, transactions and information flows with the contribution of visual analytics can offer better support of business and finance management (Singh and Best, 2016). Big Data and the related field of data analytics (DA) is affecting also the tax, advisory and audit practices of public accounting firms (Whitehouse, 2014). In relation to auditing practices more issues present challenges due to the high regulatory environment of audits. These issues are related to the exact role of DA in risk analysis, the implications of testing 100% of the population, the interpretation and the consequences of using DA, as well as the skill sets and characteristics of auditors performing DA work (Earley, 2015).

According to International Integrated Reporting Council (IIRC) definition, integrated reporting is "a concise communication about how an organization's strategy, governance, performance and prospects, in the context of its external environment, lead to the creation of value in the short, medium and long term. IR is a relatively new domain of research and many questions regarding its applicability need to be answered (Villiers, Rinaldi and Unerman, 2014).

Accounting education and employability skills

Accounting education is among the sciences that should teach the above computing tools through various teaching methods like case studies, role playing and experiential learning with the scope to prepare future accountants and possible entrepreneurs to appreciate the risks and the management of their profession. Employers, clients and public's rising expectations regarding professional accountants' contribution at work and to society generally have prompted an increased emphasis on professional (transferable) skills including communication and interpersonal skills, interdisciplinary and strong ethical orientation as well knowledge of information technologies (IFAC, 2010; Montano et al., 2010; Asonitou and Vitouladiti, 2015; Asonitou and Kottara, 2019; Asonitou and Hassall, 2019). Regarding accounting education a fairly widespread view is that technological developments represent an important area that should be covered across accounting curricula, to expose changes in the marketplace and to enhance the employability of graduates (Coyne, Coyne and Walker, 2016; Al-Htaybat, Alberti-Alhtaybat and Alhatabat, 2018). However, Kotb et al. (2019) argue that it is still a peripheral component in accounting curricula, with no clear agenda for change. Major inhibitors seem to be the professional accounting bodies through accreditation requirements along with the lack of competent/

interested staff and lack of time/ space in already overloaded syllabi. Given the limited time in the accounting curricula programmes (Asonitou, 2015b), Rebele, St. Pierre (2019) argue that it is impossible to meet all of soft skills and technology skills demands, so priorities must be set as to what can be covered and what must be left to "on the job" training.

Current trends and future outlook

The above analysis revealed an intense interest of researchers on the applications of technology that can enhance entrepreneurship, create new business areas and facilitate accountants' work. These applications include: Accounting Information Systems (AIS), International Financial Reporting Standards (IFRS), cloud computing, big data, visual performance models, social media and Integrated Reporting (IR). All these technological applications and related knowledge should be incorporated and developed together with other employability skills in the business curricula. Future outlooks include a vast area of technology issues which can further advance businesses such as robotics, artificial intelligence, Blockchain, and other fascinating tools.

5. Discussion and conclusions

Executives and accounting researchers already work towards the future innovations and applications that will further transform the businesses. They have realized that globalization and transformational innovation will be the overriding global themes for the decade ahead and they strive to develop the "business radar" in order to anticipate changes and capitalize on new opportunities. New entrepreneurs either in accountancy or in any other professional field, should be in position to acknowledge, to use, and to comprehend the enormous potential that new technologies can offer to them. These technologies can be treated either as tools to evolve new venture and increase any customer base or to be included in their product line and gain market share in a fascinating field. Prospective executives and entrepreneurs as well as future accountants should be aware of both the opportunities and the risks associated with the new digital applications and processes through attending practitioners' studies and scholars' research.

Accounting education is important to address new information and communication technologies and technological applications and to ensure that graduates and future entrepreneurs acquire work-place relevant knowledge, especially as global accreditation standards (AACSB, 2019) and global professional qualifications (IFRS), International Standards on Auditing (ISAs) and International Standard on Quality Control (ISQC) require such updates and adjustments (IFAC, 2019).

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Kształcenie w zakresie rachunkowości, technologii i przedsiębiorczości – aktualne trendy i perspektywy

Abstrakt: W artykule przedstawiono badania dotyczące problemów związanych z rachunkowością i biznesem, skupiono się przy tym na wykorzystywanych w rachunkowości technologiach, które wytyczają nowe kierunki jej rozwoju. Zaprezentowano, czy i jak edukacja w zakresie rachunkowości może wspierać rozwój umiejętności zatrudnienia u absolwentów oraz kształtowanie kompetentnych przedsiębiorców poprzez stare i nowe osiągnięcia technologiczne i aplikacje. Z przeprowadzonych badań wynika, że przyszli przedsiębiorcy prowadzący działalność gospodarczą lub księgową powinni być świadomi wielu dodatkowych elementów, takich jak czynniki ludzkie i emocje, strategia komunikacji, kwestie bezpieczeństwa, struktura biznesowa, wymagania budżetowe i inne kwestie, które mogą mieć wpływ na ich decyzje w cyfrowo przekształconym świecie. Celem artykułu jest prezentacja obecnych trendów oraz perspektyw wykorzystania cyfrowych narzędzi, procesów i aplikacji, które mogą służyć pracownikom rachunkowości i praktykom gospodarczym, umożliwiając interaktywną komunikację pomiędzy wszystkimi stronami procesu gospodarczego.

Słowa kluczowe: edukacja księgowa, technologia, kształtowanie umiejętności zawodowych, media społecznościowe, przedsiębiorczość

MANAGEMENT AND QUALITY

Organizational network models – proposal for typology[1]

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Abstract: The aim of the article is to present the author's proposition of typology of organizational network models. The considerations were based on the analysis of the literature on the subject of the described organizational network models and their typology, and the main part of the article is a proposal of the typology of organizational network models. The starting point was the assumption that typologies play an important role in building theory, and the concept of network is ambiguously defined and described in network theory. The multitude of features and parameters describing organizational networks indicates a large diversity of their models. The article reviews the criteria for the division and types of organizational networks in light of the literature on the subject, and presents the characteristics of organizational network models by their origin, the main mechanism explaining the functioning of the network, the method of network coordination, and the author's typology of organizational network models due to the criterion of nature and complexity of relationships appearing in them.

Key words: organizational network, typology, model

1. Introduction

Organizational networks have become a way of describing a new reality resulting from comprehensive social, economic and technological changes. The main premise for creating inter-organizational networks is the development of the global economy, affecting changes in communication, competition and cooperation between various types of institutions, market entities or individuals. The web-based economy is one of the important distinguishing features of today's entities. As a result of networking, enterprises achieve their goals more effectively. Diversified entities in the conditions of network society create networks of connections that affect the efficiency

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of their operation. Therefore, one can be tempted to say that nowadays network organization is a key concept, which is associated with forms of cooperation of various entities (Barczak, 2016).

The specificity of the network approach in management is the diversity of research and the network models used in it. In the ongoing discussion in literature on network theory, it strongly refers to the use of various network models in management sciences (Borgatti, 2011; Krzakiewicz and Cyfert, 2013). In most cases, the authors take the position that there is no universal network theory in management, and which theory is the basis for the research of networks defined by researchers as determined by the purpose and selected network model (Światowiec-Szczepańska and Kawa, 2018). The diversity of organizational network models is determined by their interdisciplinary character and the multitude of approaches to organizational networks and their features existing in the literature. Despite the fact that there are many typologies of types of networks in the literature, a research gap can be seen related to the ordering and systematization of organizational network models. The research problem raised in the article is related to the lack of comprehensive approach to organizational network models and their ordering. The research problem is therefore implied by the existing cognitive gap. It is related to the issue of distinguishing the basic categories of organizational network models, and, as a consequence, a comprehensive approach to the organizational network models described in the literature and functioning in economic practice in the form of a developed typology of these models.

Given the existing cognitive gap, the purpose of this article is to develop an original proposition of typology of organizational network models. The considerations were based on the analysis of the literature on the subject, and the main part of the article is a typology proposal[2] of organizational network models. The starting point was the assumption that typologies play an important role in building theory, and the concept of network is ambiguously defined and described in network theory. The multitude of features and parameters describing organizational networks indicates a large diversity of their models.

2. The concept of organizational network and network approach

The concept of "networks" has become more common in social sciences, colloquial language, the world of economy or technology (Czakon, 2012). These issues are constantly evolving in both the Polish and international scientific community, and the networks have been and are heterogeneously captured by various groups of researchers.

According to the most general definition, a network consists of a set of nodes and set of ties representing some relationship (Brass, Galaskiewicz, Greve and Tsai, 2004). It is a system of connections between people or organizational units, created to exchange information, notions (ideas) and resources. Nowadays, the concept of network has penetrated and effectively

[2] Typology is the division of certain types into groups, characterized by a common feature or group of features constituting a certain type. The typological division does not have to be exhaustive and disjoint. The division of objects into certain types is usually applied in a situation where the use of classification would be difficult to read in the analysis due to too extensive class structure and a small number of observations assigned to individual classes. It is nothing more than systematization, which mainly focuses on grouping, ordering and dividing specific categories (Kisielnicki, 2009).

rooted itself in Polish and foreign literature. The issues of network are covered in relatively many publications, and in the work devoted to the research of the network one can find various definitions of this concept. The magnitude of the problem of the network in the modern world may be evidenced by the fact that in the first decade of the twenty-first century almost 1 million papers have been published on the subject of the network (Czakon, 2012).

In the literature in the field of management sciences, one can notice huge terminological diversity related to networks, probably resulting from the interdisciplinary nature mentioned above. According to many authors (Niemczyk, Stańczyk-Hugiet and Jasiński, 2012; Światowiec-Szczepańska and Kawa, 2018), the heterogeneity in perception and explanation of this issue is due to the fact that network ontology, not to mention epistemology and methodology, is only at the stage of incubation and development. One may be tempted to say that the concept of network is still an amorphous concept, not fully explored and poorly structured. This heterogeneity in the perception of networks is reflected in the multitude of definitions of organizational networks. A review of the literature in this area indicates great cognitive value, while confirming the multiplicity of views on organizational networks. Most authors (Delporte-Vermeiren, 2004; Dworzecki and Żłobińska, 2002; Łobos, 2005) definitely perceive networks from the perspective of external relations, i.e. as inter-organizational networks. An example would be the approach of Peter F. Ducker (1998), who understands the organizational network as both network of institutions (or parts thereof), companies, teams and people located in different places, organized in loosely connected opaque structures that share a common goal—work (providing services or selling products) for the same client. Numerous authors point to the features of organizational networks, such as: cooperation of entities, a common goal, full or high autonomy of individuals (Nogalski and Dwojacki, 1998; Miles and Snow, 1992) and market mechanisms of network operation (Łobos 2005). When defining networks it is quite common to emphasize the fact that networking is based on a shared value system (Dworzecki and Żłobińska, 2002; Hatch, 2002; Sydow, 1999). It is pointed out that networks are a characteristic, polycentric organizational form of activity, which is based on cooperation and division of labour between enterprises (Dworzecki and Żłobińska, 2002). In some definitions (Drucker, 1998; Brilman, 2002), the authors also point to intra-organizational relationships, defining as networks practically all the systems of relations, both with the internal units of the organization and its environment (Witkowski, 2004). Some approaches (Witkowski, 2004) emphasize the evolutionary nature of the network. While defining a network organization, some authors emphasize the importance of information technology and information flow and communication processes (Castells, 2008). The presented review confirms that it is impossible to clearly define the organizational network. A certain attempt to put into order various views and definitions of the network is the one proposed by Justyna Światowiec-Szczepańska and Arkadiusz Kawa (2018), who point out that three main approaches can be observed in the understanding of the network by researchers:

– metaphorical—the term *network* is used as a metaphor for new organizational phenomena, associated primarily with the change in the orientation of theorists from dyadic relations to a constellation, portfolio or system of relationships maintained by an organization (including an enterprise);

– graphic—refers to an attempt to faithfully reflect the structure of relationships within the enterprise or enterprises with other external entities. The aim here is a kind of "mapping" or "imaging" of the network[3] (Abrahamsen, Henneberg and Huemer, 2017; Czakon, 2017);
– mathematical—refers to treating networks in mathematical categories, which focuses on the use of graph theory and mathematical tools for analyzing network structures, often considered more important than the network context itself. An example is research in the field of complex networks, including small world models or scale-free networks.

Along with the development of the network concept, the so-called network approach, in which the importance of the company's overall contacts with the environment, which form an extensive network of connections, is emphasized. Network approach is characterized by the adoption of a network metaphor that is suitable for analyzing any organization, because organizations have multiple interactions with the environment. Therefore, the network approach defines the way of describing and analyzing reality (organizations, institutions, phenomena).

Modern research indicates a wide field of possibilities for exploring the network approach in the field of management. The change towards ever more networked business environments, in which organizations simultaneously compete and cooperate, are forced to constantly reorganize their resources, their boundaries are blurred, is reflected in the increasingly strongly accepted in economic practice paradigm of the network economy or the economy of sharing. Today we are in fact talking about a network society (Castells, 2008; Kadushin, 2012; Arsenault, 2011). The development of the global economy, affecting changes in communication, competition and cooperation between various types of institutions, market entities or individuals is undoubtedly one of the main reasons for creating organizational networks. The accelerator in this process are technological factors taking the form of the fourth industrial revolution (German Industry 4.0).

The network approach is used inter alia in fields of research and practice such as: strategic management (competition, cooperation and coopetition relations), project management, logistics management (supply and distribution chains), entrepreneurship, knowledge and innovation management, and relationship marketing.

The above considerations show that the possibilities of exploring network theory are very large. This applies to many disciplines, including management sciences. The research areas presented are interdisciplinary and amorphous. Many concepts are emerging, which proves that the coming years will be associated with the further development of the network approach.

[3] A pioneer of this approach in the management science was the Swedish school of industrial marketing centred around the scientific association IMP (Industrial Marketing and Purchasing Group). At the same time, the network's research trend was developing, using IT support over time, enabling graphical presentation of the examined networks.

3. Review of research in the field of typology of organizational network models

The presented approach to definitions and features of organizational networks influence the wide variety of forms of such organizations. The diversity associated with the definition of the concept of the network itself, the characteristic features and parameters of the description and forms of organizational networks means that there are many typologies of organizational networks, considered from the point of view of various criteria. In practice, attempts to develop typologies in this area face many difficulties. In the case of many classifications, a vague division can be seen, some classifications are not separable, others take into account only the selected aspects determining the type of network.

Analysis of the literature on the subject allows to state that there are numerous achievements in the field of different typologies of organizational networks. The studies present various criteria on the basis of which types of networks are distinguished. A synthetic review of the literature in this area is presented in Table 1.

Table 1. Review of criteria for the division and types of organizational networks in light of the literature on the subject

Criterion	Network type
Level of dependence and formalization of relationships (Brilman, 2002)	integrated networks, contractual networks, federated networks, direct relations networks
Relations between participants of cooperation (Cygler, 2002)	dominated networks, peer-to-peer networks, social networks, bureaucratic networks, property rights-based networks
Network structure (Dolińska, 2002)	ring network, ring network with coordinating organization, ring network with conductive organization
Management structures and sustainability of relationships (Domański and Marciniak, 2003)	ring network, ring network with coordinating organization, ring network with conductive organization
The nature of relationships between partners (Castells, 2008)	supplier networks, client networks, standard coalitions, technology cooperation networks
Features of the network structure (Korenik, 2003)	star networks with a leading company, temporary networks, regional networks
Nature of the network system (Koźmiński, 2004)	alliances and joint ventures, supplier-recipient systems, branches of enterprises, strategic business units
Type of links between network participants and the frequency of occurrence of a given type of cooperation (Niemczyk, Stańczyk-Hugiet and Jasiński, 2012)	cooperative networks, outsourcing networks, franchise and agency networks, clusters, strategic alliances, holding networks, public-legal partnerships
Form of cooperation (Camarinha-Matos and Adu-Kankam, 2018; Graça and Camarinha-Matos, 2017)	ad hoc cooperation, organization network cooperation, long-term strategic network, goal-oriented network, virtual enterprises, virtual teams, virtual organization (VO)

S o u r c e: Author's own elaboration based on Brilman, 2002; Cygler, 2002; Dolińska, 2002; Domański and Marciniak, 2003; Castells, 2008; Korenik, 2003; Koźmiński, 2004; Niemczyk, Stańczyk-Hugiet and Jasiński, 2012; Camarinha-Matos and Adu-Kankam, 2018; Graça and Camarinha-Matos, 2017.

An interesting typology of organizational network models due to reconfiguration dynamics is presented by T. Ortega (2010). Depending on the dynamics of the reconfiguration of participating partners, the mentioned researcher identified the following three types of networks:

- static network organization. It is a network in which the leader selects the market, sets strategic goals, selects technologies, organizes a network enterprise and optimizes value chain creation. Most often it has a relatively long-term network connection between the creator and other partners;
- dynamic network organization, characterized by unstable relationships between partners and the lack of a dominant partner. The configuration of participants in this type of network varies depending on market needs;
- temporary network organization focused on the rapid implementation of short-term and specific market opportunities, followed by the process of network decomposition. In this type of relationship, we have a large independence of its members, cooperating with each other on the basis of informal connections.

Currently, the network structure crosses national borders, and their spatial range is very diverse. Companies and other entities operate in networks because they find better conditions for effective operation in them: loss prevention, or increased profitability.

Research from recent years has significantly expanded knowledge towards a network approach to some phenomena. They allowed researchers to see that despite the growing dependence of human and other organisms' behaviour as well as technology on the topological properties of complex networks, we still do not fully understand the principles governing the evolution and dynamics of these systems. It turned out that in the enormity of network systems one can distinguish characteristic groups of structures that can constitute separate types of networks. These include small world and scale-free networks (Barabási and Bonabeau, 2003).

The selected typologies of organizational networks show the great wealth and variety of forms that fall into this category. The variety of approaches to the essence of the network is the reason for ambiguous conceptualization of the network resulting in various network models. This is related to the polymorphism and multidimensionality of networks emphasized in literature (Czakon, 2012), as well as the unclear ontological status of the networks studied.

4. Division of networks by origin—emergent or intentional?

One of the most important criteria for distinguishing network models is the mechanism explaining the functioning of the network and the origin of the network (Światowiec-Szczepańska and Kawa, 2018). Taking into account the source determining its network structure or functioning, one can basically talk about endogenously or exogenously determined networks. The first type is usually associated with networks intentionally coordinated by one or more network participants. This approach is related to the dichotomous perspective of the network, in which emergent and orchestrated networks are distinguished (Provan and Kenis, 2008). Emergent networks are described in terms of changes in the environment that lead individuals to perceive interdependence in achieving similar goals. Despite various sources determining networks, there are attempts, which can be seen in literature of the subject, to connect intentional and emergent networks based on the evolution of the network and the related dynamics affecting the transformation of emergent networks into inten-

tional networks (Dagnino, Levant, Mocciaro and Destri, 2016; Światowiec-Szczepańska and Kawa, 2018). An important criterion is also the main network mechanism, which explains the situation of units participating in the network. Stephen P. Borgatti, Ajay Mehra, Daniel J. Bras and Giuseppe Labianca (2009) indicate two main network models: network flow models and network architecture models. The main criterion differentiating these models is the way ties are treated, and especially their function. The characteristics of these organizational network models are presented in Table 2.

Table 2. Characteristics of organizational network models due to selected division criteria

Criterion	Organizational network model			
	Network flow models		Network architecture models	
	The flow model applies to networks in which ties are treated like channels through which various types of resources flow. In networks considered as flow models, indirect ties and the length of so-called paths are significant. This issue is particularly emphasized in the tradition of social capital research, according to which social position in the network depends on access to resources, including mainly information.		The model is focused on the structure of the network or on the configuration of the ties. This approach (also called topological) overlooks the aspect of the content of the ties, while it focuses on the pattern of connections. In this type of network model, the focus is on relationships that align or coordinate the actions of specific nodes with those of another single node, most often with higher capabilities.	
	heterogeneous flow models	homogeneous flow models	heterogeneous architecture models	homogeneous architecture models
A mechanism explaining the functioning of the network (Borgatti, Mehra, Bras and Labianca, 2009)	– they are based on the assumption that actor is successful because they can acquire resources controlled by other actors – they use the theory of strength of weak ties, the theory of social resources and the theory of structural gaps providing benefits and information advantages	– they relate to the process of diffusion or adaptation and spread of phenomena (opinions, cultures, practices, innovations) – contamination (social homogeneity) treats nodes in the network as mutually influencing and adapting specific features from others – actors influence each other and participate in the flow process, which increases the homogeneity of the whole group	– they explain the success of an individual through the structure of the network and its position in it – in a topological approach, the actor is often seen as a rational agent who uses network positions to maximize benefits – at the level of entire networks, a relationship is sought between the structure of the network and its results	– they explain the process of convergence of units in the network – they pertain to the so-called structural equivalence, in which the nodes are assumed to adapt to their surroundings, resulting in nodes showing similarities in behaviour resulting from similarities in the structural surroundings

Source of origin	Network models endogenously determined (intentional)	Network models exogenously determined (emergent)
	Network models coordinated intentionally by one or more network participants, which means conscious, deliberate and purposeful action to improve individual performance as well as the entire network.	Models are described in terms of changes in the environment that prompt individuals to perceive interdependence in achieving similar goals. Such networks, often self-organizing, create structures characteristic of the small world.
Method of network coordination (Grandori and Soda, 1995)	Symmetrical network models	Asymmetrical network models
	The strategy is jointly formulated and coordination is based on mutual agreements. A network is then created in the form of a specific group or modular organization. Depending on the specific impact factors, the asymmetrical network takes the form of a social, bureaucratic or property rights-based network.	Networks are dominated by a central entity that formulates a strategy and coordinates the activities of the entire system. Depending on the specific impact factors, the asymmetrical network takes the form of a social, bureaucratic or property rights-based network.

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

As mentioned earlier, the diversity of research and the network models used in them become a specificity of the network approach in management. The ongoing literature discussion on network theory also refers to the use of various network models in management sciences (Borgatti, 2011; Krzakiewicz and Cyfert, 2013). In most cases, the authors take the position that there is no universal network theory in management, and which theory is the basis for the research of networks defined by researchers, determined by the purpose and selected network model (Światowiec-Szczepańska and Kawa, 2018).

5. Typology of organizational network models

When ordering organizational network models, a division based on the criterion of the nature and complexity of relationships occurring in them can be taken as a starting point. From this point of view, four internally diverse categories of models can be identified: business networks, franchise and agency networks, public networks and contemporary models of organizational networks (knowledge networks and complex networks).

Business networks are systems created voluntarily by a group of business actors of enterprises dealing in a similar field of activity, institutions of the public and private sphere, which support their activity—related relationships, interacting with the environment and established to achieve common goals. Characteristic for the functioning of business networks is the combination of competition with cooperation, while maintaining both individual (competitive) and common (convergent) goals of entities.

There is no consensus in the literature on key features of business networks (Jarillo, 1993; Ratajczak-Mrozek, 2011; Rosińska-Bukowska, 2012). Individual authors present their own concepts (Jarillo, 1993; Ratajczak-Mrozek, 2011; Rosińska-Bukowska, 2012). For example, Milena

Ratajczak-Mrozek (2011) presents three basic features of network connections (at the same time they are features of the entire business network):

– continuous interaction;
– interdependence (in terms of resources, entities and activities);
– infinity (lack of clear boundaries and structures).

Continuous interaction is the central idea of the network approach and is at the same time a general indicator of how companies operate. It is connected with the coexistence of formal and informal connections and to the long term, which means the expectation of continuation of relations and determines the many benefits of cooperation. The interdependence in terms of resources, entities, also called network actors and activities, results from the fact that there are practically no self-sufficient entities in the economy. The infinity of connections and networks means that you cannot unambiguously and clearly define the boundaries or structure of a business network.

The highest stage in the evolution of network-type solutions, i.e. a form of network thinking adapted to the requirements of corporate globalization, is the global business network. It is definitely a regulatory model, not just a typical organizational structure. It usually has a hybrid structure, which means diversifying the internal structures of global business networks due to the combination of many types of organizations into one regulatory system. Magdalena Rosińska-Bukowska (2012) presents features that can be considered as distinguishing features of global business networks against the background of classic network concepts. They are a combination of attributes: stratification, cooperation, synergy and innovative attitude related to creating added value to globally applicable standards.

The starting point for the characteristic of franchise and agency networks is an indication of the basic differences between the franchise system, agency system and partner system. Franchise networks are defined ambiguously and relate to various relationships between the donor and recipient of the franchise. Franchise means therefore (Podkorska, 2004):

– method of conducting business activities;
– form of distribution of goods and services;
– method supporting starting and conducting business activities;
– an alternative form of financing business ventures;
– the right to set up and run an enterprise in accordance with the idea, knowledge and technology of the franchise donor, transferred to the franchisee.

The franchise expansion of the company is based on the unique concept of doing business with elements of innovation or originality (knowhow) as well as the brand and reputation of the company, distinguishing it from other entities. Agency system means the concept of organizing trade or service points, run by agents who sell goods owned by the principal or provide services for and on behalf of the principal. Partnership agreements, on the other hand, usually constitute commercial cooperation agreements—distribution of products or services for resale by the partner on their own account. Often, the partnership is a transitional form for agency or franchise cooperation, because for a longer period of time such a loose agreement is not enough for either side.

Public networks are defined as cooperation between government and self-government administration units (public administration) and other entities (including private entities). In the context of network theory, local government as an independent (legally, economically, organizationally) entity is a participant in various types of inter-organizational networks. In this case, the network is a conglomerate of relations (exchanges) between local government units and entrepreneurs, non-governmental organizations, scientific organizations and institutions of the European Union.

A public network can be defined by distinguishing its characteristic features (Niemczyk, Stańczyk-Hugiet and Jasiński, 2012):

– it is formed by relations occurring between at least two independent entities, one of which always remains a public law entity;
– the purpose of the cooperation is to implement the public interest;
– the network is a space for organizational learning;
– the legal autonomy (independence) of the network participants finds expression in the formalized decision to join the network (contract);
– the existence of a relational rent is a source of efficiency in the implementation of public tasks.

Modern models of complex networks are a category of models related to research from recent years, which significantly expanded knowledge towards the network approach to some phenomena. This research is related to the revolution that took place in the late 1990s, and was largely caused by the Internet. The analyses carried out at that time allowed to see that despite the increasing dependence of people and other organisms, as well as technology on the topological properties of complex networks, we do not yet fully understand the principles governing the evolution and dynamics of these systems. Until recently, science mainly focused on research on regular and random networks, pulling many networks of complex structure into the category of the latter. However, it turned out that in the vastness of network systems one can distinguish characteristic groups of structures that can constitute separate types of networks. These include knowledge networks, small world networks and scale-free networks.[4] Figure 1 presents the author's proposed typology of organizational network models.

[4] The concept of scale-free networks has generated considerable interest in recent years, offering a unified description tool for a wide class of graphs whose organizational mechanisms are associated with a certain degree of randomness (Barabási and Bonabeau, 2003). Extensive empirical results seem to indicate that scale-free may be a desirable feature for information processing networks. Currently, there are many models of network construction that produce scale-free networks as random results. A large part of these constructions is derived from the Albert-László Barabási model based on growth and preferential attachment. The scale-free nature of the network results, among others, from the need to protect the centres (a prerequisite for the existence of the entire network and its proper functioning), and the preference for connections for nodes located in the zone of influence of several main centres.

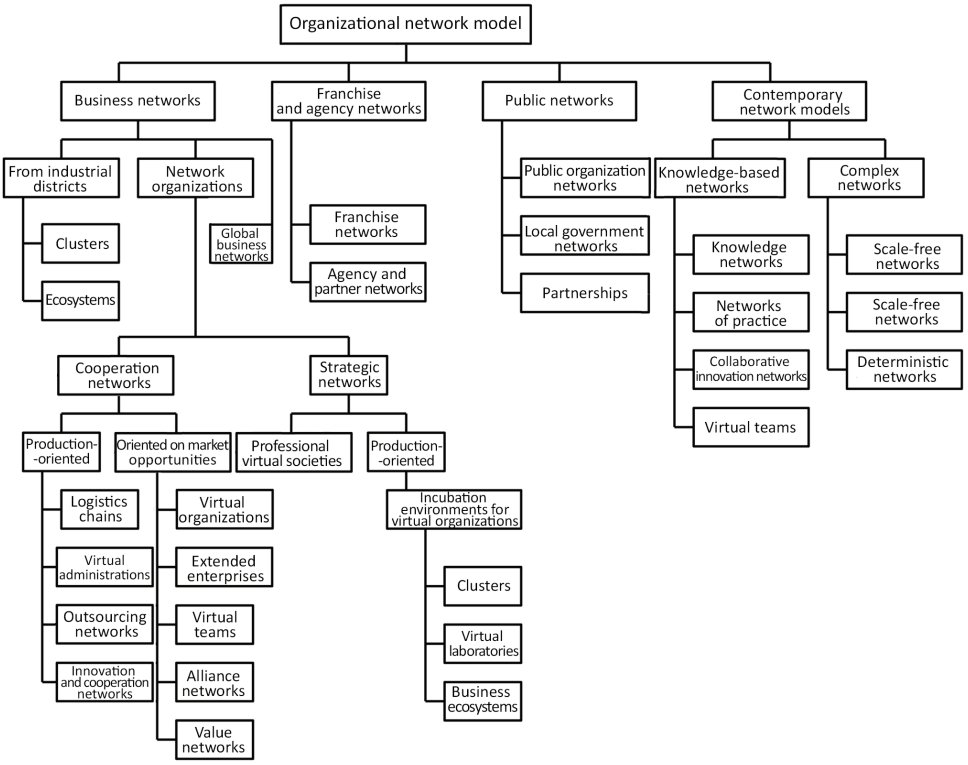

Figure 1. Typology of organizational network models

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

The typology presented mainly refers to inter-organizational networks, but in certain categories of network models one can also speak of intra-organizational networks, assuming that the interior of the organization creates a network structure of connections between elements of the organization. An example of this type of network may be based on teams of employee knowledge networks, Collaborative Innovation Networks—COINs Network of Practice—NoPs or virtual task teams.

It should also be noted that the spatial range of the identified network models is very diverse. In addition to local, regional and national networks, dispersed networks in larger spaces, i.e. those with supranational and global coverage, play an important role.

In the proposed typology, the adopted division into four categories of network models is not disjoint, which especially applies to intra-organizational and inter-organizational networks. Knowledge networks, networks of practice, collaborative innovation networks, and virtual teams can be talked about both in the context of intra-organizational and inter-organizational networks.

6. Conclusion

The article presents considerations on organizational network models, reviewing the research described in the literature in this area, as well as proposes a typology of organizational network models, divided into four main, internally diverse categories of organizational network models: business networks, franchise and agency networks, public networks and contemporary models of complex networks. Within each category, different types of networks were presented. The presented typology of organizational network models was developed taking as a starting point the division due to the criterion of nature and complexity of relations occurring in them. It indicates a large variety of studies and the network models used in them.

Analysis of the literature on the subject showed that many authors strongly refer to the use of various network models in management sciences. Most of them take the position that there is no universal network theory in management, and the purpose and selected model of the network determine the theory of the network research defined by researchers. In this context, the ordering of the various types of networks described in the literature seems to be the most reasonable. The developed typology is only a proposal to order the organizational network models described in the literature, it is also an attempt to present their diversity in a comprehensive perspective.

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Modele sieci organizacyjnych – propozycja typologii

Abstrakt: Celem artykułu jest przedstawienie autorskiej propozycji typologii modeli sieci organizacyjnych. Rozważania oparto na analizie literatury przedmiotu w zakresie opisywanych modeli sieci organizacyjnych i ich typologii, a zasadnicza część artykułu to propozycja typologii modeli sieci organizacyjnych. Punktem wyjścia było przyjęcie założenia, iż typologie odgrywają ważną rolę w budowaniu teorii, a w teorii sieci niejednoznacznie definiuje się i opisuje samo pojęcie sieci. Wielość cech i parametrów opisujących sieci organizacyjne wskazuje na duże zróżnicowanie ich modeli. W artykule dokonano przeglądu kryteriów podziału i rodzajów sieci organizacyjnych w świetle literatury przedmiotu, a także przedstawiono charakterystykę modeli sieci organizacyjnych ze względu na pochodzenie, główny mechanizm wyjaśniający funkcjonowanie sieci, sposób koordynacji sieci oraz autorską typologię modeli sieci organizacyjnych ze względu na kryterium charakter i złożoność relacji w nich występujących. Opracowana typologia wskazuje na cztery główne kategorie modeli sieci organizacyjnych: sieci biznesowe, sieci franczyzowe i agencyjne, sieci publiczne i współczesne modele sieci złożonych.

Słowa kluczowe: sieć organizacyjna, typologia, model

Outsourcing and communication technologies in the sphere of enterprises accounting-information support

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Abstract: The delegation of accounting functions becomes current for reducing intensive work; minimizing administrative costs; preventing fines and financial sanctions for violating accounting and tax laws in a post-industrial economy. The prospects of accounting with the involvement of outsourcing institutions in the enterprise are given in the article. The advantages and disadvantages of outsourcing are substantiated. The delegation variants of accounting works with providing information security of the enterprise are considered. The organizational differences in the outsourcing services provision by person entrepreneurs and entities are determined. The role of communication technologies in the dialogue between the enterprise and the outsourcer is outlined. The possibilities of organizing accounting work outside the enterprise, remote counseling with representatives of the outsourcer, fiscal services or other state controlling bodies with the use of communication technologies are researched for the real-time adjustments of certain actions for making decisions.

Key words: accounting, outsourcing, communication technologies, accounting and information support

1. Introduction

Permanent changes in the normative provision of accounting and reporting, the solution of legal and taxation issues lead to complication of economic activities of enterprises. Financial sanctions for violation of tax and other legislation have caused the occurrence of significant unproductive losses in business. The reason of business losses is the lack of qualifications and competence of persons engaged in accounting, the formation of financial, tax and other reporting. In small enterprises, the problem lies in not loading the accepted accounting workers by processing of information. Employees must also be competent in any matters related to the organization of accounting and taxation to solve legal, managerial and other issues.

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Such work can be performed only by a person who owns certain competencies, material and information resources. Executors of accounting and tax functions are outsourcing companies acting as separate legal entities and private entrepreneurs who perform the accounting and reporting work on a contractual basis. Delegation of certain accounting functions or works to these executors will improve information provision, competently solving the most complex issues in the management and taxation of an enterprise.

Ukrainian legislation provides for various forms of accounting organization in enterprises. In accordance with the Law of Ukraine "On Accounting and Financial Reporting in Ukraine" and, in particular, the amendments to this Law dated 5 October 2017, the company independently selects the forms of accounting organization, including its maintenance principles (Law of Ukraine). Among them:

- introduction of an accountant position to a company's staff or creation of an accounting service headed by a chief accountant;
- using the services of a specialist registered as an entrepreneur without creating a legal entity;
- accounting on a contractual basis by centralized accounting or other business entity;
- accounting by a self-employed person engaged in accounting and/ or auditing activities;
- independent accounting and reporting directly by the company's owner or manager.

This form of accounting organization cannot be used in public enterprises or institutions. Various options for the organization of accounting work in Ukraine and in the world practice can be used. Among them is the transfer of accounting and reporting functions to other legal entities or individuals. More and more outsourcing forms of accounting and reporting are applied in Ukraine.

The main aim is to research the advantages, disadvantages of outsourcing accounting and the prospects of information technology used in delegating accounting functions. The tasks of the paper are:

- generalization of history and prospects for outsourcing accounting;
- identifying the advantages and disadvantages of outsourcing accounting functions;
- systematization of organizational options for outsourcing in accounting and financial reporting;
- researching of the role of information technologies in the communication process of outsourcing.

At the basis of scientific research is the hypothesis of transferring accounting functions to third-party institutions (outsourcers) and remote work of accounting specialists with information and communication technologies, which makes it possible to abandon organizational structure—accounting office.

During the scientific research, along with the use of traditional methods, an epistemological method will be used to clarify and deepen the content of concepts and categories in the field of theory and methodology of outsourcing in accounting and financial reporting. In the course of doing research for experts, a thematic-oriented (specialized) methodology will be applied using the foundations of normative and positive accounting theory to study the structure of the theory of outsourcing accounting, its elements and the relationships between them; the methodology of outsourcing accounting functions, which consists in the definition

of three qualitative independent and interrelated methodological levels: subject-conceptual, economic-legal and logical, which provides methodological orientation to measures for the development of outsourcing accounting with using information and communication technologies.

2. Outsourcing in the accounting and financial reporting

Outsourcing is the partial transfer of the enterprises work or processes to outside contractors on the contract basis. Outsourcing is the assignment of one entity (customer) to another third-party organization or person to perform certain tasks (functions), business processes. There are various types of work and functions which enterprises can transfer to outsourcing services. Popular outsourcing (along with IT technologies) is outsourcing in the field of accounting and tax, finance and reporting.

The active development of the outsourcing market in the accounting and reporting field in the first place acquired a significant spread in Europe and the USA. At first, the use of outsourcing services was motivated by a decrease in administrative expenses for maintaining accounting specialists, whose functions were delegated to other performers. Over time, the active use of the outsourcing companies' services has become possible with the transfer of the most complex and time-consuming accounting functions.

In Europe, over 86% of small and medium-sized businesses use the services of outsourcing companies, in the USA their number exceeds 92%, and in Israel—96% now. The most common is the functions delegation for the calculation and accounting of wages, taxes and other government fees. Outsourcing services have also been increasingly developed in the countries of the Asia-Pacific region, where the main incentive argument is the high profitability of the outsourcing business (about 30%) with an annual market growth of 10–15% (Heywood, 2004, p. 24). In Ukraine, the initial stage of outsourcing development in the accounting, financial and tax reporting fields came in the mid-1990s, along with the active development of the audit services market (Alyeksyeyev, Patryn and Didukh, 2015, p. 36).

Ukrainian audit firms were the first to introduce the combination of audits with tax advice and assistance in organizing accounting in the enterprise into practice. At that time, the law prohibited accounting functions providing by audit firms and at the same time forming an official audit report on the compliance of financial statements indicators with the real state of affairs. Now accounting outsourcing services are increasingly provided not only by audit firms, but also by specialized consulting companies in the accounting and legal field—outsourcers.

The outsourcing process is characterized by the following features:

– the need to conclude a long-term (not less than a year) contract with a specialized outsourcing firm on the certain functions transfer;
– transfer to perform only certain functions that are not the main activity of the enterprise;
– fees for outsourcing services in accordance with the contract;
– periodic reporting to the customer, responsibility for the results of the work.

The latest amendments to the Law of Ukraine "On Accounting and Financial Reporting in Ukraine" stipulate that a specialized accounting (auditing) company conducts accounting and reporting for the company, then such reports are signed by the enterprise head, as well as by

the head of this company. The responsibility of an outsourcing firm should be determined by law and the contract for the provision of accounting services.

Experts identify the advantages and disadvantages of accounting and reporting by an outsourcing company (Table 1).

Table 1. The advantages and disadvantages of outsourcing in the field of accounting and reporting

Advantages	Disadvantages
1. Professionalism—the best organizational, methodological and technical work.	1. Threats to the confidentiality of information—insufficient guarantees in its non-disclosure.
2. Independence from the business scale—there is no need for recruitment and reduction of personnel, expenses for their studies, etc.	2. Inoperability of obtaining information through organizational and territorial remoteness.
3. Competence—more qualified human capacity, the relevant regulatory and information base.	3. Human factors—staffing of outsourcing companies, the impossibility of combining professions.
4. Responsibility—clearly defined by the terms of the contract with the outsourcing company.	4. Cost factors—the price of services, which includes overhead costs and profits of outsourcing companies.
5. Optimization of expenses—reduction of expenses, avoidance of sanctions for mistakes in accounting and taxation.	5. The threat of bankrupcy by outsourcing companies.

S o u r c e: Authors' own elaboration.

It should be noted that the professionalism of the outsourcing companies is more professional than the competence of the accountant of a small or medium-sized enterprise, which must provide all parts of the accounting work, have information about the latest changes in taxation and other areas of economic life. Outsourcing firms have a more complete and high-quality regulatory information base, technical tools and work experience. The most difficult and responsible areas of accounting and analytical work are assigned to them.

A team of researchers led by F. F. Butynets' has compiled a list of the advantages of accounting by an "external accountant": no need for financial reporting and monitoring regulatory changes; less need for qualified company personnel; financial responsibility of third parties for accounting errors; the possibility of obtaining qualified assistance from an outsourcing firm consultants (Butynets', Voynalovych and Tomashevs'ka, 2005, p. 97).

The advantage of outsourcing is the possibility of using the experience and professionalism acquired during the activity. The enterprises often spend significant resources to solve various problematic issues. An outsourcing accounting company usually has ready-made answers to solving such problems.

Among the disadvantages are the doubts of individual specialists regarding the reduction of an outsourcing company costs to processing information. G. P. Zhuravel', V. B. Klevets', V. M. Oliynychuk and P. Ya. Khomyn notice that the usefulness of accounting outsourcing is greatly exaggerated. An outsourcer recruits employees and performs settlement operations similar to an enterprise that have applied for outsourcing services. In addition, the outsourc-

ing services cost is 15–25% of the profits, which casts doubt on the savings from the delegation of accounting functions (Zhuravel', Klevets', Oliynychuk and Khomyn, 2013, pp. 38–41).

There are certain threats to ensure the confidentiality of account information. Although the terms of non-disclosure are usually prescribed in an agreement with an outsourcer, in practice there are often cases of disclosing confidential information by an outsourcer. It is difficult to control the implementation of the functional responsibilities of outsourcers. Third parties access to accounting information can adversely affect the enterprises cyber security.

A combined approach is used to interact with its own accounting and control unit with an external consulting (outsourcing) company for solving the problem moments. The company's own accounting department processes information for management accounting purposes. A limited amount of information is transmitted to an outsourcer for organizing financial accounting and generating financial statements. The distribution of functions provides the necessary information security of the enterprise. In case of breach of confidentiality by an independent firm, only accounting data of financial accounting and financial reporting, which in most cases is public, can be subject to disclosure. The data of the management accounting, containing the commercial secret, do not go beyond the information boundaries of the enterprise.

Another organizational model of accounting functions delegation provides for the absolute transfer of financial accounting and management accounting to an independent firm, but only for individual geographically separated divisions or branches of an enterprise. Accounting and internal control of the parent company is maintained by the company's full-time employees. Subsidiaries are fully serviced by the outsourcer. This model is recommended to be implemented by transnational corporations, foreign branches of which, for accounting and control, must comply with the regulations of the country in which they operate. Delegation of accounting and control functions will ensure proper organization of accounting and control, as much as possible adapted to the national peculiarities of the countries legislation where the enterprise divisions are located.

3. Delegation of accounting functions to self-employed individuals

The modern technical using provides great opportunities for remote exchange of accounting information. S. V. Ivakhnenkov notes that the use of information technologies such as the Internet, virtual accountant workplaces, and network lines of communication provides an opportunity for accountants and auditors to work outside the enterprise (Ivakhnenkov, 2003, p. 24). According to Annie Britton and Chris Waterston, the efficiency of accounting in the electronic network is growing in comparison with the unallocated accounting data processing due to the compatible use of the accounting system database (Britton and Waterston, 2010, p. 324).

Accounting and management specialists can perform functions outside the enterprise. Work at home is becoming more popular with the development of communication technology. 24-hour workday is provided with minimal expenses for the arrangement of a specialist's workplace. Accounting far away from the enterprise information field provides the ability to delegate accounting authority. 5% of employees aged 15 to 64 in the European Union often worked at home in 2017 (Eurostat, 2018a).

The highest rate of work at home is in the Netherlands (13.7%), Luxembourg (12.7%) and Finland (12.3%). Ukraine (0.2%) with Bulgaria and Romania occupy the lowest ratings for working remotely. The largest percentage of people working in Ukraine at home is employed in the development and testing of software.

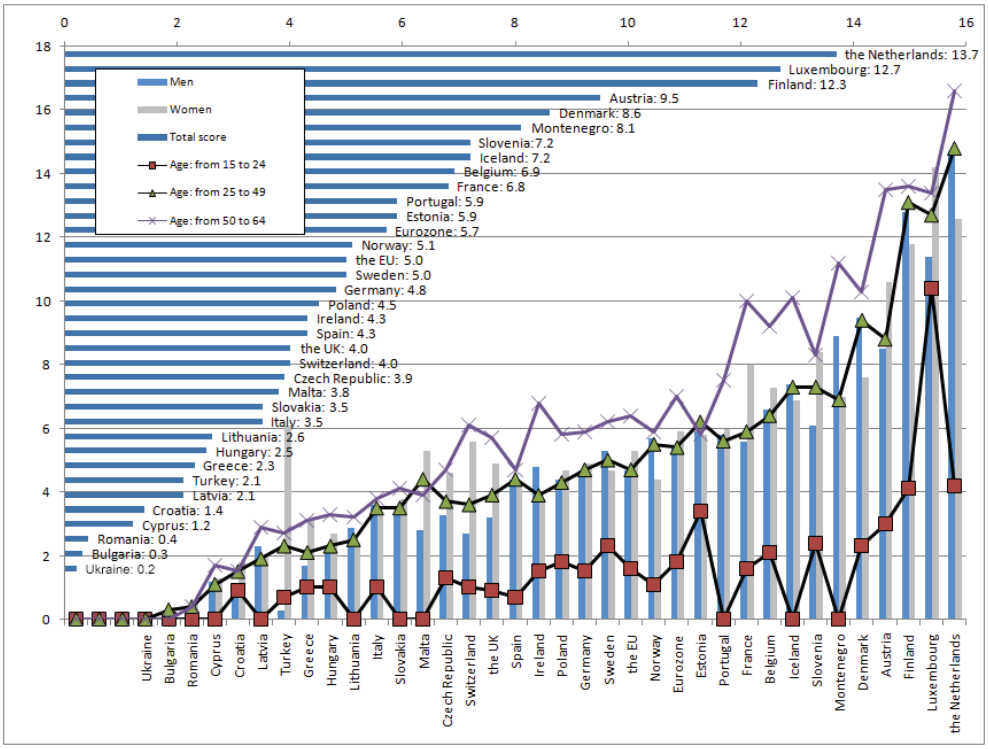

Figure 1. Percentage of people working at home by country, gender, and age group

S o u r c e: Eurostat, 2018a.

The percentage of people working at home has grown in the past years in general and according to gender and age groups. An interesting fact is the tendency to increase the percentage of women working at home in the EU countries (5.3% in 2017) compared to men (4.7%). The statistical data confirm a significant age-gradation of remotely working persons. Only 1.6% of people in the age group of 15 to 24 worked at home, among such workers at the age of 25–49—4.7%, and 50–64— 6.4% (Eurostat, 2018a).

Work at home using the modern communication technology significantly changes the accountants' work. Registration of entrepreneurs with the fulfillment of the main functions at home on the basis of self-employment is most manifested in the field of accounting, law, software and computer services (Figure 2).

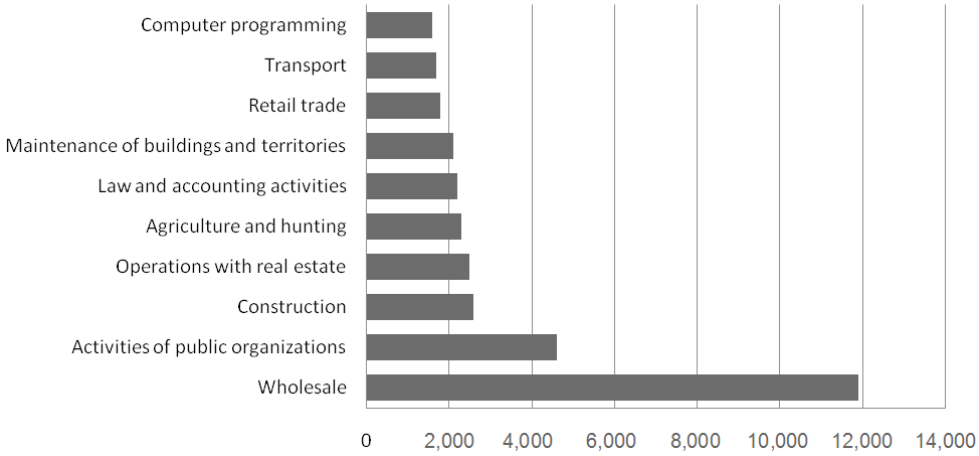

Figure 2. Registration of new legal entities in Ukraine by the type of activity in 2018

S o u r c e: Romanyuk, 2018.

Law and accounting activity among legal institutes is gaining popularity (sixth in terms of the number of newly created economic agents) (Romanyuk, 2018). The actual trend in the accounting services market is the delegation and computerization of accounting processes.

4. The role of communication technologies for a dialogue between the enterprise and the outsourcer

The growing popularity of outsourcing is possible with the effective using of communication technologies. By introducing Internet communications technology into accounting and management processes from an outsourcer one can receive ready-to-use accounting information. Modern software products are developed not only for computer equipment, but also for communication devices in the form of add-on programmes. Accounting computer programmes integration with various communication technologies significantly increases the functionality of the software. The software market is developing in the direction of combining the functionality of personal computers with mobile telecommunications devices based on cloud databases and information services.

Delegation of accounting functions provides for the cloud virtual data processing services using. Cloud computing is a technology of distributed data processing in which information resources and functionality of computer equipment are provided to the user as an Internet service. Cloud technologies provide processing and storage of accounting information using software. The company minimizes the cost of technical devices, computer programmes and the maintenance of specialized personnel. Employees of the company receive and process the information in the Internet browser of a personal computer or mobile device.

More clearly, the tendency to increase the mobility of electronic processing accounting information is demonstrated by statistical data about enterprises of the European Union which give portable devices for performing functions to their employees (Eurostat, 2018b) (Table 2).

In 2017 in Europe, 70% of business entities gave mobile phones, tablets, laptops to their employees for performing functional duties. Direct access from the software to assistance databases and the Internet provides the outsourcer with help at any stage of the activity. Modern business communications are significantly transformed using the chat system. Chat provides assistance with the performance of accounting functions. The accounting and management specialist has the opportunity to consult in real time with an outsourcer, a fiscal, statistical service, or other government regulatory agencies regarding the appropriateness and correctness of management decisions.

Table 2. Enterprises giving portable devices for a mobile connection to the Internet to their employees for performing functions in the EU (in %)

Region/ Country	Years			
	2014	2015	2016	2017
the European Union	66	65	69	70
Belgium	70	66	80	72
Czech	65	57	77	79
Denmark	89	91	92	92
Germany	71	65	67	66
Ireland	67	68	71	76
Greece	41	46	48	52
Spain	53	61	76	80
France	69	76	72	75
Croatia	72	83	83	83
Italy	67	63	65	71
Hungary	64	62	66	70
the Netherlands	70	73	69	77
Austria	76	78	76	81
Poland	64	62	65	70
Portugal	67	70	71	71
Romania	39	41	43	50
Slovenia	71	76	78	81
Slovakia	80	77	74	82
Finland	89	92	94	92
Sweden	85	85	78	77

S o u r c e: Eurostat, 2018b.

Electronic chat technologies simplify simultaneous work of several accounting and management specialists with an outsourcer. The implementation of chat communication systems allows the staff to work outside the enterprise.

5. Conclusion

The accounting and control organization using information and communication technologies on the basis of delegation of accounting and control functions to an outsourcing firm or private individual ensures the completeness, reliability, efficiency of obtaining information for management, its adaptation to changes in the internal and external environment. At the same time, the implementation of an organizational model with full delegation of accounting and control functions needs further research in the direction of maintaining confidentiality, compliance with the rules of information security of the enterprise and consolidation of the final information. Outsourcing accounting by the outsourcing audit firm with a good reputation and experience in work brings greater benefits than self-sustaining accounting.

The developments of information and communication technologies automate most of the accounting processes in a future. Additional transferring accounting functions to third-party institutions (outsourcers) as well as remote work of accounting specialists using information and communication technologies make it possible to abandon the organizational structure—the accounting office.

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Аутсорсинг и коммуникационные технологии в сфере учетно-информационного обеспечения предприятия

Аннотация: В условиях постиндустриальной экономики приобретает актуальность делегирование учетных функций с целью уменьшения трудоемкости работ, минимизации административных расходов, недопущения штрафов и финансовых санкций за нарушение законодательства в области бухгалтерского учета и налогообложения. В статье изложены перспективы ведения учета на предприятии с привлечением аутсорсинговых институтов. Обоснованы преимущества и недостатки аутсорсинга. Рассмотрены варианты делегирования учетных работ с обеспечением информационной безопасности предприятия. Определены организационные различия предоставления услуг аутсорсинга физическими и юридическими лицами. Изложена роль коммуникационных технологий в проведении диалога между предприятием и аутсорсером. Обусловлены возможности организации учетной работы за пределами предприятия, дистанционного консультирования представителями аутсорсера, фискальной службой или другими государственными контролирующими органами с использованием коммуникационных технологий с целью выполнения в режиме реального времени корректировок определенных действий для принятия управленческих решений.

Ключевые слова: учет, аутсорсинг, коммуникационные технологии, учетно-информационное обеспечение

Informacja w rachunkowości przedsiębiorstwa – technologie outsourcingowe i komunikacyjne

Abstrakt: W gospodarce postindustrialnej delegowanie funkcji księgowych staje się istotne w celu ograniczenia kosztów pracy, zmniejszenia obciążeń administracyjnych, zapobiegania karom finansowym za naruszenie przepisów prawa podatkowego. W artykule przedstawiono perspektywy rachunkowości w przedsiębiorstwie przy zaangażowaniu instytucji outsourcingowych. Zaprezentowano zalety i wady takich rozwiązań, naświetlono problem powierzenia prac księgowych firmie zewnętrznej w kontekście zapewnienia bezpieczeństwa informacji w przedsiębiorstwie. Określono różnice organizacyjne w świadczeniu usług outsourcingowych przez osoby fizyczne i prawne. Przedstawiono rolę technologii komunikacyjnych w prowadzeniu dialogu między przedsiębiorstwem a zleceniodawcą, a także możliwości organizowania pracy księgowej poza przedsiębiorstwem, w tym konsultacje zdalne z przedstawicielami outsourcera, ze służbami podatkowymi lub z innymi państwowymi organami nadzorującymi, z wykorzystaniem dostępnych technologii komunikacyjnych w celu dostosowania niektórych działań w czasie rzeczywistym, aby móc podejmować decyzje zarządcze.

Słowa kluczowe: rachunkowość, outsourcing, technologie komunikacyjne, księgowość i wsparcie informacyjne

The use of IT tools and social media in customer relationship management

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Abstract: The purpose of the article is to identify and characterize IT instruments and tools used in customer relationship management (CRM) and to present the results of empirical research. In particular, the article presents the essence and elements of the customer relationship management system (CRM), determines its importance in the functioning of the company and shaping business relations with stakeholders. Especially, a lot of space is devoted to a discussion on information technology in the development of CRM. A selection of more important IT tools supporting CRM are characterized, such as the database management subsystem, Internet services, social media (social CRM), cloud computing, ERP/MRP III applications and Big Data, highlighting their advantages and disadvantages and applications. The empirical section of the work contains a description, including the significance and benefits of use, of e-learning in the development of the CRM system and the conditions for its implementation.

Key words: customer relationship management (CRM), database management subsystem, ERP/MRP III applications, social media, sCRM, cloud computing, e-learning

1. Introduction

Creation and development of an organization in the modern globalized world of science and technology requires gathering of information resources in various areas of its functioning. In particular, information characterizing changes occurring in its environment is important. The collection, storage and use of information stimulates rapid technical and IT progress, among others in the field of communication. This significantly speeds up obtaining of necessary information. The collection of information used in the organization constitutes its information resources. Customer knowledge resources as

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well as the ability to use it are particularly useful. Although this knowledge is possessed by every company, what is important is its integration.

In recent years, there has been a significant change in the approach to marketing management, new marketing concepts and techniques have been put into practice; among others, increased interest of enterprises in strategic and operational aspects of customer relationship management (CRM) has been noted. Also, in this area it is necessary to develop properly constructed marketing information systems. Although this system can operate without an IT subsystem (this solution can be found in some companies), it is necessary in most organizations. It is therefore worth considering the selection of IT tools to support this system.

The purpose of the publication is therefore to identify and parameterize IT tools that support CRM and to present the results of empirical research. The effectiveness of IT tools is presented in the context of implementation of the marketing function of the enterprise in relation to its competitiveness.

The article is theoretical and empirical. To achieve the goal and verify theses, the following research methods were used: analysis of impact factors, expert research and questionnaire method.

2. The concept of customer relationship management (CRM)

Significant changes that have occurred in recent years have concerned all areas of management, including marketing and marketing management. They consist mainly in changing the approach to the customer. As mentioned, one of them is the application in practice by many companies of the customer relationship management (CRM) system, as a specific variation of the marketing information system (MIS). The development of the concept of customer relationship management (CRM) is largely a response to changes and transformations of customer behaviour such as (Sołtysik-Piorunkiewicz, 2008, p. 73; Adamczyk, 2002):

- less and less customer loyalty;
- increased competition and the cost of acquiring new customers;
- increasing experience and customer requirements for suppliers;
- less and less effective promotional, advertising and even PR activities;
- greater production flexibility, which allows products to be adapted to the needs of demanding customers;
- increase in the number of distribution channels and their types.

The authors dealing with this issue consider this concept in two aspects: in the first approach, CRM is defined as a certain marketing philosophy in relation to the customer. In this sense, customer relationship management "can be defined as a concept or field of management dealing with methods of maintaining the most profitable customers while reducing costs and increasing the value of interactions—which increases profit" (Burnett, 2002, p. 279). In the light of the above, this concept covers every sphere of the organization's activities, especially that which concerns customer service. It can therefore be concluded that CRM is to a large extent a psychological approach towards the customer aimed at building

customer loyalty towards the products or services offered by the company, and thus towards loyalty to it. It can function even without IT support.[1]

In the second aspect, the customer relationship management system is defined in relation to IT, and more specifically ERP (enterprise resources planning) class systems. In essence, it is therefore an IT system supporting all contacts with customers, both before and during a sale, as well as after a sale. The definition of CRM thus understood is the most widespread among management theorists and practitioners.

The overriding goal of using a customer relationship management system is to acquire and retain customers. When creating a CRM strategy, you must determine what values are preferred by the customer and then provide them. It is believed that a company should treat each customer individually, rightly assuming that it is an entity with specific preferences (*one to one clienting*). The key tasks for CRM are (Newell, 2002, p. 31):

- identifying those customer values that are relevant to a particular business;
- understanding the relative importance of these values for each customer segment;
- decide whether providing these values will have a positive effect on your net profit;
- transfer and delivery of relevant values to each customer segment in a manner that the customer would like to receive;
- measuring results and guaranteeing investment profitability.

The initial stage of implementing this system is to obtain relevant customer data. This is usually done with the consent of the customer. Then they are used mainly to make every effort not to lose the customer.

The starting point in the implementation of CRM is to create an enterprise information architecture in which all the elements of the planned project must find their place. The purpose of creating such architecture is to develop a map showing subsequent contractors what interaction and cooperation should occur between individual parts or components within the entire system. This kind of map for the CRM enterprise is the corporate information architecture of the company aimed at providing knowledge acquisition mechanisms and its distribution based on data from existing operating systems in the enterprise (Wurm, 2002). Most CRM systems contain the following elements of corporate information architecture (Cegielski, 2002, p. 308):

- sales (contact management, customer account management);
- sales management (prediction, sales cycle analysis);
- time and territory management;
- correspondence (e-mail, fax, SMS);
- marketing (advertising campaign management, product encyclopaedia, price lists, offers, campaign effectiveness analysis);

[1] In the psychological approach to CRM, numerous techniques of analysis and improvement of this strategy are used, such as scial CRM together with a communication platform based on so-called *customer generated media*, *customer segmentation* and *customer care* (see Sołtysik-Piorunkiewicz, 2008, p. 75; Kaszyca and Zacharski, 2015). A different approach to the essence of CRM, in the first stream, emphasizes that this is a new strategy, process and culture that allows organizations to better understand the needs of customers and gives the opportunity to increase companies' profitability (Kaszyca and Zacharski, 2015).

– handling commercial notifications (receiving and distributing information about customers interested in the offer within the company's structures);
– telemarketing (arranging telephone lists of target groups according to given criteria, collecting orders);
– after-sales customer service and support (assignment, tracking and reporting of tasks, problem management, order control, warranty);
– information (wide and easy to use reporting function);
– integration with ERP systems (accounting, production, distribution);
– data synchronization between mobile devices and a central database;
– e-commerce;
– call centre;
– assessment of the effectiveness of corporate information architecture.

There are three types of CRM system in the business practice of enterprises (Frąckiewicz and Rudawska, 2005, p. 56):

1) operational CRM system (*front-office*);
2) analytical CRM system (*back-office*);
3) communication/ interactive CRM system.

The operational CRM system covers all areas at the customer-enterprise interface. It includes such functions as: customer service, order management, billing, invoicing, configuring offers, sales management, updating customer databases as well as their automation and marketing management, with the use of registration modules. These include all activities, even the smallest, such as the gesture of greeting the customer. The information about the customer collected and its sharing allows for a full and comprehensive service. It is synonymous with ERP class systems.

Analytical CRM system. The main task of this system is the analysis of data on individual customers of the company. These data are subject to statistical analysis. This is to provide information that will help to make the right decisions. Thanks to this, the company can shape appropriate offers for customers, and based on them create appropriate reports. The basic functions of this CRM system are: collection, storage, processing and interpretation of customer data in the form of reports. This approach mainly uses databases as well as customer data warehouses.

The communication/ interactive CRM system relies on direct contacts between the customer and his supplier via available communication channels. This solution uses both traditional tools, such as face-to-face conversations, surveys, call centres, and modern technology (mainly the Internet). This system has the greatest impact on shaping customer relationships. It is the communication CRM system that is the most responsible for creating and maintaining a proper relationship with the customer thanks to the complete independence of the service quality level from the contact channel used (*CRM as an IT system = CRM jako system informatyczny*, 2019).

The combination of the above-mentioned types of CRM systems creates an integrated enterprise CRM system.

The following modules can be distinguished in CRM systems (Buchowska, 2006):

– sales support (*TES—technology-enabled selling*);

– marketing support (*TEM—technology-enabled marketing*);
– customer service and support (*CSS—customer services and support*).

The use of CRM systems is intended to help in acquiring new customers, maintaining existing ones, reducing administrative costs of commercial activities and finally building a comprehensive database of existing and potential customers. These systems are mainly used in the micro, small and medium enterprises sectors.

CRM class systems supporting management are becoming more and more popular. This is indicated by the results of some studies of limited nature, and by the Central Statistical Office.

At the beginning of the twenty-first century, i.e. in 2000–2005, several percent of the surveyed enterprises had CRM systems at their disposal, the majority intended to start work on the implementation of this system (about 55%), while 22% thought that such a system was unnecessary for them (Process4E, 2001). More recent studies have shown a significant increase in the use of CRM. Currently, more than half of enterprises and institutions have introduced these solutions to a full or limited extent (Olszak, Bartuś and Bilewicz, 2015, p. 189; Kowalczyk and Narutowska, 2013, p. 103; GUS, 2012).

3. The functioning of selected IT tools in customer relationship management

As already mentioned, the CRM system is based mainly on acquiring, maintaining and servicing customers. However, progress in the field of information technology has resulted in the automation of these activities. In addition to traditional tools such as trade negotiations, face-to-face conversations, call centres and market research, modern technology is also used. The most commonly used IT resources in customer service are:

– database management systems;
– Internet services: use of websites (World Wide Web), electronic mail (e-mail), FAQ (Frequently Asked Questions—a set of common questions and answers), chatrooms, IRC (Internet Relay Chat), video conferences, NetMeeting;
– ERP applications;
– CRM applications (packages);
– document archiving system;
– mail merge management system.

Database management systems (DMS) are software enabling the use of customer databases.

A database is a collection of interrelated information stored in a computer's internal memory. The specified database set creates a data warehouse. This is a specially constructed IT system integrating all necessary information resources that are important for the enterprise. According to Immon, the data warehouse is an integrated, time-stable thematic data warehouse enabling the acquisition of information (Mierzejewski, 2001, p. 18). Often—in order to increase the efficiency of analytical activities—so-called themed warehouses (data marts) are created. Enterprises using CRM have databases containing information not only about customers, but also about employees, products manufactured and the environment. The con-

struction of the database is time consuming and must be constantly updated. A specific kind of database are those used to perform analyses based on collected data (data mining). They are intended to develop segmentation, discover relationships between customer descriptive features, and build classification rules (e.g. rules that assign a newly acquired customer to an appropriate group in which a product with the highest probability of sale is determined) (Wurm, 2001, p. 396). Many authors include in this group OLAP (On-Line Analytical Processing) direct analytical processing systems. This tool supports decision making, data processing and reporting.

The person responsible for the proper functioning of database management systems is the database administrator. He supervises the correct collection of data, their storage, organization as well as their processing (updating).

The most commonly used database management system is Access, which operates in the Windows environment. Its functioning is based on building relationships between data, e.g. customer-product relationships. This means that customers buy a certain number of products and that a certain number of company products are bought by the customer. Other commonly used DMSs are: Oracle, Informix, On Line, Sybase, SQL Server (Aingres).

The Internet is the most popular tool used all over the world, including in companies using the customer relationship management system (mainly via contact CRM). Generally, it is defined as "a global computer network made up of smaller networks" (Kiełtyka, 2002, p. 327). It is a system combining various techniques of information transfer.

The predecessor of the Internet was a tool called the customer service centre (*call centre*). This was based on the company's employees answering every customer's questions. In this case, only landline telephony was used. The employees of the company treated each conversation with the customer as unique. The effectiveness of this system depended on the speed of answering customer questions.

The most popular Internet tools are websites (*World Wide Web*). This is the multimedia section of the Internet. The company presents various information here to attract customers based on their preferences. This includes information about the company's current operations, presentation of manufactured products or services, etc. Via the Internet, customers can purchase specific products (so-called online store), make bank transfers, download foreign language lessons (so-called e-learning), etc. A web browser is used to search for this information. When creating websites, you should consider mainly the substantive content. Companies often encourage their customers to cooperate in their creation.

Electronic mail (*e-mail*) is another tool used by companies, including those using CRM over the Internet. It involves the company communicating with customers via an email account. Information on products, both current and recently produced (so-called *direct mail*), along with their presentation, photos, etc. is sent to the address provided by the customer. In addition, companies provide here additional information, such as: discounts, price reductions for permanent customers, information about organized competitions. This is aimed at to increasing customer loyalty. At the same time, customers can communicate with the company by submitting their comments on the products or services offered, presenting their preferences, and also receive necessary information from specialists (using the FAQ—*Frequently*

Asked Questions). They can also order the company's information bulletin (so-called *newsletter*). It is also used to attract new customers.

Chatrooms are a common Internet tool used by businesses. These are special discussion places on the web. They are run with even several people participating simultaneously. The customer, without moving from home, can have a conversation on a topic of interest, called a conversation. However, for such discussion to take place, participants must be on the same website at the same time. Companies on their websites often inspire such discussions, mainly about the products or services provided. IRC (*Internet Relay Chat*) is a specific discussion tool.

Companies using CRM can simultaneously organize video conferences. These are conferences held via the Internet. They consist of two or more teams of people as well as individuals who are discussing a particular topic. The advantage of this tool is that participants can hear and see each other.

Considering information and information technology tools, the role of the Internet today cannot be ignored. In addition to providing tools successfully used in the broadly defined e-marketing business, the Internet is primarily a huge source of information about current and future customers. The functioning of a company on the Web is indispensable today, a modern customer is looking for information about the goods he is interested in, primarily on the Internet, he also makes purchases there (according to this year's Gemius report: "E-commerce in Poland" [Gemius, 2019], 62% of Internet users in Poland buy online).

It is only possible to get information about customers visiting the classic website on what they were interested in, what information interested them the most and which the least, or the location of the visitor. However, such data acquisition does not allow the customer to be identified, but only gives him personalized content when he visits the company website again. This approach to the customer, however, can be perceived as intrusive and unwanted as well as ineffective, because Internet users have effective tools that can protect them from information being collected about them. These are programmes built into modern Internet browsers that provide protection against tracking and profiling, and so-called ad blockers[2] will effectively block the display of profiled ads. This problem can be solved by getting the information sought from the potential customer by him leaving his contact details (e-mail address or telephone number) enabling personal contact, and thus establishing the desired relationship with the customer.

The data that can be obtained about online store customers is of a different nature. In this case, the buyer wanting to make a purchase must register in the company's database, this is necessary due to payment and delivery of the goods. In this case, the owner of an e-store has the ability to precisely track customer's activity, which will allow for effective personalization and sending of an offer addressed to a specific person, rather than sending a newsletter or the latest catalogue.

The telecommunications tool used by companies that use CRM is the mobile network. It is used to communicate with customers. In addition to the features of a traditional telephone, it has many modern services for transmitting information. These are, among others, voicemail (sending information using text graphics), tools for sending faxes, SMS, MMS (i.e. sending

[2] Adblock: a computer programme that allows the blocking of ads on a web browser.

short information using text graphics). At the same time, a wide range of Internet services can be used with the help of a mobile phone.

ERP (*Enterprise Resource Planning*) applications called MRP III (*Money Resource Planning*) are applications used to support such areas of the enterprise as e-business, production, supply, warehouse control, etc. This makes it easier for managers to make specific marketing decisions. It is a class of integrated management systems. The main advantage of this system is the ability to operate in conditions of uncertainty resulting from incomplete data. In addition, it can be used to make planning decisions even in an organization with an incomplete structure. In enterprises using the CRM strategy (mainly operational CRM), applications of the ERP/MRP III class primarily support decision-making regarding customer acquisition and service.

Many companies and other organizations use specific applications called CRM packages. They are used in the area of communication with customers (channel management), e.g. applications such as data mining or Business Intelligence, planning and conducting marketing campaigns, support the company's activities for closer cooperation with customers as well as suppliers and cooperators.

In addition, companies, including those using CRM, are increasingly using cloud computing. This is associated with an increase in the demand for data storage for analysis and decision making.

Cloud computing is a broad concept related to data processing and the way services are delivered. It is a type of Internet-based processing where shared resources, software and information are delivered to computers and other devices on demand at lightning fast speed. The following types of cloud computing model can be distinguished:

1. Infrastructure as a Service (IaaS)—the recipient gets a virtual server with specific resources (CPU, RAM, Disks) with or without an operating system installed. Only disk space can be an option. CRM in this model works as follows: as part of the subscription fee we gain access to our CRM system fully maintained by the service provider, which takes responsibility for updates and the stability of the system. This solution is certainly the most convenient, but at the same time burdened with the greatest restrictions in the context of adapting the system to specific business needs and proper compliance with the provisions regarding the storage of private personal data (Evolpe, 2019). More knowledge in the field of IT systems administration is also needed.
2. Platform as a Service (PaaS)—the recipient gets a ready platform for application development in accordance with the specification (database, application server, programming tool). They must install the system themselves and ensure the correct configuration of the environment. Companies applying CRM rarely use this model.
3. Software as a Service—the recipient gets a ready-made application or business platform as well as software design tools, e.g. Microsoft Windows Azure, Google App Engine.
4. However, the greatest potential for creating and maintaining relationships with customers today is social media, i.e. websites that have set themselves the goal of satisfying the needs of Internet users in maintaining social bonds. This is accomplished by enabling the exchange of thoughts, sharing personal resources such as photos and videos, interests and views, or the realization of the desire to share emotions and experiences.

It is estimated that around 3 billion people are active in social media today, establishing relationships at often very close levels. The nature of these media makes them also a valuable source of information about customers. This is not only personal information but above all the preferences of their participants, interests and trends.

Social media is the result of the natural development of the Internet from a network that provides only content for reading and viewing, to an interactive and multidirectional network. In the age of the so-called Web 1.0 there were a small group of professionals who could create and deliver content, and the rest of the community were consumers of that content. Everything changed when tools that enabled all Internet users to create and publish their own information were created and made available. These were hosting services, easy-to-use website generators, blogs, forums and wikis. These tools broke the monopoly of specialists and opened wide access to resources of the global network, socializing the Internet by being able to easily add their content, co-editing and commenting. In 2004, the term "Web 2.0" appeared, described by Dale Dougherty (O'Reilly, 2005), which formulated a number of features of the new quality of networks such as social programming, participation, harnessing the power of the crowd, democratizing the network, user contribution.

Social media are characterized by their own characteristic way of functioning. The first distinctive factor is the creation of virtual communities centred around people, ideas, social phenomena, interests and other manifestations of social life. These communities create virtual bonds between their members based on mutual trust, a common group of friends or shared views. Another factor is the ability to express your own opinions, share your impressions, give support or disapproval, strengthen or weaken relationships. The most important factor that makes social media such a popular communication channel is participation in creating a community, expressing of opinions that influence the authors of blogs, profiles on social networks, maintaining them in real life, contributing to content extends and enriching the community.

The modern customer relationship management (CRM) system must take into account the above features of the social medium in its functioning:

- create a customer community around the company profile;
- eliminate asymmetry in contacts with customers;
- enable customers to express opinions and pass on their own ideas and concepts for the business;
- provide customers, members of the enterprise community with a sense of having additional status as a valued member of a group;
- through appropriate actions on popular social networking sites, strengthen customer confidence in the brand and company, and strengthen the sense of responsibility for the brand and company.

The system using social media to maintain proper relationships with customers is called social CRM (sCRM), such a system plays two roles (Sudolska, 2013 p. 6):

- providing information;
- establishing and maintaining bonds.

Social CRM is part of the overall business concept of how a company operates on the Internet. Social media marketing allows direct and indirect sales through profiled selection of the offer to the customer, shaping the proper image of the company and its reputation on the web. In turn, the second part (sCRM) focuses on monitoring customer sentiment, responding to changes in these, taking actions related to satisfying the needs indicated on blogs, profiles, forums. An important element of sCRM is enabling customers to cooperate with the company, taking into account their postulates expressed in the area of social media.

The above activities are implemented by the modern Social CRM system using such means as (Sudolska, 2013, p. 8):

– information about new products;
– information about promotions and special offers;
– open discussions with customers;
– technical support;
– private customer correspondence;
– collecting customer ideas for new products.

An interesting aspect of the functioning of modern social CRM systems is the enormity of information that such systems are able to obtain and the problem of its interpretation. The integration of the CRM system with social media means that a human and his perceptive capabilities are not able to assimilate and process the data reaching him. This causes problems with identifying emerging problems and making the right decisions at the right time. This problem can only be solved by elements of artificial intelligence with Machine and Deep Learning algorithms operating in SCRM systems in real time.

It is also worth mentioning one more aspect of CRM systems using mobile technologies, the so-called mobile CRM (mCRM). In 2018, smartphone saturation among Internet users reached 90% and is estimated to increase by a few percent annually. Mobile technologies as a marketing channel have not gone unnoticed. The mobile branch of e-marketing has been developing for several years, and mobile CRM is becoming more and more significant.

Mobile CRM is defined as marketing activities related to the use of smartphones and tablets to acquire and maintain relationships between enterprises and their customers. mCRM is therefore a very technologically advanced concept. It is estimated that mCRM is primarily more responsive than sCRM and shortens the time to achieve CRM goals by about 15% to 20%.

At the end of the discussion on this issue, it is worth mentioning applications that improve the quality of customer service. For example, we can mention the document archiving system, which allows storage documents attached to the system in electronic form, and the mail merge management system, with which you can automate the process of sending information to customers regarding new products, promotions, etc. (Kozioł, 2005, p. 196).

Currently, many CRM class software solutions are offered, such as (Kisielnicki, 2014, p. 239; Sokołowski, 2001, pp. 13–14): SAS CRM (from SAS Institute Inc.), My SAP—CRM (SAP company), IFS/CRM (from IFS), Oracle CRM (from Oracle), Dynamics CRM (Microsoft company), TETA CRM (TETA company), SugarCRM, CRM.pad (from Update Software AG).

The use of the described IT tools in CRM systems in many Polish companies has allowed the collection and organization of data and their management. In the final analysis, this has enabled the identification of customer shopping preferences, prediction of their consumer behaviour, organization of sales campaigns on the one hand, and customer segmentation, increasing customer loyalty and efficiency of marketing employees on the other.

At the end of the presentation of CRM IT instruments and tools, it is worth mentioning the difficulties that enterprises often face during the implementation and operation of this system. Formulating the conclusions of the research, the lack of definition of CRM system elements and processes was mentioned first, insufficient training was the second, the third type of difficulty was the misunderstanding of the importance of CRM in the implementation of business processes, the next was the increase in the complexity of the customer service process, in the final analysis these difficulties contributed to the extension of customer service time (Olszak, Bartuś and Bilewicz, 2015, p. 188). These barriers, apart from technological and economic issues, constitute important negative premises for the implementation of CRM.

4. The use of e-learning in CRM systems—research results

The research has accepted the thesis that one of the important IT instruments used in customer relationship management (CRM) is e-learning. During the research, an organizational method was used, which is a questionnaire and statistical methods. In the conducted research, attempts were made to obtain information on business entities from the persons managing them, primarily from owners, board members, directors, managers of an appropriately high level of management.

The research covered 166 enterprises of the SME sector, dealing mainly in the provision of services (47%), production (21%) and trade (13%). The reach of the largest number of companies was the region (37%), fewer companies indicated national (34%) and international (25%) reach. Most of them positively assessed their financial condition (almost 50%), many fewer—29%—rated their financial condition as average, another 10% described it as very good. Only 8% considered their financial standing weak.

Summing up the general characteristics of the companies, it should be noted that the enterprises participating in the study in their economic-organizational and technical-technological structure reflected the structure of the SME sector in southern Poland (Kozioł, 2018, p. 109).

Two categories of enterprises were distinguished, i.e. those that use e-learning (category A) and those not using e-learning (category B).

The research shows that companies using e-learning perform tasks in the area of marketing, finance and training to a much higher extent than companies not using it. In particular, these differences relate to employee training: 67% for category A and 17% for category B; sales and customer service: 87% for category A and 51% for category B; development of a new product, 60% and 32% respectively, and internal communication: 73% and 47%. The above regularities confirm significant differences in the implementation of marketing tasks that exist between both groups in almost all areas of the enterprise studied (see Table 1).

Table 1. Tasks in which the company uses e-learning (in %)

Description	Using e-learning (category A)	Not using e-learning (category B)
Development of a new product/ service	60.00	32.05
Financial management (accounting)	73.33	80.13
Administrative management (personnel)	53.33	48.72
Internal communication	73.33	47.44
Sales (accepting offers)	86.67	51.28
Service (customer service)	80.00	41.67
Purchasing (contact with suppliers)	60.00	44.23
Payment regulation	73.33	68.59
Staff training	66.67	16.67

S o u r c e: Authors' own study based on research results.

It is also worth presenting the importance of training in the implementation and functioning of CRM, especially that related to the architecture and organization of CRM, the use of business processes in the area of CRM, the customer service process, and even the development of a new product. The data in Table 1 showed the great importance of e-learning and other IT tools in the development and increase of the scope and effectiveness of training and employee improvement in the aspect of the implementation of the enterprise's functions, including the marketing function.

Most of the surveyed business entities emphasized the significant, positive impact of modern information technologies on their marketing activities, except that these opinions were more often expressed by companies using e-learning. The results of the enterprise's application of modern e-learning technologies (Internet of Things, database systems, traditional systems—domain information systems and others) are presented in Table 2.

Table 2. Results of a company using modern e-learning technologies

Scale* / Results	1		2		3		4		5		0	
	A**	B**	A	B	A	B	A	B	A	B	A	B
Improving the company's image	0.0	2.0	0.0	2.0	7.1	17.1	25.2	39.1	61.2	34.7	6.5	5.1
Better meeting customer needs	0.0	1.3	0.0	2.7	0	8.2	19.4	45.6	74.5	35.1	6.1	7.1
Increase of the company's market share	0.0	3.7	0.0	7.8	13.8	26.6	39.8	29.5	39.8	21.1	6.6	11.3
Increase in the number of customers acquired	0.0	5.8	0.0	7.0	19.4	30.8	19.4	23.4	55.1	21.9	6.1	11.1
Improving contacts with suppliers	0.0	3.7	0.0	2.2	7.1	14.9	35.7	39.7	53.1	27.3	6.1	12.2
Streamlining the forecasting process	0.0	7.0	0.0	12.7	25.5	30.0	61.2	24.3	7.1	14.2	6.4	11.8

* A scale of 1 to 5 was adopted, with 1 being of little use, 5—very useful (no response was marked 0).
** A—enterprises using e-learning; B—enterprises not using e-learning.

S o u r c e: Authors' own study based on research results.

The collected data shows that 86.4% of category A companies found e-learning information technologies to be useful and very useful, at levels 4 and 5, respectively, in improving the company's image. For group B, this percentage was 73.8%. The positive impact of these IT tools (supporting CRM) on better satisfying the needs of customers was indicated by almost 94% of companies in category A and 81% in category B; for an increase in market share of 78.8% and 50.6%; 74.5% of category A and 45.3% of category B companies spoke about an increase in the number of acquired customers. Almost identical relations are shaped with regard to improving contacts with suppliers and improving the forecasting process. A similar differentiation is observed in relation to the effects of using e-learning, which are not included in Table 2, such as: increasing employee innovation, improving communication in the company and reducing costs. In the light of the above data, it should be emphasized that the activity and efficiency of companies using e-learning in a competitive environment is higher than companies that do not use e-learning, similar relationships are observed in internal activities, i.e. in the process of learning about the organization, as well as employee training and improvement.

5. Concluding remarks

Along with the development of the IT sector, there has been a significant change in the approach to marketing management mainly in the instrumental aspect. The goal remained the same: customer acquisition and retention, which is associated with market development and product improvement. The new approach to CRM boiled down mainly to supplementing the CRM marketing philosophy used so far with modern IT management systems, significantly increasing the effectiveness and efficiency of this management method in achieving the marketing goals of the company.

It turned out that customer relationship management systems are functional relative to enterprise resource management systems. They are a natural extension of ERP/MRP III class systems, which, when properly integrated, can be used to support such areas of the enterprise's operation as e-business, production, logistics, and accounting. They support the making of accurate decisions in conditions of uncertainty or incomplete data, optimization of the flow of work and documents (workflow). They enable closer cooperation with suppliers, which is especially important in the market of investment goods (*Business to Business—B2B*).

As mentioned above, this tool (CRM) supports the making of decisions, including those of strategic importance. Research results focused on the architecture and content of the Big Data warehouse and reports created on this basis are used to create the company's strategy and even to build a strategy for sustainable development of the manufacturing sector.

The CRM system, like any restructuring and innovation project, requires certain conditions to be met. Selected major ones are:

- parameterization of CRM architecture objects and processes constituting this system;
- identification of business processes and enterprise goals as well as the importance of CRM in their implementation;
- wider use of e-learning in the organization and functioning of the CRM system than before;
- training of staff and employees by conventional and e-learning methods are an important premise for the practical use of CRM.

Summing up the above remarks, it should be emphasized that the use of CRM contributes to increasing the effectiveness of the marketing function in the enterprise, increasing the efficiency of operational management, and recently this method has been successfully used in the formulation and implementation of the organization's strategy, and even to define a plan for the sustainable development of the production sector industry.

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Wykorzystanie narzędzi informatycznych i mediów społecznościowych w zarządzaniu relacjami z klientami

Abstrakt: Celem artykułu jest identyfikacja i charakterystyka instrumentów i narzędzi IT wykorzystywanych w zarządzaniu relacjami z klientami (CRM) oraz prezentacja wyników badań empirycznych. W szczególności w artykule przedstawiono istotę i elementy systemu zarządzania relacjami z klientami (CRM), określono jego znaczenie w funkcjonowaniu firmy i kształtowaniu relacji biznesowych z interesariuszami. Szczególnie wiele miejsca poświęcono na omówienie technologii informatycznej w rozwoju CRM. Scharakteryzowano wybrane, ważniejsze narzędzia informatyczne wspomagające CRM, takie jak podsystem zarządzania bazami danych, usługi sieci Internet, media społecznościowe (*social CRM*), wykorzystanie chmury obliczeniowej (*cloud computing*) oraz aplikacji typu ERP/MRP III, Big Data, podkreślając ich zalety, wady i zastosowania. Empiryczny fragment pracy zawiera opis, znaczenie i korzyści wykorzystania e-learningu w rozwoju systemu CRM oraz warunki jego implementacji.

Słowa kluczowe: zarządzanie relacjami z klientami (CRM), podsystem zarządzania bazami danych, aplikacje typu ERP/MRP III, media społecznościowe, sCRM, chmura obliczeniowa, e-learning

Analysis of the relation of remuneration with the effectiveness of business operations of enterprises—sectorial and sectional views

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Abstract: This article deals with the issue of linking remuneration with the effectiveness of business operations. The aim of the study was to determine the strength and direction of the relation between remuneration and the effectiveness of economic activity, taking into account its various measures as well as sectorial and sectional division of the Polish economy. For this purpose, data from the Central Statistical Office for the years 2005–2017 was used for values classified as total, public and private sector in addition to PKD (Polish Classification of Activities) sections. To determine the relation in the study, Pearson's correlation coefficient was used, which was estimated for the relation of remuneration between work efficiency (based on revenues from total activity and net financial result) and profitability (assets, equity, revenues from total activity). Three of the four hypotheses were verified as negative. First, the remuneration was not always related to the effectiveness of business operations. Secondly, the increase in the efficiency of business operations was not always accompanied by an increase in wages. Thirdly, the salary was not always the strongest link to labour productivity. The only positively verified hypothesis was the one which assumed sectorial and sectional differentiation of the relation between remuneration and individual measures of effectiveness of business activity.

Key words: remuneration, work efficiency, profitability

1. Introduction

Salary is one of the basic economic concepts. It is of great importance to business entities, employees and national governments. Setting its value is a challenge that is most often thrown at the managerial staff. In the conditions of a global, highly competitive economy, it is necessary for the remuneration to take into account the financial capabilities of paying agents as well as the needs of employees. Therefore, the most popular, but not always applied way of remunerating employees is to make the remuneration dependant on the achieved effects of an economic activity. It assumes the unanimous di-

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rection of the results' dynamics and the remuneration. Managers, when determining the basis used to set remuneration, have a wide range of different types of company's achievements. For this purpose, performance indicators are the most frequently used, which due to the sectorial diversification of the importance of individual measures constitute a very complex group. In the literature on the subject, it is mentioned that the setting of wages should be most strongly dependent on the dynamics of labour productivity or the dynamics of the profitability of the enterprise. All the above statements fill the research gap regarding the method of setting wages. However, there is no research on the development of wages in individual ownership sectors and sections of the economy. Therefore, the following research questions were posed in this article:

1. Was there a relation in all sectors and sections of the economy between remuneration and business performance?
2. Were there sectorial and sectional differences between the remuneration and the effectiveness of business operations?
3. Was there an increase in wages in all sectors and sections of the economy?
4. Was the relation between wages and labour productivity indicators stronger than between wages and profitability ratios?

The purpose of this article is to determine the strength and direction of the relation between remuneration and the effectiveness of economic activity, taking into account its various measures as well as sectorial and sectional division of the Polish economy.

Research hypotheses based on a literature review are as follows:

1. There was a relation in all sectors and sections between the remuneration and the effectiveness of the business.
2. The relation between remuneration and the effectiveness of business activity varied depending on the sector and sections.
3. In all sectors and sections, the increase in the efficiency of business operations was accompanied by an increase in wages.
4. In all sectors and sections, there was a stronger relation between wages and labour productivity than between wages and profitability.

The methods used to verify hypotheses are critical literature analysis, case analysis and statistical significance tests.

2. Literature review

Salary fulfils a number of functions in business life. From the company's point of view it is a cost (cost function). However, from the point of view of the employee receiving it, this is an income (income function). This fact makes remuneration an object of interest both for the company that seeks to minimize it as well as for the employee who wants to maximize it. It makes it a distinctive cost factor among other costs in an enterprise (Hamermesh, 2014, pp. 1–10). The board of company use remuneration to form attitudes and behaviours of their employees (motivating function). The motivating function is a consensus between the cost and income functions. Companies spend money on remuneration of employees to buy their work.

They expect quality and high efficiency of work. Employees work according to the expectations of board for the remuneration at the level accepted by them (Oleksiak, 2013, p. 132).

Remuneration is one of the most difficult areas of business management. According to the literature on the subject, the purpose of managing remuneration is, among others: gratification of employees for the created value, harmonization of the method of remuneration with the objectives of the enterprise, setting the culture of high effectiveness of work and communication of the company with employees (Armstrong, 2005, pp. 19–23). The implementation of the above objectives should enable setting the expected employee attitudes in the enterprise (incentive function) (Pinto, 2011, pp. 81–91; Rynes, Gerhart and Minette, 2004, pp. 381–394). Therefore, setting the level and structure of remuneration in an enterprise is a complicated task, which is most often a challenge for the managerial staff (Folwarski, 2017, pp. 105–114; Kawka, 2016, pp. 78–90).

Managers can choose a fixed or variable remuneration system. The basic difference between systems is the degree of linking remuneration with goals. In the system of permanent remuneration, the remuneration results from the adopted structure and philosophy of the enterprise. However, as proven by the research, both the system of permanent remuneration and the system with a low significance of the part associating the remuneration with the effects reduces the activity and initiative of the employees (Bun and Huberts, 2018, pp. 1–21). Therefore, the system of variable remuneration is more often implemented, in which the remuneration depends on the results achieved (Madhani, 2011, pp. 5–17). From an enterprise perspective, consideration of the results generated in the remuneration process is beneficial (Lazear, 2000, pp. 1346–1361; Fibirova and Peter, 2013, pp. 3–19). It allows to increase the efficiency of the labour force, which is reflected in the result of the company's activity (Syverson, 2011, pp. 326–365). At the same time, thanks to its flexibility, the system enables adjustment of labour costs to business cycles (Gielen, 2007, pp. 2–18). In addition, linking remuneration to the company's goals changes the attitude of employees and their perception of the remuneration system and the business itself (Blanchflower, 1991, pp. 3–9).

The policy of a variable remuneration system generates a problem related to the necessity of choosing a clearly defined measure used in the process of setting remuneration. The company can take various results as the effectiveness of its business operations. It is indirectly conditioned by the industry's characteristics and the diversified importance of individual indicators in the financial analysis (Zabolotnyy, 2009, pp. 121). One of the most popular results to be achieved are profitability ratios. They inform about the return on assets, revenues or capital invested by the owner (Ważna, 2012, pp. 526–537). A characteristic feature of profitability is its syntheticity, stemming from the method of calculating the financial result. Therefore, it can form the basis for setting wages (Kruk, 2017, pp. 17–225). However, labour productivity is used more often than profitability, which is in line with the theory of an effective wage (Adamczyk, 2007, pp. 55–65). In this theory, the remuneration depends on the productivity of work (Golnau, 2012, pp. 151–159). The basic assumption of the effective wage theory is the existence of a positive relation between remuneration and productivity (Nyk, 2016, pp. 175–187). Employees should not receive more than they are able to produce (Katovich and Maia, 2018, pp. 7–31). Most often, the value of income or financial result divided by the number of employees in the enterprise is considered as labour productivity (Velnampy,

2011, pp. 1–15; Datta, Guthrie and Wright, 2005, pp. 135–145). In addition, it should be remembered that due to the existence of various employee groups in the enterprise, there may be a situation in which objectives are achieved separately for each group (Kopycińska and Wiśniewski, 2016, pp. 167–189).

3. Research methodology

The analysis uses statistical data published by the Central Statistical Office for the years 2005–2017. The information on employment as of the 31st of December and the value of revenues from total activity, equity, liabilities, net financial result, average monthly gross remuneration (hereinafter: remuneration) were used. The analyses were made in accordance with the breakdown done by the Central Statistical Office for the general value, including the ownership sector and the section of the Polish Classification of Activities (PKD).

The study was about determining the relation between remuneration and the effectiveness of business operations and the evaluation of this relation. For this purpose, the following indicators of business operations effectiveness were used: work efficiency calculated on the basis of revenues from total activity (hereinafter: income productivity) and net financial result (hereinafter: result productivity), return on equity (hereinafter: ROE), return on assets in total (hereinafter: ROA), profitability of revenues from total operations (hereinafter: ROTR).

The labour productivity rate is the quotient between revenues from total activity and the number of employees as of the 31st of December. The result productivity rate is the quotient between the net financial result and the number of employees for the 31st of December. The ROE ratio is the quotient between the net financial result and the equity. The ROA ratio is the quotient between the net financial result and the sum of equity and liabilities.

The ROTR ratio is the quotient between the net financial result and the revenues from total activity. The remuneration, income and result productivity were calculated using natural logarithm so as to obtain relative values. This treatment will reduce the risk of erroneous results and misinterpretation. Pearson's correlation analysis was used to determine the relation. The degree of connection between the examined features was determined according to the following scale. In the range from 0.0 to 0.3—irrelevant correlation, from 0.3 to 0.5—weak correlation, from 0.5 to 0.7—moderate correlation, from 0.7 to 0.9—strong correlation and from 0.9 to 1.0—very strong correlation (interval right closed) (Mukaka, 2012, pp. 69–71; Watters and Boslaugh, 2008, pp. 169–189). At the same time, the positive value of the coefficient means that the increase in the value of one characteristic is accompanied by an increase in mean values of the second characteristic, while the negative value is that the increase in the value of one characteristic is accompanied by a decrease in mean values of the second characteristic (Samuel and Okey, 2015, pp. 22–28). The level of p-value significance was set to 0.01 or 0.05, respectively. For this interpretation, it was assumed that the null hypothesis means the lack of correlation between the examined features, while the alternative hypothesis means the existence of a correlation between the examined features (Gogtay and Thatte, 2017, pp. 78–81).

4. Results

The study consisted in analyzing the relation between remuneration and individual measures of business operations' effectiveness and its evaluation. Table 1 presents the results of Pearson's correlation coefficient and statistical significance calculated for the relation between remuneration and individual measures of the effectiveness of business operations.

In general, the relation between remuneration and individual measures of economic efficiency in the period 2005–2017 was as follows. In the period under consideration, there was almost a full correlation between remuneration and labour productivity (a statistically significant result) and poor dependence on the resulting work performance (statistically insignificant result).

The direction of change in remuneration and both measures of work efficiency was the same. The relation between remuneration and profitability ratios was poor for ROA and ROE, and for ROTR the correlation was irrelevant (statistically insignificant results). At the same time, it was established that the increase in remuneration was accompanied by a decline in profitability, and vice versa.

Taking into account sectorial affiliation, the following was diagnosed. In the private sector, there is practically full dependence, while in the public sector there is a strong relation between remuneration and income performance (statistically significant results). In the private sector, in the audited period, the correlation between remuneration and the result efficiency was irrelevant (statistically insignificant result). In turn, in the public sector, this relation was moderate (statistically significant result).

The direction of change in remuneration and both measures of labour productivity was the same both in the public and private sectors. In the public sector, the remuneration was positively correlated with the following indicators: ROA, ROE, ROTR, while in the private sector negatively. In the public sector, the relation was practically non-existent between remuneration and ROA and ROE, while in the case of ROTR it was moderate (statistically insignificant results). On the other hand, in the private sector, the relation between remuneration and ROA and ROE was weak, while in the case of ROTR dependencies were not diagnosed (statistically insignificant results).

Regarding the sectional division, the following was observed. In four sections, there was practically full dependence (statistically significant results) between remuneration and income performance, in five a strong relation (statistically significant results), in one moderate relation (statistically significant result) and in three weak dependence (statistically insignificant results). Pearson's correlation coefficient was negative only in the Information and communication section, in other sections the direction of change in remuneration and income performance was the same. In two sections, there was a strong relation (statistically significant results) between remuneration and the result work, moderate in three (statistically significant results), one moderate relation (statistically insignificant), four weak dependence (statistically insignificant results) and in three virtually no dependencies were identified (statistically insignificant results).

As in the case of the analysis of the remuneration relation with the revenue-related work efficiency, only in the Information and communication section, Pearson's coefficient was negative. In two cases, a strong negative relation was observed between remuneration and ROA,

ROE, and ROTR (statistically significant results). In the Human health and social work activities section, a strong negative relation was observed between remuneration and ROA, and a moderate negative relation between ROE and ROTR (statistically significant results). In addition, a moderate negative and statistically significant relation between remuneration and ROTR was diagnosed in the Administrative and support service activities section, the ROA and ROE remuneration ratio was both statistically insignificant as well as very infinitesimal.

In five sections between remuneration and profitability ratios, the diagnosed relation was insignificant (statistically insignificant results). In other four sections, the remuneration was moderate: ROA in two cases, ROE in three cases, poor in ROA and ROE in one case, with ROTR in two cases, to a negligible extent from: ROA in one case and ROTR in two cases (statistically insignificant results).

Analyzing the setting of individual effectiveness indicators, the following was diagnosed. In thirteen out of sixteen cases, the relation between wages and the rate of labour productivity was the strongest. In fifteen cases, the increase in the income of labour productivity was accompanied by an increase in wages, and only in the case of the Information and communication section the situation was reversed. From among all analyzed relations in the section Accommodation and catering, the strongest relation between remuneration and the result efficiency was diagnosed.

However, in seven subsequent cases it was the second. As in the case of income productivity of labour in the majority of fourteen cases, the increase in labour productivity was accompanied by an increase in wages. Only in the case of the Information and communication and Construction sections, the situation was reversed. Sections where the strongest relation was not between pay and income or result efficiency was the Information and communication section—where, although negative, the strongest relation was diagnosed with ROA—and the Industry section where also the negative strongest relation was diagnosed with ROE.

In the case of the relation between remuneration and ROA, ROE and ROTR rates, a large variation was diagnosed. Pearson's correlation coefficient between remuneration and profitability ratios assumed values for: ROA nine negative seven positive, ROE eight negative eight positive, ROTR ten negative six positive.

In addition, there were diagnoses of situations in which the direction of change in remuneration was the same as the direction of revenue change and the resulting work efficiency, and the opposite ROA, ROE, and ROTR. This situation was diagnosed in: total, private sector, three sections (Industry, Education, Health and social work activities). The same direction of change in remuneration and all measures of effectiveness of business operations was diagnosed in: public sector and four sections (positive in: Agriculture, forestry and fishing, Transporting and storage, Financial and insurance activities; negative in: Information and communication). In the other six sections, however, the situation was very diverse.

Table 1. Pearson's correlation between remuneration and efficiency rate

Specification		Total	Public Sector	Private Sector	Section				
					Agriculture, forestry and fishing	Industry	Construction	Trade; repair of motor vehicles	Transportation and storage
Work productivity (total revenue)	P.c.	0.959**	0.709	0.942	0.922	0.468	0.803**	0.809**	0.864
	S.s.	0.000	0.007	0.000	0.000	0.107	0.001	0.001	0.000
Work productivity (net financial result)	P.c.	0.441	0.572	0.235	0.668	0.492	−0.014	0.803**	0.523
	S.s.	0.131	0.041	0.439	0.012	0.088	0.963	0.001	0.067
ROA	P.c.	−0.414	0.066	−0.421	0.543	−0.500	−0.204	−0.168	0.180
	S.s.	0.160	0.829	0.152	0.055	0.082	0.504	0.583	0.556
ROE	P.c.	−0.364	0.030	−0.377	0.548	−0.550	−0.079	0.141	0.196
	S.s.	0.221	0.922	0.204	0.052	0.051	0.797	0.647	0.521
ROTR	P.c.	−0.216	0.503	−0.282	0.478	−0.161	−0.184	0.103	0.240
	S.s.	0.479	0.080	0.350	0.098	0.600	0.548	0.738	0.429
Specification		Section							
		Accommodation and catering	Information and communication	Financial and insurance activities	Real estate activities	Professional, scientific and technical activities	Administrative and support service activities	Education	Human health and social work activities
Work productivity (total revenue)	P.c.	0.410	−0.417	0.951**	0.891**	0.665	0.938**	0.891**	0.969
	S.s.	0.164	0.156	0.000	0.000	0.013	0.000	0.000	0.000
Work productivity (net financial result)	P.c.	0.458	−0.762**	0.638*	0.161	0.174	0.493	0.333	0.669
	S.s.	0.115	0.002	0.019	0.599	0.570	0.087	0.266	0.012
ROA	P.c.	−0.098	−0.789**	0.284	0.428	−0.290	−0.228	−0.788**	−0.733
	S.s.	0.751	0.001	0.347	0.144	0.337	0.454	0.001	0.004
ROE	P.c.	0.028	−0.730**	0.350	0.531	−0.272	0.245	−0.734**	−0.665
	S.s.	0.928	0.005	0.241	0.062	0.370	0.420	0.004	0.013
ROTR	P.c.	−0.094	−0.788**	0.359	−0.159	0.044	−0.556*	−0.828**	−0.596
	S.s.	0.761	0.001	0.229	0.603	0.888	0.049	0.000	0.032

* Correlation significant at 0.05 (two-sided). ** Correlation significant at 0.01 (two-sided). P.c.—Pearson's correlation. S.s.—subsidiary significance

S o u r c e: Author's own study based on the Statistical Yearbook of the Republic of Poland, 2006–2018.

5. Discussion and conclusion

The study of the relation between remuneration and individual measures of effectiveness of conducted business activity allowed to achieve the goal of the article, to answer the research questions posed and verify the hypotheses posed on the basis of the literature review.

In all analyzed cases, the value of Pearson's correlation coefficient was different from zero. However, in five out of eighty cases, it was diagnosed that the Pearson correlation coefficient obtained the classification value as a practical lack of dependence between the examined categories. Therefore, one cannot accept the hypothesis assuming that in all sectors and sections there is a connection between remuneration and individual measures of effectiveness of conducted business activity.

In total, in individual sectors and sections, Pearson's correlation coefficient between remuneration and individual measures of the effectiveness of business operations assumed various values. This differentiation is not only due to the fact that Pearson's correlation coefficient assumes a different value of force. This coefficient is also different in terms of determining the direction of co-association of the analyzed values. These statements allow for a positive verification of the hypothesis regarding the sectorial and sub-sectorial diversification of the relation between remuneration and individual measures of effectiveness of business operations.

In the study of eighty cases thirty-two were diagnosed with Pearson's correlation coefficient as negative. This means that in thirty-two cases, the increase in the efficiency of economic activity was not accompanied by an increase in wages. Therefore, it is necessary to reject the complex hypothesis about the coexistence of the growth of individual effectiveness measures of business operations with the increase in wages. It should be noted, however, that the vast majority of Pearson's negative correlation coefficients were the result of an analysis of the link between remuneration and profitability ratios of assets, equity and revenues from total activity.

The results of the study also allow to negatively verify the last hypothesis, assuming that the existing relation between the pay and work performance was stronger than between remuneration and profitability. The study shows that in total, in both sectors and most sections, Pearson's correlation coefficient between revenue and resultant labour productivity was the strongest. However, in two sections, i.e. Industry and Information and communication, the most significant remuneration was related to the return on equity and the profitability of total assets.

The findings of the research allow to conclude as follows. Forming remuneration is a very difficult and complex issue. The theory of management of human resources states that remuneration should depend on the effectiveness of the conducted business activity which may be measured by means of various indicators. In practice, there are a large number of effectiveness indicators and the dependence of remuneration on a specific indicator is an individual issue of the company. The research shows that in a given sector remuneration may be linked with one or more than one effectiveness indicator. It varies from sector to sector and from section to section. Additionally, the theory assumes that remuneration should develop in the same direction as effectiveness, although it should not be viewed as a core principle while forming remuneration. Depending on a sector, the direction of remuneration development may be consistent with only one selected indicator, while the relation with other direction may be opposite. The research also revealed that the direction of a change in remuneration and in effectiveness in-

dicators in some sectors was not the same in all the cases. It means that remuneration may be dependent on factors other than the effectiveness of business activity. The above conclusions supplement those drawn from statistical verification of the hypotheses. It should be noted that forming remuneration is an essential issue in terms of economics, management and finance. It is the area with research gaps and unverified hypotheses worth further examination.

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Analiza związku wynagrodzenia z efektywnością prowadzonej działalności gospodarczej przedsiębiorstw – ujęcie sektorowe i sekcyjne

Abstrakt: W niniejszym artykule poruszono problematykę powiązania wynagrodzenia z efektywnością prowadzonej działalności gospodarczej. Celem badania było określenie siły i kierunku związku pomiędzy wynagrodzeniem a efektywnością prowadzonej działalności gospodarczej z uwzględnieniem różnych jej miar oraz podziału sektorowego i sekcyjnego polskiej gospodarki. W tym celu wykorzystano dane z GUS za lata 2005–2017 dla wartości sklasyfikowanych, jako dane: ogółem, dla sektora prywatnego i publicznego oraz dla poszczególnych sekcji PKD. Do określania związku w badaniu wykorzystano współczynnik korelacji Pearsona, który został oszacowany dla relacji wynagrodzenia pomiędzy wydajnością pracy (bazującą na przychodach z ogółu działalności i wyniku finansowym netto) a rentownością (aktywów, kapitałów własnych, przychodów z ogółu działalności). Negatywnie zweryfikowano trzy z czterech postawionych hipotez. Po pierwsze, wynagrodzenie nie zawsze było powiązane z efektywnością prowadzonej działalności gospodarczej. Po drugie, wzrostowi efektywności prowadzonej działalności gospodarczej nie zawsze towarzyszył wzrost wynagrodzeń. Po trzecie, wynagrodzenie nie zawsze było najsilniej powiązane z wydajnością pracy. Jedyną pozytywnie zweryfikowaną hipotezą była hipoteza zakładająca sektorowe i sekcyjne zróżnicowanie związku pomiędzy wynagrodzeniem a poszczególnymi miarami efektywności prowadzonej działalności gospodarczej.

Słowa kluczowe: wynagrodzenia, wydajność pracy, rentowność

Application of the management factor and labour productivity index to assess the enterprise's bankruptcy risk

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Abstract: The functioning and development of an enterprise requires an appropriate level of management that can be analyzed on the basis of financial data reported by the entity. The article presents the concept of measuring the management level using the labour productivity indicator and the management level indicator. These are indicators derived from the model of the analytical production function, integrating a number of economic quantities in the field of financial analysis. This function is a financial model of natural production processes taking place in enterprises and consistent with classic cost accounting. From the point of view of the company's financial equilibrium, the question arises whether these indicators reflect the financial position of the company well enough so that they can be used to assess the risk of bankruptcy of the company. The aim of the study is a comparative analysis of the dynamics of indicators: level of management and labour productivity in enterprises threatened by collapse and those enterprises retaining the ability to continue their operational activities. The second group of enterprises was chosen using selected methods of discriminant analysis.

Key words: discriminant analysis, management level indicator, labour productivity index, company bankruptcy, financial analysis

1. Introduction

There are many goals of the existence of an enterprise, but in practice, the increase in the capital of owners is the most common. The survival and development of such an organization requires an appropriate level of management process based on the necessary financial data. Therefore, in the interest of both the owners of the company and the management is continuous monitoring of the financial condition of the company, especially the detection of threats that could lead to its collapse.

Monika Szczerbak (2007, p. 44) on the basis of her own and the predecessors' research indicates that although the catalogue of reasons for the collapse of enterprises is relatively constant, their hierarchy changes with time. The importance of global-

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ization processes and intensified competition are currently growing. This observation is consistent with the point of view of Joseph Schumpeter, who pointed to the large role of technological, product or organizational innovations in the survival and development of the company. The level of competitiveness in these areas is determined by the ability to adapt to changing market requirements. Low innovativeness in comparison with competitors increases the risk of business failure (Pieńkowska, 2005, pp. 18–25). Research confirms that the vast majority of the reasons of the collapse of enterprises are endogenous, that means, these reasons have their source inside the enterprise and are controlled by management. Less often exogenous factors, e.g. macroeconomic or legal factors contribute to the collapse of the enterprise (Boratyńska, 2009).

Company bankruptcy is usually not a sudden process but is preceded by numerous symptoms. The symptoms of a company collapse are divided into financial and non-financial (Nowak, 2008, p. 65). Financial, in particular, include deterioration of financial liquidity, decrease in profitability, systematic descent of sales revenues, deterioration of receivables collection, growing volume of liabilities and loans, increase in inventory value, in particular increase in the value of production in progress, improving liquidity by selling assets below book value, negative operating cash flows. In turn, among the non-financial symptoms of loss of ability to continue business activity, there is a significant or complete loss of key sales markets, staffing problems, technological and legal changes, a large number of lawsuits against the entity, termination of the contract with a key supplier. Both the financial and non-financial symptoms of the impending collapse of the enterprise are accompanied by a deterioration in key financial indicators. Properly conducted monitoring of financial data gives a chance to identify an increase in the risk of losing the ability to continue business activity. On this relationship are based many bankruptcy forecasting methods and models.

Methods of forecasting bankruptcy of enterprises can be divided into three groups (Korol, 2010, pp. 90–95):

– theoretical methods (hazard models, credit risk models, entropy theory models);
– statistical methods (logistics regression, decision trees, probit regression models, discriminant analysis models);
– non-statistical methods (fuzzy logic, genetic algorithms, neural networks, expert systems, support vector machines methods).

The aim of the study is a comparative analysis of the dynamics of indicators: level of management and labour productivity in enterprises threatened by collapse and those enterprises retaining the ability to continue their operational activities. For the purpose of this paper discriminant analysis models, included in the group of statistical methods, were used. These models are used to assess the company's financial situation with synthetic measures. Due to the complex nature of the company's bankruptcy problem, these measures are a specific combination of various economic indexes calculated usually based on financial report data, but also based on market data. Such a model allows transforming several dimensions of the analysis of a company's financial situation into one dimension analysis (Hołda and Micherda, 2007, p. 121). The discrimination analysis model can be represented by the following formula:

$$Z = a_0 + a_1X_1 + a_2X_2 + \ldots + a_nX_n$$

where:
Z—variable explained by the model
a_i —discrimination coefficients
X_i —external variables.

Each discriminatory model provides a Z—limit value that divides companies into threatened and not threatened with bankruptcy. In addition, some models have an intermediate range of Z values. It is the range of the value of the explained variable (Z) for which it cannot be clearly concluded whether the company is in fact threatened with bankruptcy or not (Prusak, 2005, pp. 40–49).

Edward Altman is considered as the precursor of the discriminatory modelling of corporate bankruptcy. In 1968 he published the linear discriminatory function of five financial indicators. Due to differences in the features of the economic environment, the Altman model useful in the United States performed much worse in relation to Polish enterprises. Since 1990s, many discriminatory models adapted to Polish economic realities have been created. These models are characterized by high quality prediction. The research was conducted on companies listed on the Warsaw Stock Exchange Company (Giełda Papierów Wartościowych w Warszawie S.A.). Warsaw Stock Exchange shows that the highest efficiency in forecasting the threat of bankruptcy has the model by Elżbieta Mączyńska, the so-called Poznań model and the model by Dorota Hadasik (Wojnar, 2014). These models were used in the research part of this work.

Elżbieta Mączyńska is the author and co-author of several bankruptcy forecasting models, however one of them has a high prognostic value. It is a combination of six indicators, among which dominate the return on assets and sales profitability. This model has the following form (Mączyńska, 1994; Antonowicz, 2007, p. 55):

$$Z = 1.5x_1 + 0.08x_2 + 10x_3 + 5x_4 + 0.3x_5 + 0.1x_6$$

where:

$$x_1 = \frac{earning\ before\ tax + amortization}{total\ liabilities}$$

$$x_2 = \frac{total\ assets}{total\ liabilities}$$

$$x_3 = \frac{earning\ before\ tax}{total\ assets}$$

$$x_4 = \frac{earning\ before\ tax}{revenue}$$

$$x_5 = \frac{inventory}{revenue}$$

$$x_6 = \frac{revenue}{total\ assets}$$

The limit value of the explained variable Z is 0. If its value is lower than 0 or equal to this value, it means that the analyzed enterprise is under the threat of bankruptcy. The weak financial condition is represented by the value of Z in the range (0; 1), only the value of Z above 1 indicates good financial position of the entity.

A model developed by Mirosław Hamrol, Bartłomiej Czajka and Maciej Piechocki, known as the Poznań model, has a comparatively high predictive ability. In this model, the dominant argument of the discriminatory function is sales profitability (Hamrol, Czajka and Piechocki, 2004):

$$Z = 3.562x_1 + 1.588x_2 + 4.288x_3 + 6.719x_4 - 2.368$$

where:

$$x_1 = \frac{net\ earnings}{total\ assets}$$

$$x_2 = \frac{current\ assets - inventories}{current\ liabilities}$$

$$x_3 = \frac{fixed\ capital}{total\ capital}$$

$$x_4 = \frac{gross\ profit}{revenue}$$

In this model, a negative value of the variable Z means a threat of bankruptcy, a positive absence of such a threat.

Dorota Hadasik is the author of several discriminatory models, of which the one presented below has the highest predictive ability. This model is based on asset structure indicators and sales turnover ratios relative to selected asset items. The discriminatory function has the following form (Hadasik, 1998, pp. 164–167):

$$Z = 2.3626 + 0.3654x_1 - 0.7655x_2 - 2.4043x_3 + 1.5908x_4 + 0.0023x_5 - 0.0128x_6$$

where:

$$x_1 = \frac{current\ assets}{current\ liabilities}$$

$$x_2 = \frac{current\ assets - inventory}{current\ liabilities}$$

$$x_3 = \frac{total\ liabilities}{total\ assets}$$

$$x_4 = \frac{current\ assets - current\ liabilities}{total\ liabilities\ and\ equity}$$

$$x_5 = \frac{receivables}{revenue}$$

$$x_6 = \frac{inventories}{revenue}$$

As in the Poznań model, a negative value of the variable Z means a threat of bankruptcy, a positive absence of such a threat.

2. Indicators of management level and labour productivity as derivatives of the function of economic activity

For the purpose of this work, the management level index (F) and the labour productivity index (Q) based on a special analytical production function were used. This production model can be described as the Economic Activity Function (EAF). It quantitatively represents the economic activity of each economic entity operating for profit. It is a function of seven variables which values are obtainable from company accounting systems. This function takes into account the measurability of production inputs in monetary units (e.g. labour costs), which allows adding up their value in the product in accordance with the principles of cost accounting. As a result, EAF can be used to analyze the production process (Dobija, 2016).

The modern economy is characterized by an increase of the importance of human resources. The effectiveness of their use can determine the market success of a company or its bankruptcy. The effectiveness of using human resources in the field of financial analysis should be understood as economics of labour costs, which can be illustrated by the labour productivity index (Q) presented below. Optimizing a production system based on labour costs requires that the production model allows it to be transformed into production formula as a function of remuneration (labour cost).

The idea of EAF results from the statement that every economic activity generates costs and expectations of revenues exceeding costs. This leads to a formal record:

$$P = K \cdot (1 + r)$$

where:
K—operating costs
r—cost profitability.

As it can be seen, the market value of the product (P) is the historical cost of its production plus necessary expenses, such as costs of sales and marketing, administrative and management costs, adjusted by the cost profitability ratio (r). The r indicator can be represented by the profitability formula:

$$r = \frac{Z}{K}$$

where Z denotes the profit from economic activity. Costs K can be divided into labour costs (W) and other costs (B), such as the raw materials use, services, depreciation, etc. Therefore, EAF is as follows:

$$P = (W + B) \cdot (1 + r)$$

The formula presented in this way allows to present production as a function of the remuneration of the employees of the enterprise (W):

$$P = W\left(1 + \frac{B}{W}\right) \cdot (1 + r)$$

Using the asset rotation ratio A, costs B can be represented as:

$$Z = \frac{B}{A}$$

then:

$$B = z \cdot A$$

As it was shown (Kozioł, Kozioł, Pyrek and Wojtowicz, 2014), wages (labour cost) are a percentage of human capital, so $W = u \cdot H$. The variable H represents the human capital of all employees in the unit. Cost profitability $r = Z / K$. The variable K is eliminated by the rotation ratio relative to assets A.

$$K = A \cdot v \qquad r = \frac{Z}{A \cdot v} = \frac{ROA}{v}$$

Substituting the obtained formula to EAF can be obtained:

$$P = W \cdot \frac{1 + z \cdot A}{u \cdot H} \cdot (1 + \frac{ROA}{v})$$

It can be seen that this function contains a set of significant variables that characterize the production process in the business entity. Particularly noteworthy are two of them: labour costs (W) and other quantities that contribute to labour productivity denoted by the letter Q, which variable is dimensionless, i.e. numeric.

$$P = W \cdot Q = W \cdot \frac{1 + z \cdot A}{u \cdot H} \cdot (1 + \frac{ROA}{v})$$

Considerations led to the labour productivity index $Q = P / W$. It can be seen that this indicator synthesizes the impact of six significant financial values and should grow in effectively conducted business activities.

Further transformation of the formula allows the identification of short-term influences represented by the management variable F. The Economic Activity Function offers a natural basis for presenting a non-linear model describing economic activity. Using the relation $e^a = 1 + a$ production is presented as follows:

$$P = W e^{\frac{A \cdot F}{H}}$$

where:
A / H—technical work equipment
F—management variable.

Using the dependence $W = p \cdot H$, the human capital variable H is eliminated from the model by replacing it with the amount of labour cost (W) available from the accounting system. The value $p = 0.08$ (1 / year) denotes an 8% economic constant of potential growth (Kozioł, 2011).

After transforming the above formula, the management variable F is calculated as follows:

$$F = \frac{L}{A \cdot p} \cdot lnQ$$

This variable synthesizes level of human capital remuneration (u), rotation of non-wage costs B relative to assets (z) and ROA. This variable, just like the variable Q, is expected not to decrease but rather to systematically increase as a result of the economic activity. The management variable, as its name implies, is associated with its short-term nature, and therefore subject to ongoing management.

3. Main findings

Realizing the aim of the study, a research hypothesis was formulated, assuming that the indicators for assessing the financial situation: management level (F) and labour productivity (Q) have the ability to predict bankruptcy.

In order to verify the research hypothesis, the financial condition of 10 companies listed on the Warsaw Stock Exchange Company was analyzed. Half of them are enterprises with a positive financial condition, the other part are enterprises that have announced bankruptcy. For the first group (Table 1), the management variable F and the labour productivity index Q were calculated for the period of 5 years (2014–2018). In addition, it was verified using selected discriminatory models whether these enterprises were not at risk of bankruptcy. The choice of the discriminatory models: Elżbieta Mączyńska, Poznań and Dorota Hadasik was based on the research by J. Wojnar (2014) which shows that these models most accurately predict the threat of bankruptcy.

In the case of a group of enterprises in poor financial condition, the management variable and labour productivity index were calculated for the year of bankruptcy announcement and the last four years preceding the bankruptcy announcement. The level of bankruptcy risk was not investigated for these enterprises, because J. Wojnar (2014) in her study confirmed that in the case of these five companies, Mączyńska, Poznań and Hadasik models correctly classified these companies as bankrupts.

Table 1. Comparison of the value of the management variable (*F*) and the labour productivity index (*Q*) with the values of selected discriminant functions (*Z*) in enterprises not threatened with bankruptcy in the years 2014–2018

	2018	2017	2016	2015	2014	Change 2014/2018
BORYSZEW S.A.						
F	4.79	5.17	5.11	5.25	5.22	−8.2%
Q	7.18	7.43	7.09	7.82	7.4	−3.0%
Z—model by Mączyńska	1.20	1.37	1.33	0.84	1.16	
Z—Poznań model	1.48	1.46	1.09	0.62	1.01	
Z—model by Hadasik	1.12	1.07	0.98	0.96	1.12	
AZOTY S.A.						
F	2.5	2.75	2.7	2.99	2.98	−16.1%
Q	8.57	8.76	8.65	10.02	10.28	−16.6%
Z—model by Mączyńska	0.49	1.52	1.44	2.11	1.19	
Z—Poznań model	3.36	4.99	4.97	5.13	3.45	
Z—model by Hadasik	1.14	1.35	1.35	1.43	1.57	
LOTOS S.A.						
F	1.47	1.43	1.37	1.38	1.43	2.8%
Q	39.53	32.86	30.38	33.15	41.79	−5.4%
Z—model by Mączyńska	2.58	2.45	1.87	0.22	−1.34	
Z—Poznań model	3.11	3.38	3.23	2.41	1.69	
Z—model by Hadasik	1.48	1.24	1.12	0.99	1.19	
LPP S.A.						
F	5.23	4.92	3.9	3.46	3.99	31.1%
Q	9.67	12.1	15.47	18.06	18.27	−47.1%
Z—model by Mączyńska	2.81	2.79	1.55	2.53	3.21	
Z—Poznań model	5.20	5.12	4.72	4.72	5.49	
Z—model by Hadasik	1.48	1.72	1.71	1.65	1.65	
POLSAT S.A.						
F	0.7	0.59	0.61	0.62	0.8	−12.5%
Q	14.46	17.77	17.04	17.86	17.56	−17.7%
Z—model by Mączyńska	1.52	1.65	1.36	1.64	0.62	
Z—Poznań model	3.98	4.16	4.14	2.78	4.01	
Z—model by Hadasik	0.69	0.66	0.60	0.46	0.42	

S o u r c e: Authors' own calculation based on financial statements data.

The following conclusions follow from the data contained in Table 1:

1. There was no high dynamics of labour productivity index and management level variable among companies not at risk of bankruptcy. An exceptional case is LPP S.A., where the level of

management has increased by 31%, while the labour productivity has fallen by half. Additional information included in the financial report shows that LPP S.A. in 2016 initiated the process of moving from leasing employees to employing own employees under an employment contract. This resulted in a shift on costs booked as services of external companies to labour costs and a deterioration in the labour productivity index. An additional factor reducing labour productivity in LPP S.A. was the introduction of hourly minimum wages into the Polish legal system.

2. Discriminant analysis confirms that the companies selected for this part of the analysis are companies not at risk of bankruptcy. Only in the case of Lotos S.A. in 2014, the negative value of Mączyńska's function was recorded, indicating the threat of bankruptcy. However, the other two models classified this company as not at risk of bankruptcy.
3. Dynamics of *F* and *Q* indicators for Azoty S.A. shows significant similarity to the dynamics of these variables in companies threatened with bankruptcy. In the analyzed period, these indicators dropped regularly by a small amount. Discriminant analysis showed no threat of bankruptcy, however, the possible financial problems of this company are indicated by model by Mączyńska. *Z*-value for 2018 is 0.49 and it is placed in the area of uncertainty as to the threat of bankruptcy.

Table 2. Value of the management variable (*F*) and labour productivity index (*Q*) in the year of announcement of bankruptcy (year 0) and the preceding years (−1; −4).

Year	0	−1	−2	−3	−4	Change −4/0	Change −4/−1
FOTA S.A.							
F	3.1	3.15	2.85	2.93	2.94	5.4%	7.1%
Q	7.67	11.57	14.13	14.7	15.49	−50.5%	−25.3%
ABM SOLID S.A.							
F	2.51	4.17	4.32	4.4	4.5	−44.2%	−7.3%
Q	4.1	9.99	9.64	9.07	10.38	−60.5%	−3.8%
BUDOPOL							
F	−0.55	0.21	1.05	2.6	2.56	−121.5%	−91.8%
Q	0.7	1.47	2.93	9.07	9.64	−92.7%	−84.8%
ADVADIS S.A.							
F	3.43	4.79	4.53	5.23		−34.4%	−8.4%
Q	8.76	15.89	16.63	17.58		−50.2%	−9.6%
DREWEX S.A.							
F	3.04	3.86	4.3	4.64	4.92	−38.2%	−21.5%
Q	3.11	3.86	3.86	4.48	6.29	−50.6%	−38.6%

S o u r c e: Authors' own calculation based on financial statements data.

The dynamics of the management variable and the labour productivity index obtained in enterprises which announced bankruptcy lead to the following conclusions (Table 2):

1. Over the four years preceding the declaration of bankruptcy by the surveyed enterprises, the *F* and *Q* indicators recorded a decrease in value. In the case of four enterprises, the decreases are

significant, by several dozen percent. One exception is Fota S.A., where there was no decrease in the level of management (*F*), paradoxically this value increased slightly. This is the result of the selling out of company assets in the year preceding the announcement of bankruptcy. It led to improving the important component of variable *F*, the ratio of assets turnover.

2. In order to examine the predictive possibilities of variables *F* and *Q*, the dynamics of these indicators was calculated over a period of four years, from the fourth year before the fall to the year preceding the announcement of bankruptcy. In this case, there were also significant drops, although lower than between the fourth year and the year of announcement of bankruptcy. This means that the labour productivity index and management variable are a kind of early warning system for approaching bankruptcy.

4. Conclusions

The management variable and the labour productivity index have different characteristics than the *Z*-score indicators of discriminatory functions. They are used to assess the level of current management and the effectiveness of the use of human resources. Although these indicators were not designed for the assessment of bankruptcy risk, the values they measure have a direct impact on the survival and development of the enterprise. As a result, it is not possible to provide their limit values separating companies at risk of bankruptcy from those "healthy". However, the conducted research shows that the regular decrease in the values of the presented indicators (*F*) and (*Q*) denotes a deteriorating financial situation, which in the case of a significant scale of decreases leads to the bankruptcy of the enterprise. This is due to the fact that the goal of the enterprise should be a constant, gradual increase in the level of management and labour productivity. It can therefore be concluded that not value analysis but trend analysis of management variable and labour productivity can be one of the elements of the early warning system against the risk of bankruptcy.

The financial indicators used in the article take into account the level of remuneration. High dynamics in this area constitutes a certain limitation of the significance drawn using the presented research method. The research revealed the need for additional information on labour costs, as data from financial reports of enterprises mainly includes remuneration for employees on contracts. The use of personnel solutions aimed at reducing tax and insurance components of labour costs may distort the correctness of labour cost valuation. Work performed by external employees (e.g. in the form of employee leasing) or work based on self-employment is not included in reported costs of remuneration and employee benefits.

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Wykorzystanie zmiennej zarządzania i wskaźnika produktywności pracy do oceny zagrożenia przedsiębiorstwa upadłością

Abstrakt: Przetrwanie i rozwój przedsiębiorstwa wymagają odpowiedniego poziomu zarządzania, który można analizować na podstawie danych finansowych wypracowanych przez jednostkę. W artykule przedstawiono koncepcję pomiaru poziomu zarządzania za pomocą wskaźnika produktywności pracy i wskaźnika poziomu zarządzania. Są to wskaźniki wywodzące się z modelu analitycznej funkcji produkcji, integrujące szereg wielkości ekonomicznych z zakresu analizy finansowej. Funkcja ta stanowi finansowe odwzorowanie naturalnych procesów produkcyjnych przebiegających w przedsiębiorstwach oraz w zgodzie z klasycznym rachunkiem kosztów. Z punktu widzenia równowagi finansowej przedsiębiorstwa pojawia się pytanie, czy wskaźniki te na tyle dobrze odzwierciedlają sytuację finansową przedsiębiorstwa, że mogą zostać wykorzystane do oceny zagrożenia upadłością przedsiębiorstwa. Celem pracy jest analiza porównawcza dynamiki wskaźników poziomu zarządzania i produktywności pracy w przedsiębiorstwach zagrożonych upadkiem oraz tych zachowujących zdolność do kontynuacji działania. Druga z wymienionych grup przedsiębiorstw została wyłoniona za pomocą wybranych metod analizy dyskryminacyjnej.

Słowa kluczowe: analiza dyskryminacyjna, wskaźnik poziomu zarządzania, wskaźnik produktywności pracy, upadłość przedsiębiorstwa, analiza finansowa

Settlements with employees in respect of salaries in the accounting system of the company

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Abstract: The purpose of the article is to present a method of measuring and recording settlements with employees in respect of remuneration, and to present the results of empirical research. A thesis was adopted according to which a system of remuneration measurement, settlement and documentation that is complicated and incomprehensible to employees significantly reduces the implementation of the pay incentive function, which is also a factor characterized by a negative form of motivation. The subject of the study was the method of organizing the measurement and record of settlements with employees within the accounting system, and the scope of the analysis was limited to the basic principles of calculating remuneration. The results of the analysis of settlement with employees in the examined company showed that the adopted principles (recommendations) of effective motivation are not properly respected in the system and the process of settlement with employees in respect of remuneration. In particular, this applies to the principle of proportionality of inputs made and effects achieved, the principle of maintaining incentive thresholds and the principle of internalization of organizational goals and others. The research used the method of analyzing impact factors, case analysis and expert method.

Key words: remuneration system, salaries, settlements, records

1. Introductory remarks

Salary as an important economic category fulfils many different functions, among which the most frequently mentioned functions are: income, cost, motivational and social. Numerous and extensive literature emphasizes the essence, structure of pay, principles and tools for determining it, as well as other elements of the remuneration system, while emphasizing the momentous practical importance of this subject. In addition to the issues mentioned, there is also a different approach to the study of remuneration issues that exposes its formal and legal aspects, resulting mainly from financial practice, indirectly from accounting principles. An important task of this

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trend of research are settlements with employees in respect of remuneration in the accounting system, with particular attention to the recording of remuneration.

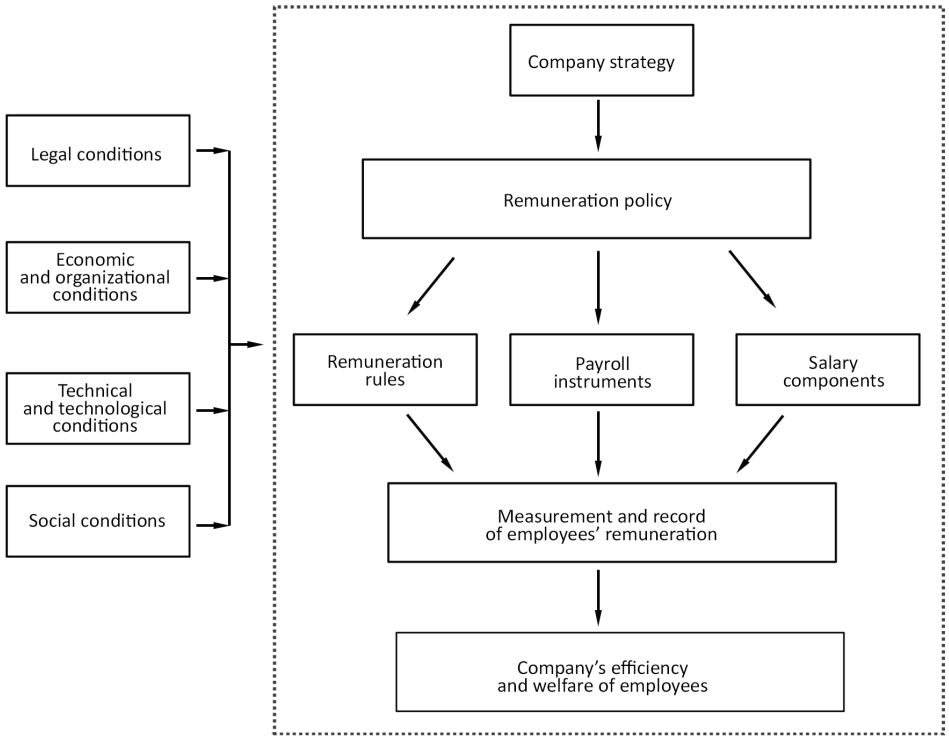

Figure 1. Model of remuneration

S o u r c e: Kozioł, 2002, p. 87.

The purpose of the article is to present a method of measuring and recording settlements with employees in respect of remuneration and to present the results of empirical research. The problem of settlement with employees in respect of remuneration is presented in the framework of the enterprise's accounting system, while the reference is the implementation of the diagnostic and motivational function in the enterprise and the principle of pay motivation in particular.

It was assumed that the essence of good management lies in the performance measurement system associated with the company's incentive system; the measurement value is the achieved or expected increase in work efficiency resulting from changes in employee behaviour under the influence of the measurement. It was also assumed that the fulfilment of the diagnostic function of a measurement depends on its design and features such as: adequacy, uniformity and comparability in time, usability; it should be adapted to the needs of the individual and the expectations of employees and others, especially since almost every component of remuneration has a separate principle of its determination.

The subject of the study was limited to the analysis of the basic tools of settlement with employees, in particular the recording of working time, preparation of the payroll, settlements with the social insurance institution and their records as well as calculation of personal income tax.

The research used the method of economic analysis, the lack of appropriate provisions for measuring and recording remuneration prompts us to search for the experience of enterprises, the so-called good practices. According to Hubbard (Hubbard, 2013, p. 51), one can also use the technique of testing small random samples, as well as a thought experiment.

2. The concept of a pay and remuneration system and the functions of pay

The concept of *remuneration* is understood and used often in the sense of *pay*. The Central Statistical Office also recognized the interchangeability of these terms in various methodological instructions. In accordance with Article 80 of the Act of 26 June 1974, the Labour Code, remuneration is understood as all monetary expenses and benefits in kind paid to employees for employment in an economic entity and calculated according to the principles of employment and remuneration statistics (Journal of Laws of 2019, item 1040, as amended). Detailed characteristics of the remuneration and the rules for determining it are given, among others, in Articles 84 and 86 of the Labour Code (Journal of Laws of 2019, item 1040, as amended), they are also the subject of numerous publications (see Liskowski, 2016, p. 33).

Remuneration for work should be considered in the legal, social, economic and ethical context (Wojas, 2011, p. 32). When considering the issue of work and pay from a legal point of view, it is required to familiarize oneself with applicable laws in this area, and then develop on their basis one's own internal rules and legal regulations. The social aspect of remuneration results from the perception of salaries as income and the primary source of income for households. However, from an economic point of view, they are treated as part of the cost of an enterprise's activities. The ethical context boils down to the correct measurement and determination of a fair amount, according to the actual effects of work, taking into account the working conditions and the qualifications held by the employee (Wojas, 2011, p. 32).

Remuneration for work is a benefit (*Remuneration*, 2011; Kucharska, 2010):

- From employment relations, the source of which may be an employment contract, cooperative employment contract, appointment, election or nomination.
- For work done—in general, remuneration is paid "in arrears", i.e. payment of remuneration is made after the work has been properly completed. In the event of a defective performance of products or services due to the fault of the employee, remuneration is not due.
- Periodic—remuneration for work is a repetitive benefit, it should be paid at least once a month on a fixed, predetermined date.
- Monetary—the remuneration should be paid in money, partial fulfilment of remuneration in non-monetary form is allowed, if statutory provisions of Labour law or a collective Labour agreement provide for it.
- Personal—remuneration is due to an individually designated employee.

– Obligatory—this is an absolute benefit, the employer may not free himself from the obligation to pay the employee, while the employee may not waive the right to remuneration or transfer this right to another person.
– The remuneration is a claim and is equivalent to the work done.
– The employee retains the right to remuneration for time not performing work only if the provisions of the Labour law so provide, i.e. for downtime not attributable to the employee.
– The remuneration should correspond to the type of work performed by the employee and the qualifications required for performing the work. When determining the amount of remuneration, the employer should also take into account the amount and quality of work performed.

Remuneration for work is an obligatory benefit for the employer. It has a complex structure, some components of remuneration are obligatory, others optional (discretionary). According to the CSO classification, remuneration is divided into: personal and impersonal remuneration and fees (see Table 1).

Table 1. Types of salary and their components in Poland

Type of salary	Components
Personal remuneration	1. Basic salary 2. Bonuses and rewards 3. Supplementary pay 4. Extras and payments
Impersonal remuneration	Remuneration arising from civil law contracts: specific work contracts, mandate contracts
Honoraria	Remuneration for creative, proprietary and production works as well as royalties paid to authors

S o u r c e: Authors' own study based on Kozioł and Tyrańska, 2002, p. 51.

An important category of remuneration is the remuneration system. According to some authors, the remuneration system is equated with forms of pay, but most of them understand the concept of the remuneration system as the whole issue of pay in the company. According to the authors of the chapter, the pay system is an internally coherent arrangement of pay components, consisting of rules, instruments and components of remuneration, as well as a method of their division and updating, valorization. The system should be functional in relation to the company's goals and take into account, as far as possible, the expectations and needs of employees.

In essence, remuneration is reflected in its functions, namely the income, cost, motivational and social function—so they can be analyzed from the point of view of the interests of the employer, employee and in the context of the tasks of the state's social policy (see Kozioł and Tyrańska, 2002, pp. 54–57).

The income function determines the nominal, and in relation to prices—real income of employees shaping their standard of living. The essence of this function is expressed in the fact

that remuneration for work is the main (often the only) source of income for employees and their families. The income function of salaries inspires the consideration of the concept of fair and minimum salaries. The latter finds expression in the form of the lowest remuneration in the economy, protection of remuneration, adjustment of remuneration, etc.

The motivational function assumes that the desire to earn money is the main factor prompting people to take up a job, stay in it and increase work efficiency. Remuneration, being a compensation and a reward for the work performed, has a motivational function, which aims to shape the desired attitudes and behaviour of employees in accordance with the expectations of employers.

In fact, only the proper implementation of the motivational function of pay allows the organization to achieve its goals, while ensuring the internalization of the organization's goals in the employee's interests.

The concept of the social function of pay assumes that the amount and diversity of pay affect interpersonal relationships inside and outside the company. In the company environment, especially in the Labour market, the amount and diversity of pay is affected by the level and directions of education, internal and external Labour market, and the rank of individual professions. The implementation of this function affects the satisfaction of employees with work, thereby reducing the scale of undesirable phenomena such as absenteeism, professional fluctuation, conflicts, strikes. Proper implementation of this function prevents pay inequalities, and therefore unjustified pay gaps; prevents social conflicts, facilitates their resolution.

The cost function emphasizes the fact that salaries are a significant cost component for companies, thus affecting its competitiveness on the market. This means that the employer's natural interest is to minimize Labour costs, especially when competition gains an advantage in this area. Therefore, one can notice a contradiction between the income and cost function of remuneration, which is levelled by making the increase in remuneration dependent on an increase in work efficiency.

The term *Labour costs* defines the total expenditure of the employing entity—the employer, related to the use of the human factor in economic processes. The literature on the subject presents many different classifications of Labour costs, i.e. the division into homogeneous groups depending on their economic significance.

In Polish business practice, the classification of Labour costs based on the type of employment-related costs is widely used. Due to this criterion, the following components of Labour costs can be distinguished (Bednarski et al., 1998, p. 185):

- payroll fund charged with operating expenses;
- monetary rewards from profits charged on operating expenses;
- retirement pension, disability pension and health insurance contributions;
- sickness and accident insurance contributions;
- contribution to the Labour fund;
- contribution to the guaranteed employee benefits fund;
- basic write-off to the company social benefit fund and supplementary write-offs from profit to this fund;
- personnel policy costs (recruitment and selection costs, training and improvement of personnel, travel expenses, transport and accommodation of employees, medical exami-

nations, costs of occupational health and safety, compensation benefits, development allowances, death benefits);
– value of remuneration in kind (deposits and other, e.g. cafeterias).

Knowledge of the components of Labour costs and factors affecting their formation enables rationalization of Labour costs.

3. Examining the problem of measuring remuneration

The basic premise for the implementation of the function of pay is an efficient system for measuring and recording the remuneration of employees of the enterprise. It has been assumed that the measurement is a kind of information that reduces recipient uncertainty. According to D. W. Hubbard, measurement is a quantified reduction in uncertainty, based on one or more observations (Hubbard, 2011, p. 43). According to C. A. Shannon, the recipient of information can be described as someone who was previously in a state of uncertainty. This means that the recipient already knew something, and the new information only eliminated some, but not necessarily all, uncertainty (Shannon, 1948). It is worth adding that reducing uncertainty is decisive for business. In the case of settlement with employees in respect of remuneration, the measurement and recording of these benefits is of key importance for employers, employees, the social insurance institution, financial institutions and tax offices as well as many other stakeholders. Accounting therefore has the function of "metering", i.e. the function of measuring work and recording employee remuneration—important from the point of view of the company. This is why accounting is treated as a theory and system for measuring economic value in the management process (Dobija, 1997, p. 15).

It is worth quoting D. W. Hubbard's concept of the value of measurement (Hubbard, 2011, pp. 137–138). The author associates measurement with the resulting information, which he considers in the context of making decisions. He emphasizes that:

1. Measurement (information) reduces uncertainty about decisions that have economic consequences.
2. Measurement influences the behaviour of others, which also has economic consequences.
3. Sometimes the information resulting from measurement has its own market value.

The first two issues listed, particularly relevant to the research subject adopted in the article, relate to the impact of measurement on the behaviour of others and on the market value of information resulting from the measurement.

According to D. W. Hubbard, the value of the measurement of its impact on human behaviour is exactly the same as the value of the difference in human behaviour.

Measurement of working time or, more broadly, work efficiency may affect the investment decisions of the owners. But it also has value because those whose use of working time or performance is measured can change their behaviour and work more efficiently. For example, if performance measurement brings a 20% increase in production, then the value of the pro-

duction increase is the stimulus value of the measurement. Thus, the stimuli provided by the measurement can bring noticeable, measurable effects.[1]

For the record, we should explain the value of information in the context of a decision (point 3). So, if the value of information equals its market value, then we are dealing with the issue of market forecasting, which is no different from estimating the sale of any product. The value of the measurement is the expected profit from the sale of this information (Hubbard, 2011, p. 138). Properly constructed measuring systems should meet certain requirements and have specific parameters, among which the most important are (Caplice and Sheffi, 1994; Copeland, Koller and Murrin, 1997; Sierpińska and Kubalańca, 1999):

- adequacy, which means that the given measure adequately describes events and processes, and is also not very sensitive to changes in external factors;
- force, which is understood as uniformity and comparability in time and space;
- usability, perceived by the ease of interpretation and content relevant to the management and employees;
- capacity, in which the meter captures significant aspects of the process and phenomenon described;
- effectiveness, understood as the relation between the effects of using a given meter and the costs of its calculation;
- compliance, perceived as a quantity related to the ratio of the meter to other information generated and aggregated in the company;
- level of aggregation, understood as the desire to determine an unambiguous, synthetic financial indicator, less often technical.

4. Settlement and documentation of employee remuneration

4.1. Work time records

The issue of recording working time has been the best and most fully regulated. According to experts, these provisions are detailed enough to ensure correct recording of working hours and employee protection.

The employer is obliged to keep records of working time, including overtime work. The employer provides this record to the employee at his request. The time record is to be kept in the form of a personal card. The regulations do not specify the card template—it can be kept in any form, provided it contains all the necessary information. Each employer sets his own card template depending on the needs arising, among others from applied systems and

[1] Among the numerous theories of growth (productivity) those that emphasize the importance of measuring the impact of technology on the increase in labour productivity deserve special attention. The creators of modern growth theory, Philippe Aghion (Harvard and LSE), Pete Klenow (Stanford) along with co-authors from the USA and France have traced the interaction between the statistical measurement process and the process of economic innovation. Example: iPhone X, which entered the market in 2017, was not in the consumption basket the year before, so the statistical office could not count "growth" on it. In contrast, the demand for the previous version of the Apple phone in 2017 decreased. If it so happens that most of the increase in productivity appears in new products that replace the demand for old ones, our statistics are aimed at measuring declines, not increases, so we understate all measures of economic growth. Aghion, Klenow and colleagues show that after correcting this "mistake" American performance is growing at an average rate of 1.9% per year, not 1.3%, as it seemed to everyone based on official statistics (Szewczyk and Wajsman, 2018, p. A13).

work time schedules. This card should contain information on the number of hours worked each day, without unnecessary details, such as arrival and departure times (see Guza, 2019, p. B10).

However, in the opinion of the Court of Justice of the European Union, issues regarding the recording of working time have not yet been precisely defined in the applicable provisions of Labour and commercial law or the instructions of relevant offices. The Court of Justice of the European Union has recently taken a position on this matter. As a result of the judgment of the CJEU of May 14, 2019 (case C 55/18), Member States must oblige employers to implement an objective, reliable and available system that measures the daily working time of each employee. This judgment may facilitate the pursuit of claims, e.g. for overtime work, but may also impose an obligation on employers to keep records of working hours, which may mean a significant increase in their operating costs, in particular a burden for small companies. In addition, it should be remembered that in the case of an increasing number of employees, objective measurement of working time is difficult or even impossible. These include, for example, teleworkers, people covered by task-time work, mobile workers, managers, creators. Many companies, in particular in the services sector, have a limited impact on employees' working hours.[2] If it was necessary to implement detailed working time recording systems for all employees, at least half of the companies in this industry would have serious survival problems. It is not surprising then that a lively discussion around the issue of choosing and using different ways of settling payroll accounts with employees is still ongoing and this problem has not been resolved definitively.

The abovementioned judgment of the CJEU and the new provisions in force from 1 January 2019 oblige employers to record not only the number of hours worked on a given day, but also indicate the time when work begins and ends. These regulations may facilitate the seeking of claims, e.g. for overtime work. In the event of a dispute with the employer about whether overtime work has taken place, the employee may show the court that the company did not use an objective system of measuring working time, thus prove whether there was any oversized provision of duties.

4.2. Settlements with the social insurance institution and calculation of personal income tax

The employer as a contribution payer is obliged to collect income tax and contributions for insurance on the employee's income for the month in which the employee actually received the remuneration or it was put at his disposal. The employee is subject to compulsory social insurance from the date of entering into an employment relationship with the employer until the date of termination of employment. The burden of individual insurance premiums is also charged to the employer. The principles of financing, calculating and paying social security contributions are regulated by the Act of 13 October 1998 on the social insurance system (Journal of Laws of 2019, item 300, as amended). The aforementioned Act lists four insurance risks: retirement pension, disability, sickness, accident (Article 1, Journal of Laws 2019, item 300, as amended). The employee is insured under all of the above titles, with contribu-

[2] See for more on this subject: Kozioł and Kozioł, 2018, pp. 81–82.

tions for retirement and disability pension insurance being financed by both the employer and the employee himself, while contributions for sickness and health insurance are covered only by the employee, and accident insurance contributions are paid only by the employer. In addition, it finances contributions to the Labour Fund and the Guaranteed Employee Benefits Fund (GEBF) (see Table 2).

Table 2. Types and amount of social security contributions

No.	Description	Employee	Employer
1.	Pension contribution	9.76%	9.76%
2.	Disability pension contribution	1.50%	6.50%
3.	Sickness contribution	2.45%	–
4.	Accident premium	–	X*)
5.	Healthcare contribution	9.00%[3]	–
6.	Contribution to the Labour Fund	–	2.45%
7.	Contribution to the Guaranteed Employee Benefits Fund	–	0.10%

*) The interest rate on the accident insurance premium is determined in accordance with the Regulation of the Minister of Labour and Social Policy of 29 November 2002 on differentiating the interest rate on the social insurance premium for accidents at work and occupational illnesses depending on occupational hazards and their effects (Dz. U. of 2019, item 757). From 1 April 2019, the interest rate on accident insurance ranges from 0.67% to 3.33%.

S o u r c e: Authors' own study based on Szczypa (ed.), 2019.

The Labour Fund and the Guaranteed Employee Benefits Fund are special purpose funds. The main purpose of the first is to mitigate the effects of unemployment, professional activation and employment promotion, the task of the second is to protect employee claims in the event of the insolvency of the employer. The obligation to pay contributions to the Labour Fund and the Guaranteed Employee Benefits Fund results from statutory regulations. Target funds for which employers should pay contributions include the Bridging Pension Fund, but not all employers are obliged to do so. The obligation applies to those employers who employ employees born after 31 December 1948 and performing work in special conditions or of a special nature (Article 35 of the Act of 19 December 2008 on bridging pensions, Journal of Laws of 2018, item 1924).

When calculating remuneration and derivative charges, the basis for their calculation must be correctly determined. Analyzing individual components of remuneration, they can be divided into those (Szczypa [ed.] 2019, p. 85):

– constituting the basis for social insurance contributions and the tax base;
– not constituting the basis for social insurance but subject to taxation;
– not constituting the basis for social insurance or taxation.

[3] In part (7.75%) it is deducted from the advance on personal income tax, while the remaining part (1.25%) is deducted directly from the employee's remuneration. There are exceptions to this rule (more broadly, Art. 81 of the Act of 27 August 2004 on healthcare services financed from public funds, Journal of Laws 2019, item 1373, as amended).

The largest number of remuneration components is included in the first group, nevertheless, some of the non-contributory payment elements should be remembered (Article 18 of the Act of 13 October 1998 on the social insurance system, Journal of Laws, item 300, as amended), i.e.: (1) remuneration for the employee's illness; (2) benefits and rehabilitation benefits paid out from sickness and accident insurance; (3) the catalogue of remuneration components contained in the Regulation of the Minister of Labour and Social Policy of 18 December 1998 on detailed principles for determining the basis for calculating contributions for retirement and disability pension insurance, which may include, for example, jubilee awards granted no more frequently than every 5 years, if they result from the payroll regulations of the employer, as well as severance pay due to retirement or disability pension and others (Journal of Laws 2017, item 1949). The final group of components not constituting the basis of social insurance institution contributions or the tax base include in particular: death benefits and funeral allowances, cash equivalents for tools, materials or equipment used by employees in the performance of their work, which are the employee's property, food allowances and other business travel payments, up to the amount specified in separate provisions.

From 1 July 2019, employers who, as at 31 December 2018 employ at least 250 people, are required to comply with the provisions on employee capital plans (ECP). Employees are automatically enrolled in the ECP, but they can opt out of making payments based on a written declaration submitted to the employing entity. Payments made to ECP constitute a percentage of the ECP participant's remuneration in the basic amount of 1.5% of the gross remuneration financed by the employer and 2% of the gross remuneration financed by the employed person. The employer will be able to declare an additional payment of up to 2.5%, while the additional payment of a participant may amount to a maximum of 2% of remuneration. Contributions to ECP financed by the employer constitute income for an employed person from whom an advance on personal income tax should be calculated (Rymarz, 2019, p. 5).

After the end of each calendar month, the employer sends to the social insurance institution the settlement documents and personal reports for each of the insured persons in a timely manner and pays the amounts declared on the social insurance institution DRA form. From 1 January 2018, it is obligatory to pay social security, health, Labour Fund, Guaranteed Employee Benefits Fund and Bridging Pension Fund contributions to one account number assigned from the social insurance institution (Stolarska, 2017). Budgetary units and local government budgetary establishments are obliged to send the document by the 5th day of the following month, natural persons who pay contributions exclusively for themselves by the 10th day of the following month, while other payers by the 15th day of the following month.

The provisions on personal income tax impose an obligation on the employer to calculate, collect and pay advance income tax deducted from the employee's remuneration.

The basis for calculating the advance payment for the employee's income tax is income from the employment relationship and social security benefits obtained during the month, if they are paid by the employer and payments to ECP financed by the employing entity after deduction of: (1) tax deductible costs[4] (up to 30 September 2019 PLN 111.25), from 1 Oc-

[4] We should also mention the 50% tax-deductible cost from the creators' use of copyright and related rights (e.g. specific work contract) and 20% tax-deductible cost from activities carried out in person and from the personal performance of services under a mandate contract.

tober 2019 to 31 December 2019 it is PLN 250 per month, or increased tax deductible costs in the amount of (previously PLN 139.06) currently PLN 300 for an employee who works in a town other than their place of permanent or temporary residence and makes an appropriate declaration to the employer; (2) social security contributions deducted by the employee in a given month by the employer.

The advance payment for personal income tax is calculated from the employee's income from January to December of a given year, according to the current tax scale (currently from 1 October 2019 to 31 December 2019 for income up to PLN 85,528.00—17%, for income over 85,528.00 PLN—32%). Due to the limited framework of the article, issues related to public law benefits have only been signalled and do not exhaust the presented topic, on the contrary, they confirm the complex nature of the issues.

It is also worth reminding that from 1 August 2019, there is an exemption from taxation on income from an employment relationship, cooperative employment relationship, service relationship or mandate relationship as well as employment contracts gained by persons until the age of 26 up to the amount of PLN 85,528.00 in the tax year (in 2019 the limit was set proportionally and amounts to PLN 35,636.67). If the employee submits in 2019 to the employer a statement that his income fully benefits from the PIT exemption, the employer will not be required to collect advance income tax from individuals for the months from August to December 2019 (MF, 2019).

4.3. Preparation of payrolls and records of salaries and public law settlements

The documentation related to employee remuneration includes: documents regarding the recording of working time, payroll cards, income cards, payrolls, social insurance documentation and monthly/ annual information for the insured person.

In addition to the working time records, employers are obliged to store, separately for each employee, employee requests regarding the establishment of individual working time schedules and others (Cieślak, 2019, p. 159).

The employer is also obliged to keep a personal remuneration card for the employee. This document should contain information on individual components of remuneration for work and other benefits related to work. This card includes such information as employee data, remuneration titles and its individual components. The information contained on the remuneration card is used to calculate the equivalent for unused annual leave, severance pay and compensation resulting from the employment relationship.

The employer should calculate for each employee the amount of remuneration due for a given calendar month, as well as the amounts of deductions for each title separately. Calculation of remuneration comprises several stages (see Table 3).

Table 3. Stages of calculating remuneration

Stage	Characteristics
Stage 1	Determining the gross remuneration, i.e. basic remuneration and other components (e.g. bonuses, night or overtime allowances, sick pay, holiday pay, etc.)—some components are contributory, others may be released.
Stage 2	Deduction from the base (gross salary) of social security contributions—retirement pension (9.76% of the base), disability pension (1.5% of the base) and sickness (2.45%).
Stage 3	Calculation of the amount of contributions for health insurance (9%). The basis is gross salary minus social security contributions financed by the employee.
Stage 4	Establishment of the income tax advance, where the basis for its calculation is the income minus tax deductible costs (PLN 250 or PLN 300—for employees living outside the town where the workplace is located. The income is gross pay minus social security contributions).
Stage 5	Decrease in income tax by a tax-free amount (PLN 525.12 per year, PLN 43.76 per month) and a health insurance contribution of 7.75%. The tax amount should be rounded to full zlotys.
Stage 6	Net remuneration is derived from the gross salary by deducting social security and health insurance contributions and an advance on income tax.
Stage 7	Possible deductions from net remuneration, e.g. claims enforced by virtue of enforcement title, maintenance payments, advances paid to the employee, etc.

S o u r c e: Authors' own study based on the Act of 13 October 1998 on the social insurance system (Journal of Laws of 2019, item 300, as amended), the Act of 26 July 1991 on personal income tax (Journal of Laws of 2019, item 1387), the Act of 30 August 2019 amending the Act on personal income tax and the Act amending the Act on personal income tax and certain other acts (Journal of Laws of 2019, item 1835).

According to the announcement of the President of the CSO of 13 November 2019, the average salary in the third quarter of 2019 was PLN 4,931.59. This varies regionally and by industry. For illustrative purpose, Table 4 summarizes sample calculations of the amount of remuneration, including obligatory deductions for the employee and the burden on the employer's side based on the example of a company in the trade industry. The selected enterprise employs employees under a contract of employment, including persons under 26 years of age. The employees include people living in places other than their work establishment.

Table 4. Selected variants of remuneration calculations on the example of an enterprise in the trade industry

<table>
<tr><th></th><th>Assumptions</th><th>Calculation of remuneration</th><th>Comparison of costs</th></tr>
<tr><td rowspan="6">Variant 1</td><td rowspan="6">– Employment contract
– Work in the place of residence
– Over 26 years of age
– Gross remuneration at the minimum pay level
– Accident insurance at a rate of 0.93%
– No other components of remuneration</td><td>1. Gross salary = PLN 2,250</td><td rowspan="3">Employee
– Pension insurance PLN 219.60
– Disability pension insurance PLN 33.75
– Sickness insurance PLN 55.13
– Health insurance PLN 174.74
– PIT advance payment PLN 93

Total: PLN 576.22</td></tr>
<tr><td>2. Social security contributions = PLN 308.48, including:
Pension contribution = PLN 219.60
Disability pension contribution = PLN 33.75
Sickness contribution = PLN 55.13</td></tr>
<tr><td>3. The basis for calculating the health insurance contribution = PLN 1,941.52
Health insurance contribution = PLN 174.74</td></tr>
<tr><td>4. Basis for calculating the tax advance = PLN 2,250 – PLN 308.48 – PLN 250 = PLN 1,692
Tax advance = PLN 1,692 × 17% = PLN 287.64</td><td rowspan="3">Employer
– Gross remuneration PLN 2,250
– Pension insurance PLN 219.60
– Disability pension insurance PLN 146.25
– Accident insurance PLN 20.93
– Labour fund PLN 55.13
– GEBF PLN 2.25

Total: PLN 2,694.16</td></tr>
<tr><td>5. Tax advance after deductions = PLN 287.64 – PLN 43.76 = PLN 243.88
Health insurance contribution deductible = 150.47
Tax to RTO = PLN 243.88 – PLN 150.47 = PLN 93</td></tr>
<tr><td>6. Net remuneration = PLN 1,673.78</td></tr>
</table>

<table>
<tr><th></th><th>Assumptions</th><th>Calculation of remuneration</th><th>Comparison of costs</th></tr>
<tr><td rowspan="6">Variant 2</td><td rowspan="6">– Employment contract
– Work away from home
– Over 26 years of age
– Gross remuneration at the minimum pay level
– Accident insurance at a rate of 0.93%
– No other components of remuneration</td><td>1. Gross salary = PLN 2,250</td><td rowspan="3">Employee

– Pension insurance PLN 219.60
– Disability pension insurance PLN 33.75
– Sickness insurance PLN 55.13
– Health insurance PLN 174.74
– PIT advance payment PLN 85

Total: PLN 568.22</td></tr>
<tr><td>2. Social security contributions = PLN 308.48, including:
Pension contribution = PLN 219.60
Disability pension contribution = PLN 33.75
Sickness contribution = PLN 55.13</td></tr>
<tr><td>3. The basis for calculating the health insurance contribution = PLN 1,941.52
Health insurance contribution = PLN 174.74</td></tr>
<tr><td>4. Basis for calculating the tax advance = PLN 2,250 – PLN 308.48 – PLN 300 = PLN 1,642
Tax advance = PLN 1,642 × 17% = PLN 279.14</td><td rowspan="3">Employer

– Gross remuneration PLN 2,250
– Pension insurance PLN 219.60
– Disability pension insurance PLN 146.25
– Accident insurance PLN 20.93
– Labour fund PLN 55.13
– GEBF PLN 2.25

Total: PLN 2,694.16</td></tr>
<tr><td>5. Tax advance after deductions = PLN 279.14 – PLN 43.76 = PLN 235.38
Health insurance contribution deductible = PLN 150.47
Tax to RTO = PLN 235.38 – PLN 150.47 = PLN 85</td></tr>
<tr><td>6. Net remuneration = PLN 1,681.78</td></tr>
</table>

<table>
<tr><th></th><th>Assumptions</th><th>Calculation of remuneration</th><th>Comparison of costs</th></tr>
<tr><td rowspan="5">Variant 3</td><td rowspan="5">– Employment contract
– Work in the place of residence
– Under 26 years of age
– Gross remuneration at the minimum pay level
– Accident insurance at a rate of 0.93%
– No other components of remuneration</td><td>1. Gross salary = PLN 2,250</td><td rowspan="3">Employee
– Pension insurance PLN 219.60
– Disability pension insurance PLN 33.75
– Sickness insurance PLN 55.13
– Health insurance PLN 174.74
– PIT advance payment PLN 0

Total: PLN 483.22</td></tr>
<tr><td>2. Social security contributions = PLN 308.48, including:
Pension contribution = PLN 219.60
Disability pension contribution = PLN 33.75
Sickness contribution = PLN 55.13</td></tr>
<tr><td>3. The basis for calculating the health insurance contribution = PLN 1941.52
Health insurance contribution = 174.74 PLN</td></tr>
<tr><td>4. Tax to RTO = PLN 0</td><td rowspan="2">Employer
– Gross remuneration PLN 2,250
– Pension insurance PLN 219.60
– Disability pension insurance PLN 146.25
– Accident insurance PLN 20.93
– Labour fund PLN 55.13
– GEBF PLN 2.25

Total: PLN 2,694.16</td></tr>
<tr><td>5. Net remuneration = PLN 1,766.78</td></tr>
</table>

<table>
<tr><th></th><th>Assumptions</th><th>Calculation of remuneration</th><th>Comparison of costs</th></tr>
<tr><td rowspan="6">Variant 4</td><td rowspan="6">– Employment contract
– Work in the place of residence
– Over 26 years of age
– Gross remuneration at the national average level
– Accident insurance at a rate of 0.93%
– No other components of remuneration</td><td>1. Gross salary = PLN 4,900</td><td rowspan="3">Employee
– Pension insurance PLN 478.24
– Disability pension insurance PLN 73.50
– Sickness insurance PLN 120.05
– Health insurance PLN 380.54
– PLN 305 PIT advance payment

Total: PLN 1,357.33</td></tr>
<tr><td>2. Social security contributions = PLN 671.79, including:
Pension contribution = PLN 478.24
Disability pension contribution = PLN 73.50
Sickness contribution = PLN 120.05</td></tr>
<tr><td>3. The basis for calculating the health insurance contribution = PLN 4,228.21
Health insurance contribution = 380.54 PLN</td></tr>
<tr><td>4. Basis for calculating the tax advance = PLN 4,900 – PLN 671.79 – PLN 250 = PLN 3,978
Tax advance = PLN 3,978 × 17% = PLN 676.26</td><td rowspan="3">Employer
– Gross remuneration PLN 4,900
– Pension insurance PLN 478.24
– Disability pension insurance PLN 318.50
– Accident insurance PLN 45.57
– Labour fund PLN 120.05
– GEBF PLN 4.90

Total: PLN 5,867.26</td></tr>
<tr><td>5. Tax advance after deductions = PLN 676.26 – PLN 43.76 = PLN 632.50
Health insurance contribution deductible = 327.69
Tax to RTO = PLN 305</td></tr>
<tr><td>6. Net remuneration = PLN 3,542.67</td></tr>
</table>

S o u r c e: Authors'own elaboration.

The stages of payroll settlement presented on numerical examples show the scale of public and legal burdens on the employee's and employer's side as well as the complex nature of their calculation. The employee must be aware that the basis of remuneration contained in the employment contract (respectively: the mandate contract, specific work contract, etc.) is

not the same as the actual amount to be paid. The employer should also be aware of the scale of payroll charges, and that the costs associated with the employee's remuneration are not limited to the amount of gross remuneration. The variants presented are typical. Due to the large number of cases to which specific provisions for the settlement of remuneration already apply and due to the limited scope of the article, they have been omitted; they will constitute the basis for further considerations.

The payroll is a document on which the above data is calculated and verified, it should contain (Jacewicz and Małkowska, 2017, p. 183):

1. Identification of the enterprise concerned.
2. Determination of the period for which it was prepared.
3. List of names of employees with a separate amount of remuneration and individual deductions for each person.
4. Signature of the person drawing up the payroll and date of its preparation.
5. Signature of the person approving and date of its approval.

Based on the payroll, the employer is required to draw up an employee's income card. This document covers both remuneration received from the employment relationship and information on the remuneration received from the employer under civil law contracts concluded with his own employee. The income card should contain all the necessary information to prepare full tax and insurance documentation (Styczyński, 2018, p. 73).

The adopted accounting principles (policy) are defined, among others, by the company plan of accounts adapting it to the unit's recording needs. In accordance with the company's plan of accounts, receivables and payables are recognized in the *Payroll accounts*. The rules for recording business transactions on this account are presented in Table 5.

Table 5. Records of remuneration settlements

No.	Content of business operation	Accounting account	
		Owed	Includes
1.	Accounting on the basis of gross payroll to costs	Remuneration	Settlements of remuneration
2.	Social insurance contributions paid by the employee from the payroll	Settlements of remuneration	Settlements with the social insurance institution
3.	Advance on personal income tax deducted from the payroll	Settlements of remuneration	Other public law settlements
4.	Other deductions from the payroll (optional)	Settlements of remuneration	Other settlements
5.	Calculation of social security contributions in the part financed by the employer	Social security and other benefits	Settlements with the social insurance institution
6.	Payment of net salary	Settlements of remuneration	Bank accounts

S o u r c e: Authors' own elaboration.

5. Final remarks and conclusions

The strength of the influence of remuneration as a factor motivating employees to engage in the company's affairs and effective performance of work depends both on its amount and the method of measuring and linking it with the results achieved by the employees and the differentiation appropriate to these results. Legal and organizational conditions that are a "product" of state institutions and managerial pragmatics (to a lesser extent) significantly reduce the implementation of the motivational function of pay, moreover, they create factors that demotivate employees towards work, which are characterized by a negative form of motivation.

The monetary payments and benefits constituting the employee's income and tax exemptions on the one hand, and on the other hand taxes and numerous financial contributions deducted from the employee's income, form an increasingly complicated and incomprehensible system of settling and documenting remuneration. In addition, in practice, remuneration systems often include optional allowances related to the type of work performed. These allowances are determined on different principles, the right to receive them is regulated in separate provisions, company regulations or employment contracts. The employer should not award them on the basis of a unilateral decision (Jacewicz and Małkowska, 2017).

Referring to the principles (recommendations) of effective motivation (Kozioł and Tyrańska, 2002, pp. 60–64), most of them are not properly respected in the system and the process of settlements with employees in respect of remuneration. For example, it is difficult to conclude that the postulate of simplicity and transparency of the incentive system has been duly taken into account in the payroll accounting and documentation system. The provisions contained in the collective agreements of institutions and enterprises, for their part, complicate the structure of the system of remuneration and salaries, which as a result may have an anti-motivational impact.

The most important principle of proportionality is that the remuneration for a given activity should be proportional to the inputs (efforts) and results achieved. This principle is possible only with a sufficiently precise measurement of these inputs and effects. If we assume that a correct measurement was made, then with the current tax scale on the one hand and the amount of tax-free income on the other, better paid employees (above the second tax scale per year) are relatively lower paid than those whose annual income does not exceed the scale.

The implementation of other principles of effective motivation, such as the principle of maintaining incentive thresholds or the principle of internalization of organizational goals, also raises considerable doubts. In the first case, it can be assumed that small amounts of tax exemptions (e.g. PLN 46.33) do not correspond to the amount expected by employees and are not of major importance in the motivating process. The motive for internationalization, which is important and difficult to develop, depends on the convergence of the goals of the state and the organization with the employee's value system. Achieving high work efficiency of employees is possible when what has value for them (taxation of remuneration) does not conflict with what has value for the state (e.g. social policy, health protection), as well as the value for the organization.

The general comments presented concern the motivational issue of settlements with employees in respect of remuneration and the income function to a lesser extent. Comments and proposals are aimed at rationalizing the system of accounting and recording of remuneration without the need to reduce state budget revenues.

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Rozrachunki z pracownikami z tytułu wynagrodzeń w systemie rachunkowości przedsiębiorstwa

Abstrakt: Celem artykułu jest przedstawienie sposobu pomiaru i ewidencji rozrachunków z pracownikami z tytułu wynagrodzeń oraz prezentacja wyników badań empirycznych. Przyjęto tezę, zgodnie z którą skomplikowany i niezrozumiały dla pracowników system pomiaru, rozliczania i dokumentacji wynagrodzeń znacząco zmniejsza realizację motywacyjnej funkcji płac, co więcej – stanowi czynnik odznaczający się ujemną formą motywacji. Jako przedmiot badań przyjęto sposób organizacji pomiaru i ewidencji rozrachunków z pracownikami w ramach systemu rachunkowości, a zakres analizy ograniczono do podstawowych zasad naliczania wynagrodzeń. Wyniki analizy rozrachunku z pracownikami w badanym przedsiębiorstwie wykazały, że przyjęte zasady (zalecenia) skutecznego motywowania nie są odpowiednio respektowane w systemie i procesie rozrachunku z pracownikami z tytułu wynagrodzeń. W szczególności dotyczy to: zasady proporcjonalności ponoszonych nakładów i uzyskanych efektów, zasady zachowania progów bodźcowych, zasady internalizacji celów organizacyjnych, i innych zasad. W badaniach wykorzystano metodę analizy czynników wpływu, analizę przypadku i metodę ekspercką.

Słowa kluczowe: system wynagrodzeń, płace, rozrachunki, ewidencja

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