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THE ROLE OF MANAGEMENT CONTROL SYSTEMS IN PERSONNEL CONTROLLING DURING COVID-19 PANDEMIC

Abstract: The global crisis related to the COVID-19 pandemic engaged both academics and practitioners in studying new hypotheses and formulating new theories about the corporate financial situation. Unfortunately, according to the revised literature, the conclusions about big companies within a continuous production cycle during the pandemic are limited. The purpose of the article was to identify how COVID-19 influenced the human resources in these corporations, and what was the role of management control systems in the reduction of its negative impact. The pandemic's parameters were correlated with human resources key performance indicators. The research method employed correlation and regression analysis with wild bootstrapping. The results showed that absences due to sickness were directly related to current holiday leaves, and were usually linked to the pandemic. This increases the impact of the COVID-19 pandemic on the availability of human resources. The increase of sickness absences resulted in the reorganization of work plans. The pandemic crisis emphasized the role of the management control system in personnel controlling. Fast and adequate information about sickness absence as well as introduced safety procedures resulted in no significant correlation between sickness absence and the COVID-19 statistics.

Keywords: performance management, COVID-19, human resources.

1. Introduction

The global crisis related to COVID-19 pandemic engaged both academics and practitioners in studying new hypotheses and formulating new theories about the corporate financial situation. The uniqueness of this pandemic situation is that it affects the most important kind of resources – human resources. The method for controlling the human resource management system is personnel controlling (Foremna-Pilarska, 2017). Tasks in this field are integrated with the general controlling system of the unit. Personnel controlling combines the personnel policy and the financial policy of the unit, while maintaining the basic assumptions of general control (Horváth, 2002). The functionality of personnel controlling in this aspect is expressed in the implementation of the informational controlling function in the management process (Nowak, 2004, p. 3). On the one hand the impact of the crisis is related to the macroeconomic situation. and on the other, the economic performance of separate corporations and industries. During the research, correlation and regression analysis with wild bootstrapping was introduced (Wu, 1986).

2. Literature review

Pinsker (2020), at the begging of pandemic crisis, formulated the hypothesis that society will be divided into two parts: well-educated employees with stable work and the other, where telework is not always possible. The second part of the society was at risk of dismissal. This hypothesis was partially confirmed by the studies of Gallant, Kroft, Lange, and Notowidigdo (2020) which indicated that the increase in unemployment was related to temporary redundancy. Most of the researches agree that this is a different situation than past recessions that typically start with an increase in permanent layoffs (Chodorow-Reich & Coglianese, 2021; Elsby, Bart, & Aysegul, 2010; Forsythe, Kahn, & Lange, & Wiczer, 2020; Gallant et al., 2020). The predictions about the future situation are different. Chodorow-Reich & Coglianese (2021) describe a rather pessimistic scenario that some parts of temporal unemployment will become permanent in time. In contrast, Gallant et al. (2020) argue that the unemployment is temporal and will decrease along with economic recovery.

In Poland, unemployment is rather stable. According to Eurostat it oscillates between 3.0% and3.4% of the active population. This is an important difference to other European countries and the United States. In this case, Poland can be comparable to Japan. Nevertheless, compared to December 2019, unemployment increased in 2020 in all provinces. The most significant increase was recorded in the following voivodeships: Śląskie (by 36.8%), Pomorskie (by 34.4%), Małopolskie (by 32.6%) and Wielkopolskie (by 31.6%). (GUS, 2021) Before the COVID-19 pandemic these provinces had the relatively lowest unemployment rate.
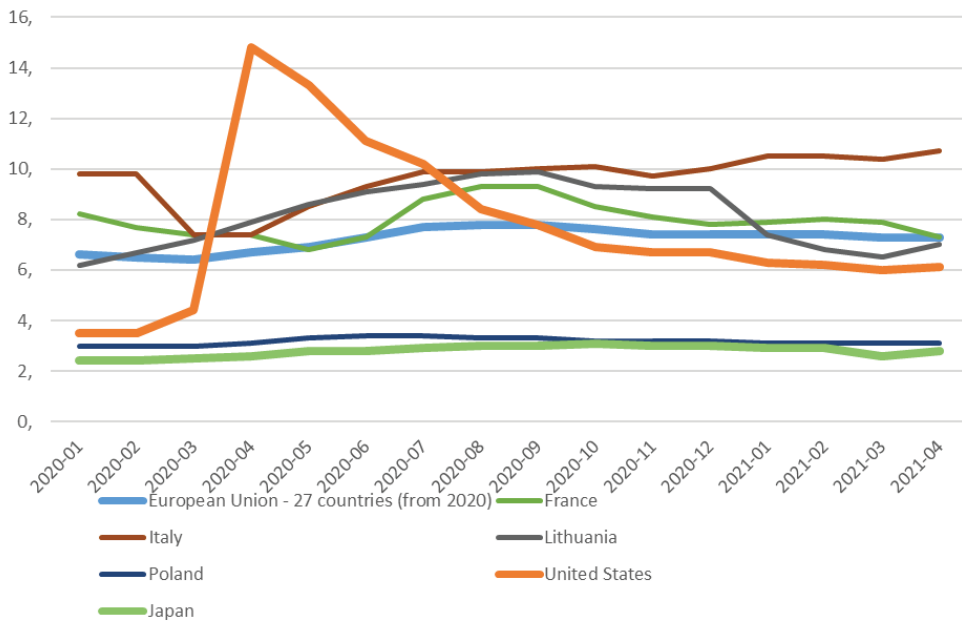
Fig. 1. Unemployment rate in selected countries

Source: Eurostat.

In many countries, including the United States and some parts of Europe, the pandemic crisis emphasized the problem of the unequal treatment of women and ethnic minorities on the labour market (International Labour Organization, 2021). In Poland, at the end of the fourth quarter of 2020, the share of women in the total number of unemployed accounted for 53.7%, and it was lower by 1.6% compared to the same quarter of 2019 (Gus, 2021).

On the microscale, the impact of COVID-19 on personnel controlling was influenced by two opposite actions. On the one hand, the lockdown of the economy temporarily closed some parts of it and caused delays in supply chains, while on the other hand, the government help and support programmes were a relief in these hard times (Aguinis, Villamor, & Gabriel, 2020). Unfortunately, some industries such as tourism suffered more than others. The excess of human resources was particularly evident in these sectors. Ngoc Su, Luc Tra, Thi Huynh, Nguyen, & O'Mahony (2021) stated at the beginning that the leading strategies were: cost reduction and innovative operational adjustments. The first is linked with layoffs, payroll cuts, recruitment freezes, reductions in training, rigorous performance management and downsizing, rather than maintaining the whole system. Lai & Wong (2020) added to these practices forcing labour force into unpaid vacations (furlough) and postponing office and system maintenance. Possible actions that may bring benefit

could be: lowering working hours, introducing changes to the duration of shifts and encouraging employees to take accrued leave or job redeployment (Ngoc Su et al., 2021). In this context, Kaushal and Srivastava (2020) identified that multiskilling of employees was considered a latent solution to the issue of reduced redundancy.

Other corporations faced multiple problems related to personnel controlling. In this trend – the best examples were small and medium enterprises. Ilić-Kosanović, Tomašević & Ilić (2020) argue that these corporations were unprepared for this crisis, mostly due to the lack of mechanisms of personnel controlling. Salamzadeh and Dana (2020) pointed out that the COVID-19 pandemic also has consequences for recruitment procedures and its effectiveness. The case was not always related to corporations. The authors also mentioned that the labour market became more dynamic and managers had problems with finding well-skilled employees.

From an employee point of view, the studies concentrated on the following key problems.

- Occupational Health and Safety, where, for example, the spread of COVID-19 was a minefield of interests (Araya, 2021).
- Post-COVID-19 symptoms (Fernández-de-Las-Peñas et al., 2021).
- How to work during the pandemic. Researchers identified that in many cases employees were not prepared for different work organizations and new forms such as teleworking (Carnevale & Hatak, 2020), but the situation forced teleworking in 88% of organizations during the pandemic (Gartner, 2020).
- Leadership. During the COVID-19 pandemic, managers have to make crucial decisions fast and deal with the long-term consequences. Caligiuri, De Cieri, Minbaeva, Verbeke, & Zimmermann (2020) identified the key competencies of managers during the COVID-19 pandemic: adaptiveness, ability to resolve conflicts and decisiveness. The authors underline that "a leader's ability to read the demands of the situation and respond, as needed, with the appropriate response out of the three alternatives above, are proving to be especially relevant during the pandemic." Sometimes this means diffused power and accountability that involve employee participation in decision-making (Ngoc Su et al., 2021).
- Work-life balance or conflict between work and family. During the COVID-19 pandemic, conflict between work and private spheres has escalated (Chawla, MacGowan, Gabriel, & Podsakoff, 2020). Additionally, economic lockdowns and closing schools made family life more demanding. According to Giurge & Bohns (2020), this increase of demand in both areas resulted in blurring work and family roles.
- Limiting human contacts affects mental health. During the COVID-19 pandemic, symptoms of anxiety and depression (16%-28%) and self-reported stress (8%) were widely revealed (Rajkumar, 2020). Lack of social interaction resulted in unhappiness (Fetters, 2020). Maurer (2020) suggested virtual lunches, coffee breaks, and happy hours to avoid this problem. Chawla et al. (2020) identified

other forms of daily recovery activities. Ngoc Su et al. (2021) proposed resilience-oriented conversations.

- Job insecurity. Chen & Eyoun (2021) postulate that job insecurity escalated fear and employees' emotional exhaustion. Perceived organizational support was an important mediator of this relationship.

Some articles try to anticipate the future. In many of them, performance management and management control systems are crucial for both surviving the COVID-19 pandemic and recovery (Ngoc Su et al., 2021; Collings, McMackin, Nyberg & Wright, 2021). Unfortunately, according to the revised literature, the conclusions about big companies within a continuous production cycle during the pandemic are limited. This study aimed to identify how COVID-19 influenced the human resources in these corporations and what was the role of management control systems in the reduction of its negative impact.

3. Methods of research and results

The analysis was conducted on one case from among big companies with a continuous production cycle during the pandemic – Grupa Azoty Zakłady Chemiczne „Police" S.A, in which personnel controlling is part of the HR Department's responsibilities. The HR department at Grupa Azoty Zakłady Chemiczne "Police" covers mainly administrative activities – comprehensive HR and payroll services for employees in the field of employment contracts, keeping personnel documentation and accounting (holiday leaves, sick absence, benefits), preparation of documentation related to the course of employment, remuneration, and the performance of other duties (reports to the Social Insurance Institution, the Tax Office, the Central Statistical Office, PFRON). The tasks of its employees also include the appropriate motivating of other employees to perform their duties, preparing and conducting various types of training, and recognising people who are extremely valuable for the team; it is a kind of link between management and employees, and an active partner of the Management Board and management, influencing the company's strategy.

The management control system of this company is focused on key performance indicators related to personnel controlling in the HR department (Table 1).

Table 1. Key performance indicators related to personnel controlling

Name	Formula	Description
R3.3. Degree of utilization of holiday leaves – overdue due to the Company	Overdue leave: (Number of days of unused leave / number of days of the outstanding unused leave) * 100 Unit of measure: % All employees are included in the calculations, except for employees posted for a term of office to perform functions in company trade unions. Reporting method: The measure is calculated cumulatively from the beginning of the year at the level of individual Organizational Units.	The measure shows the degree of utilization of the outstanding holiday leave in relation to the unused leave, which allows for the assessment of the effectiveness of the use of holiday leaves in individual Organizational Units, especially in the context of employee reserves and labor law provisions. Due leave should be understood as the leave referred to in the Labor Code, taking into account the overdue leave from previous years and the current leave for the calendar year for which the report is prepared. The indicator is provided for all Organizational Units and for the Company as a whole.
R3.2. The degree of use of holiday leaves – current leave to the amount due in the Company	Current leave: (Number of days of current leave taken / number of days of current leave due) * 100 Unit of measure: % All employees are included in the calculations, except for employees posted for a term of office to perform functions in company trade unions. Reporting method: The measure is calculated cumulatively from the beginning of the year at the level of individual Organizational Units and the Company.	The measure shows the degree of use of the current holiday leave in relation to the amount of leave, which allows for the assessment of the effectiveness of the use of holiday leaves in individual Organizational Units, especially in the context of employee reserves and labor law provisions. Due leave should be understood as the leave referred to in the Labor Code, taking into account the overdue leave from previous years and the current leave for the calendar year for which the report is prepared. The indicator is provided for all Organizational Units and for the company as a whole.
R3.1. Sickness absence of the Company	The measure is calculated according to the formula : Sickness absence = hours of absence / planned hours. Data sources: Number of hours of attendance / planned hours: data source: SAP. Description: report obtained not as the number of hours planned for individual employees	Inability to work due to illness or the employee's need to personally care for a sick family member. Documented on a medical certificate of temporary incapacity for work issued in writing on the ZUS ZLA form and from January 1, 2016 also in the form of an e-ZLA electronic document. For the Company – sickness absence during pregnancy, maternity, and paternity + rehabilitation + care for a child and family member.

	Hours of absence: Data source: SAP (data for a given month). Description: the report is obtained not as the number of hours of absence for individual employees, taking into account the type of absences, because according to the method of calculating the meter as below, only specific absences are taken into account.	
F2.4. Value of the provision for unused overdue leaves	Methodology for calculating the measure: the product of unused days from previous years (as of December 31 of the previous year) and the cumulative rate, calculated as the equivalent for leave, together with the remuneration surcharges from the employer. The holiday rate is updated on a quarterly basis. Data Source: Excel file hosted by Cost Accounting Department based on data provided once a month by the Human Resource Management Department, both in terms of the number of days of overdue leave and the agreed rate.	The measure expresses the value of the provision in PLN booked for unused leaves for previous years. The meter is updated monthly by the updater in the ESR application on a cumulative basis.
F2.5. Value of the provision for unused holidays due	Methodology for calculating the measure: the product of unused current days overdue in the current year (as of the last day of each month in a given year, in cumulative terms) and the cumulative rate, calculated as equivalent to leaves with remuneration surcharges from the employer. The holiday rate is updated on a quarterly basis. Data source: Excel files kept by the Cost Accounting Department based on data provided once a month by the Human Resource Management Department, both in terms of the number of days of overdue leave and the agreed rate.	The measure expresses the value of the provision in PLN booked for unused leaves, outstanding current, as of the last day of each month of the current year. The meter is updated monthly by the updater in the ESR application on a cumulative basis.

Source: Grupa Azoty Zakłady Chemiczne „Police" S.A.

Planned and execution data for all key performance indicators were gathered monthly data (03.2020-03.2021). Then deviations from the plan in percent were calculated according to the formula:

$$\frac{execution - plan}{plan}.$$

Additionally, COVID-19 pandemic monthly data were analysed for the same period of time.

The collected data were evaluated statistically with IBM SPSS v. 26 support. During the research, correlation and regression analysis with wild bootstrapping was introduced (Wu, 1986).

The considered linear model was targeted for R3.1. "Sickness absence of the Company" and represented the formula (Feng, He & Hu, 2011):

$$y_i = x_i^T \beta_0 + \varepsilon_i \ (i = 1, ..., n),$$

where: y_i is the ith observation; x_i is the ith nonstochastic design point in $\mathbb{R}m$ and ε_i is an independent error variable with probability density fi. For identifiability, assume that for a quantile level $\tau \in (0, 1)$ of interest, the conditional τ th quantile of ε_i given x_i is zero. The quantile regression estimator of β_0 minimises the objective function

$$\sum_{i=1}^{n} \rho_\tau (y_i - x_i^T \beta),$$

where $\rho\tau (u) = u\{\tau - \mathrm{I}\,(u < 0)\}$ is the quantile loss function, and $\psi\tau (u) = \tau - \mathrm{I}\,(u < 0)$ is the score function. The author used the wild bootstrap, as described in the following steps (Feng, He & Hu, 2011):

Step 1. Fit y_i to the data, and denote the estimate of the parameter vector by $\hat{\beta}$ and use $\hat{\varepsilon}_l$ ($i = 1, ..., n$) to represent the residuals.

Step 2. Generate the weights V_i from an appropriate distribution satisfying the conditions stated later, and let $\varepsilon_i^* = V_i |\hat{\varepsilon}_l|$.

Step 3. Calculate the bootstrapped sample as $y_i^* = x_i^T \hat{\beta} + \varepsilon_i^*$.

Step 4. Refit y_i to the bootstrapped sample and denote the bootstrap estimate by $\hat{\beta}^*$.

Step 5. Repeat Steps 2-4 2000 times, and estimate the variance of $\hat{\beta}$ by the sample variance of the B copies of $\hat{\beta}^*$.

Table 2. Correlation analysis with wild bootstrap

			Confirmed cases of COVID-19	No. of deaths caused by COVID-19	R3.3. The degree of use of holiday leaves – overdue due to the Company	R3.2. The degree of use of holiday leaves – current due to the amount due in the Company	R3.1. Sickness absence of the Company	F2.4. Value of the provision for unused overdue leaves	F2.5. Value of the provision for unused holidays due
			1	2	3	4	5	6	7
Confirmed cases of COVID-19	Pearson correlation		1	,983**	,384	−,232	−,152	−,416	,042
	Significance (two-sided)			,000	,195	,446	,620	,157	,892
	N		13	13	13	13	13	13	13
	Bootstrap^c	Deviation	0	,003	,037	−,164	−,104	,044	−,178
		Standard error	0	,000	,000	,000	,023	,000	,000
		Confidence interval 95% BCa — Lower Bound	.	.	.	.	.	.	.
		Confidence interval 95% BCa — Upper Bound	.	.	.	.	.	.	.
No. of deaths caused by COVID-19	Pearson correlation		,983**	1	,425	−,191	−,158	−,371	,061
	Significance (two-sided)		,000		,147	,531	,605	,212	,843
	N		13	13	13	13	13	13	13
	Bootstrap^c	Deviation	,003	0	,033	−,159	−,096	,028	−,165
		Standard error	,000	0	,000	,000	,022	,000	,000
		Confidence interval 95% BCa — Lower Bound	.	.	.	.	.	.	.
		Confidence interval 95% BCa — Upper Bound	.	.	.	.	.	.	.
R3.3. Degree of use of holiday leaves – overdue due to the Company	Pearson correlation		,384	,425	1	−,490	−,588*	,020	−,009
	Significance (two-sided)		,195	,147		,089	,035	,949	,976
	N		13	13	13	13	13	13	13
	Bootstrap^c	Deviation	,037	,033	0	−,028	−,019	−,009	−,059
		Standard error	,000	,000	0	,000	,020	,000	,000
		Confidence interval 95% BCa — Lower Bound	.	.	.	.	−,610	.	.
		Confidence interval 95% BCa — Upper Bound	.	.	.	.	−,604	.	.
R3.2. Degree of use of holiday leaves – current with the amount due in the Company	Pearson correlation		−,232	−,191	−,490	1	,947**	,276	,088
	Significance (two-sided)		,446	,531	,089		,000	,362	,774
	N		13	13	13	13	13	13	13
	Bootstrap^c	Deviation	−,164	−,159	−,028	0	−,007	−,006	,112
		Standard error	,000	,000	,000	0	,010	,000	,000
		Confidence interval 95% BCa — Lower Bound	.	.	.	.	,934	.	.
		Confidence interval 95% BCa — Upper Bound	.	.	.	.	,944	.	.

Table 2, cont.

			1	2	3	4	5	6	7
R3.1. Sickness absence of the Company	Pearson correlation		-,152	-,158	-,588*	,947**	1	,296	,024
	Significance (two-sided)		,620	,605	,035	,000		,326	,939
	N		13	13	13	13	13	13	13
	Bootstrap[c]	Deviation	-,104	-,096	-,019	-,007	0	,001	,074
		Standard error	,023	,022	,020	,010	0	,041	,034
		Confidence interval 95% BCa — Lower Bound	.	.	-,610	,934	.	,222	.
		Confidence interval 95% BCa — Upper Bound	.	.	-,604	,944	.	,371	.
F2.4. Value of provision for unused overdue leaves	Pearson correlation		-,416	-,371	,020	,276	,296	1	-,442
	Significance (two-sided)		,157	,212	,949	,362	,326		,131
	N		13	13	13	13	13	13	13
	Bootstrap[c]	Deviation	,044	,028	-,009	-,006	,001	0	,036
		Standard error	,000	,000	,000	,000	,041	0	,000
		Confidence interval 95% BCa — Lower Bound	.	.	.	.	,222	.	.
		Confidence interval 95% BCa — Upper Bound	.	.	.	.	,371	.	.
F2.5. Value of the provision for unused holidays due	Pearson correlation		,042	,061	-,009	,088	,024	-,442	1
	Significance (two-sided)		,892	,843	,976	,774	,939	,131	
	N		13	13	13	13	13	13	13
	Bootstrap[c]	Deviation	-,178	-,165	-,059	,112	,074	,036	0
		Standard error	,000	,000	,000	,000	,034	,000	0
		Confidence interval 95% BCa — Lower Bound	.	.	.	.	.	.	.
		Confidence interval 95% BCa — Upper Bound	.	.	.	.	.	.	.

* Correlation significant at the level of 0.05 (two-sided); ** Correlation was significant at the level of 0.01 (two-sided); [c] Until communicated, bootstrap results are based on 2000 wild bootstrap samples.

Source: own elaboration.

The following analysis identified that R3.1. "Sickness absence of the Company" was correlated negatively with R3.3. "The degree of use of holiday leaves – overdue due to the Company" and positively with R3.2. "The degree of use of holiday leaves – current with the amount due in the Company". Correlations between other key performance indicators as well as pandemic statistics were not observed.

4. Discussion

The following result shows directly that sickness absence is not related significantly to the COVID-19 statistics. This means that the safety procedures introduced in the corporation worked perfectly. The introduced procedures concerned not only safety rules, but also covered situations related to the emerging staff shortages. In this respect, personnel controlling played a large role, as it performed motivating functions and contributed to the identification and elimination of bottlenecks primarily understood in the sense of staff shortages caused by the pandemic. For example, remote work was made possible for employees in selected positions. Personnel controlling in this case was focused on efficiency and effectiveness in the area of human resource management through a greater focus on motivation, as well as tasks performed and their effects.

The strong and positive correlation between the sickness-related absence and the degree of use of current holiday leaves shows that consequences linked with COVID-19 were more profound. The situation relates to individual context of each case. The Company understood different points of views and diverse awareness. Some of those are connected with post-COVID-19 symptoms, others with different issues such as the conflict between work and family, or the consequences of isolation. This situation was linked with better communication supported by personnel controlling systems. Due to the established restrictions, orders and prohibitions in connection with the pandemic, the Management Board of Grupa Azoty POLICE decided to provide an additional benefit that may support the organization of actual childcare during the period of limitation of the functioning of education system units, for employees who care for children aged 8 to 12.

In connection with the above, the Company concluded an agreement with its employees, regarding caring for children aged 8 to 12, specifying the conditions for the release from work during the temporary limitation of the functioning of the education system units.

Each employee of the Company who took care of children aged 8-12 was granted the right to take a holiday leave and exempted from the obligation to work, with the proviso that one day of the holiday leave used will entitle them to take one day exemptions from the obligation to work.

For the period of exemption from the obligation to perform work referred to above, the employee will be entitled to a benefit calculated on the basis of care

allowance (i.e. payment of 80% of the basic salary, with inclusions contained in the Collective Labor Agreement).

The additional benefits were financed by the Company.

Grupa Azoty Zakłady Chemiczne „Police" S.A. is a case of a big company with a continuous production cycle during the pandemic. With the increase in sickness--related absence, the corporation prepared action plans in the case when absence level would increase, which included work reorganization. The negative correlation between overdue holiday leaves and work absence was not related to temporary cancelation. The only thing that could cause this situation were the employees themselves, who did not want to take overdue holidays because of the lockdown and government recommendations about personal mobility. They were delaying their leave with a view to the pandemic ending soon.

5. Conclusions

Management control systems and personnel controlling are essential instruments, especially in times of crisis. Every organization in a business must increase control over the use of its financial resources during crisis. The organization also needs to recognize other resources in its area, especially workforce and productivity-oriented employees. Such an organization of organized, constant and specific effort is needed to ensure that the resources are used to implement current and effective plans.

In the introduced management control system and personnel controlling, the results can be quickly compared with the planned values and with the previous years' achievements. Some statistics can be also assessed such as moving averages, assessed trends, and dynamics. The system operating in the company is used to monitor and report the implementation of strategic goals (measures and projects) and the periodic verification of the value of not only strategic, but also operational and financial measures.

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ROLA SYSTEMÓW KONTROLI ZARZĄDCZEJ W CONTROLLINGU PERSONALNYM PODCZAS PANDEMII COVID-19

Streszczenie: Globalny kryzys związany z pandemią COVID-19 zainspirował zarówno naukowców, jak i praktyków do badania nowych hipotez i formułowania nowych teorii dotyczących sytuacji finansowej przedsiębiorstw. Niestety, zgodnie z aktualną literaturą wnioski dotyczące dużych firm w ciągłym cyklu produkcyjnym podczas pandemii są ograniczone. Celem artykułu było zidentyfikowanie, w jaki sposób wirus COVID-19 wpłynął na zasoby ludzkie w przykładowej korporacji tego typu oraz jaka była rola systemów kontroli zarządczej w ograniczaniu negatywnego wpływu pandemii. Zmienne charakteryzujące pandemię skorelowano z kluczowymi miernikami dokonań stosowanymi w zarządzaniu zasobami ludzkimi. Metody zastosowane w tym celu to analiza korelacji i regresji liniowej dla przypadku niestabilnej statystyki bootstrapowej. Wyniki wykazały, że absencje chorobowe wiązały się bezpośrednio z późniejszymi urlopami wypoczynkowymi. Zwykle były więc pokłosiem pandemii. Zwiększa to wpływ pandemii COVID-19 na dostępność zasobów ludzkich. Wzrost absencji chorobowych zaowocował planami reorganizacji pracy. Kryzys pandemiczny podkreślił rolę systemu kontroli zarządczej w controllingu personalnym. Szybka i adekwatna informacja o absencji chorobowej oraz wprowadzone procedury bezpieczeństwa spowodowały brak istotnej korelacji między absencją chorobową a statystykami dotyczącymi zachorowań na COVID-19.

Słowa kluczowe: zarządzanie dokonaniami, COVID-19, zasoby ludzkie.