

## The Efficiency of a Service Provider in A Pandemic\*

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### Abstract

The paper undertakes considerations to verify the assumptions of the conceptual model of efficiency developed by Parkitna in 2020 and to test its validity on a group of small service enterprises under pandemic conditions. Quantitative research was based on deductive approach and was conducted in the first half of 2021 in Poland, qualitative research was conducted in Lower Silesia in June and July 2021. The research technique used was the GOOGLE electronic survey questionnaire and the collected data was statistically processed (SPSS). A sample was used in the study to select a set of population elements and establish the representativeness of the research sample. The theses and hypotheses presented were verified based on data collected in a quantitative study. The specificity of the distributions of the variables was established. Nonparametric tests were used to analyze the data. Correlations between variables were examined using Spearman's test. The verification of the research hypotheses confirmed the veracity of the Parkitna model of 2020. The assumptions made at the stage of selecting the research sample, allow to formulate a thesis of wider universality of the confirmed regularities, which should be confirmed in extended research. Which is an important contribution to further discussion.

**Keywords:** Efficiency, Services, Efficiency Model

### Introduction

Enterprise efficiency in a rapidly changing environment is a challenge that many pandemic enterprises have now had to face. Covid regulations and the imposition of numerous restrictions have protected people, but have hindered operations and disrupted the proper management of businesses, especially in the services sector. The pandemic made planning in organizations more complicated, but also negatively influenced consumption tendencies and investment activities. In addition, it has even prevented the operation of companies that provide many services, as exemplified by the hotel, fitness or restaurant industry. As a consequence, it has led to a disruption of free market processes, which made it necessary for companies to find new, atypical and non-standard tools, adjusted to the prevailing situation, which will allow to overcome the crisis situation. In view of the above, it is particularly important that the management process in enterprises lead to counteracting the crisis and become pro-active and lead to well-considered management decisions. In normal conditions, the company is considered effective, when it seeks to maximize the achieved profit using the resources at its disposal. In pandemic conditions this assumption should be revised to survival while ensuring continuity of services and products manufactured, in order to meet future market demand for a given good.

In connection with the realization of the above assumptions, *the aim of the study was to verify the model of efficiency of a small service enterprise under the conditions of changes caused by the occurrence of a pandemic.*

## Pandemic as an unprecedented change

The occurrence of pandemic COVID-19 is undoubtedly an unprecedented event, COVID-19 is the most serious global economic and social crisis of recent times (Dontho, Gustafsson, 2020). The public began to fear for their own safety and increased concern for the budget due to the uncertain times. Fear among consumers and firms has distorted usual consumption patterns and created market anomalies (McKibbin, Fernando 2020). Regulations imposed during COVID-19 resulted in several emerging economic pressures, including lower disposable income and income security (Karpen, Conduit. 2020). As a result, this has led to modifications and transformations in individual consumers' attitudes and the ways in which they make purchases. At the same time, it is likely that these habits will be modified by new regulations and procedures on how consumers shop and purchase products and services (Sheth, 2020). Entrepreneurs have faced many challenges beyond the fear of declining revenue. Organizations have had to focus on supporting and holding customer relationships digitally and on not losing the trust of consumers in the process (KPMG 2020). The coronavirus has activated new roles and tasks for enterprises. New strategies' model, both in the course of counteracting the pandemic, as well as in different areas of business management, is the requirement of this new time (Potejko 2020).

Thus, a pandemic is considered as an unforeseen and unexpected event for the whole world. It will have extreme and strong consequences throughout the world economy. Many scholars recognize it as an event of the type „*black swan*” (Taleb 2020), i.e., it includes in „*black swan events*” (Szczepański 2020). The global spread of a new coronavirus, also known as the COVID-19 pandemic, had a devastating impact on the operation of entire supply chains (Chowdhury, Paul, Kaiser, Abdul 2021). It is hard to find an example of a business or an entire industry that would not be affected by the coronavirus pandemic. However, this impact was not always negative. In several industries, such as healthcare, gaming or e-commerce, the coronavirus pandemic somehow "helped" in achieving better overall sales results. Unfortunately, the overwhelming majority of entrepreneurs, experienced the negative effects of the pandemic, which created the phenomenon that can be named “*coronacrisis*” - “This health crisis is linked to an economic crisis” (Cifuentes-Faura, 2021). As reported in economic reports, the most difficult situation is observed in the service sector, where in the wave V of the survey (conducted on May 26-29 this year) as many as 7% of SME declared that their situation is insufficient to operate even for a month, whilst such assessments in the manufacturing sector reached 3%, and in the sector of trade only 1 percent (Rzeczpospolita 2020). Surveys conducted in Poland on the impact of the COVID-19 pandemic on the economic situation - evaluations and expectations - do not give unequivocal opinions in all categories of services, e.g., entities from the real estate services section are not affected (64.0%), while entities from the accommodation and catering section are strongly affected (52.8%) (Raport GUS 2020). From the perspective of the last year, in addition to burying many industries, the pandemic has contributed to the development of others. So far, there has been a dynamic development of technology companies in the economy, although in many areas this has not yet been so visible or has been carried out in dual conditions, i.e. all processes have been carried out digitally, but also in an analogue way primarily paper-based. Undoubtedly, the world of digitization has succeeded in 2020 thanks to the pandemic (Vedev , Drobyshevsky, Knobel , Sokolov, Trunin 2020). The lockdown introduced by those in power has led to people staying at home (Rydlewski 2021a and 2021b). At the same time, many activities and actions have moved to the Internet. Companies that had the opportunity introduced remote working. Learning and education were transferred and conducted online. Commerce was also mainly conducted over the Internet. The same was the case with medicine, doctor's appointments were mainly held via teleportation and the documents issued were in the form of e-prescriptions, e-releases and e-referrals. Officials switched to remote work mode, so that administrative matters could be completed by phone or electronically. Undoubtedly, the pandemic accelerated the digitization of economic (Marchenko, Starzyk, Klimczyk, Badowski. 2021), and social life ( Stryjek 2021). This is undoubtedly an advantage because: (Pracodawcy RP 2021)

- The mode of remote work has been legally regulated,
- Dedicated programs, applications and lesson plans for remote teaching were created,
- Digitalization of the health care system has been introduced,
- State and administrative offices have introduced permanent digital solutions in relations with enterprises and citizens,
- Access to culture and entertainment on the Internet has evolved, making it more widespread and even faster.

In 2008 the employment in the sector of modern business services in Poland amounted to 50 thousand people. At the end of the first quarter of 2020 the sector already employed 338,000 people in more than 1,500 centers (5.2% of employment in the enterprise sector). Including multiplier effects, the sector generates 608,000 jobs. According to the latest ABSL estimates, the sector accounts for 3.0-3.5% of Poland's GDP ( Raport Sektor nowoczesnych usług biznesowych w Polsce 2020). The pandemic has affected the existing habits and customs of both the public and economic operators (Obłój2021). Work-life boundaries are heavily blurred during the pandemic because people work at home, study at home, and relax at home. Since the consumer cannot go to the store, the store must come to the consumer ( Werner-Lewandowska, Lubiński., Słonec 2021). Remote working has been popularized, which until now was only a form of employee benefit and used only by individual companies. Undoubtedly, the introduction of the provision on remote work in the covid act has revolutionized the labor market (Waliszewski, Solarz, 2021). Employees, but also employers, have found that this way of working can bring many benefits (Matulewicz, P. 2020). Probably, despite the end of the pandemic situation, in the future, enterprises will continue

to use remote working mode, as it helps to automate and speed up many processes while working (Rajavel, 2021). This situation may also affect employment in companies.

### **Changes Leading Through Uncertainty to Crisis**

Owners and employees of medium-sized and small service companies are a social group that has experienced the uncertainty and threat of the pandemic to a far greater extent. "Central control of the economy" by the state and the introduction of further restrictions on business activity have, unfortunately, led to many companies going bankrupt. This has led to confusion and frustration among service providers (Abramowicz 2021). Coronavirus has caused many negative changes. The pandemic crisis has affected different service industries with varying degrees of severity. By far the greatest difficulties were observed in the service sector, followed by retail trade and industry. Whereas the lowest - in the construction industry (Rokicki, T. 2021). Despite the anti-crisis shield and job protection measures, not all companies have been spared. Many companies will be affected by pandemics and lockdowns for a long time to come (Pracodawcy RP, 2021).

The COVID-19 pandemic has had a significant impact on the ecotourism market, due to the travel restriction across the globe in an attempt to prevent the pandemic spread. According to the United Nations World Tourism Organization (UNWTO) estimation, the global international tourist arrivals might decrease by 58–78% in 2020 depending on the speed of containment and the duration of travel restrictions as well as shutdown of borders. In addition, the travel & tourism industry will suffer a loss of \$910 billion to \$1.2 trillion in export revenues from tourism in 2020, which is further expected to hamper the growth of the global market. According to UNWTO "As many as 100 million direct tourism jobs are at risk, in addition to sectors associated with tourism such as labor-intensive accommodation and food services industries that provide employment for 144 million workers worldwide. Small businesses (which shoulder 80% of global tourism) are particularly vulnerable. "Countries around the world are working to build a more resilient tourism economy post COVID-19. Governments are undergoing structural transformation and providing financial stimulus in order to support tourism sector. The duration of the virus outbreak remains a key factor in assessing the overall impact of the pandemic, however, the global tourism industry is likely to stabilize after 2023.( Raport. Global Ecotourism Market 2021)

Services form a large and very diverse sector of the economy. They include primarily the activities of private enterprises whose main purpose is to make profit (i.e.: financial institutions, banks, outsourcing companies, hotels, transport companies, etc.), but they may also include the activities of government delegations (i.e.: military, police, justice, etc.). The differences that occur in the service sector are the reason why it is difficult to provide a clear and universal definition of the term service.

Analyzing the characteristics of a service enterprise, it can be noted that there are some differences in the way such an organization is managed. Under the conditions of economic freedom and strong competition, service providers must focus on the way of organizing activities and developing the management process in order to achieve their goals and prosper in the market. However, in the case of a pandemic, no developed management patterns are appropriate. This is an unprecedented situation. In the case of companies providing services, a certain specificity in the way of management can be observed. It depends mainly on the characteristics of the services offered. The difficulty in determining the details of the final service makes the accuracy of forecasting and planning very difficult. However, given that customer satisfaction is a complex human process of psychological and physiological factors, it is not merely an affective phenomenon but is also a cognitive process (Oh and Parks, 1997)

In the case of the pandemic, however, the market proved to be a great unknown. As a rule, during the planning of a material product, the method and methodology of production are defined very precisely. Meanwhile, the service is created at the moment when there is a demand for it and with a high level of consumer intervention. The synchronization of the production and consumption process usually causes modifications and changes in the quality characteristics of the service, and the pandemic has made this process more difficult due to the fear of direct contact with the service provider. Services tended to be unique and unrepeatable, which makes it impossible to mass produce them, they should be flexible, so that at any time it is possible to change the conditions of production taking into account individual customer needs. In the process of service provision, means of delivery of knowledge and its application to solve a client's problem are of key importance for a service company's success (Dabholkar, , Overby 2005). What if the buyer's consumption need has disappeared due to fear or legal conditions of market operation - a temporary lockdown ban? It is very important to plan the resources used during the "production of service". A big impediment to running a service business is also the lack of opportunity to produce services for stock and storage. This would make organizing work much more efficient. Then there would be a reserve that would guarantee continuity of supply and immediate satisfaction of customer needs. Therefore, the way of realization of the planning stage in enterprises of the service sector requires a special and characteristic approach. When organizing at the service provider, the problem of matching the appropriate size of the company's capacity with the requirements and needs of the consumer is noticeable (Filipiak , Panasiuk 2008).

Services are the type of products that need to be completed on time, and this requires a high level of organization. However, service providers have to look at the motivation phase from a broader perspective and, above all, take into account the quality

of human resources (Filipiak, Panasiuk 2008). And how to motivate people when, in times of pandemic, there is no demand for services and no funds for payments. The nature of service activities, the specificity of the tasks performed, the organizational structure and the style of approving decisions cause great challenges for employees. Customer satisfaction is affected by the level of functioning of the information gathering system and the way it is used in the decision-making process. (Filipiak, Panasiuk 2008) Pantouvakis say than attributing undue importance to the interactive elements of service (assurance, empathy, and responsiveness), managers should recognise the benefits of carefully attending to the servicescape within which the service is provided – including signage, customer information systems, and renovated buildings and settings. Finally, managers should note that a good servicescape environment can facilitate positive interactive experiences for customers. Conversely, an unsatisfactory physical environment demands a higher level of interactive capacity to provide the same level of customer satisfaction. (Pantouvakis 2010).

The presence of the consumer at the time of service provides the opportunity to identify potential problems at the source and direct access to a variety of information. However, there is no panacea for the fact that the demand for a service does not depend on the quality of the service but on the long-term restriction of access to its provision. In particular, because services usually have characteristics that are unmeasurable and subjective. This causes problems related to the measurement of the end result. In summary, the management process of a service enterprise is an intermediary between the consumer and his needs and the resources of the organization. The priority task of such an enterprise is to acquire and integrate the necessary resources, which are available directly in the enterprise or outside of it, in such a way as to effectively, efficiently and effectively implement the processes of service activities (Filipiak, Panasiuk 2008). In the specifics of service activities, the further environment is often a source of high risk of unexpected and unfriendly events. The reason for this is the high turbulence of the environment and the difficulty in rationally predicting the course of its development (Mroczko 2014).

Today's turbulent business environment makes it difficult for companies to make effective and confident market decisions (Green, Gleń, 2020). Even companies that are properly organized and make only well-considered and prudent decisions can suffer when there is a sudden and unexpected change in the environment. The result of such a failure may even be bankruptcy, since a period of turbulence may lead to a situation of uncertainty and this in turn to a crisis, the effects of which may be irreversible (Mroczko 2014). Uncertainty is considered a cognitive category in which we are unable to make inferences about the future based on the present state. We can only identify and analyze the chain of cause and effect relationships that pertain to the analyzed situation or occurring events. However, there is no way to determine the probability of what will happen in even the near future. It is important to keep in mind that uncertainty can be a major cause of all risks and hazards associated with it (Jędralska 2010). Today, a patchwork of habit and fatigue prevails. Everyone has learned to live under a sanitation regime, has mastered the digital dimension of corporate operations, is slowly shifting to a hybrid mode of work, but has a sense of lack of prospects. The pandemic seems to have no end, and - as A. Camus wrote in his novel "Plague" - as one waits, one no longer awaits (Obój 2021).

When talking about crisis situations, it is usually assumed that the causes of their occurrence are economic problems arising either in the environment or in the company itself. However, a serious crisis that threatens the further functioning of an organization may be caused by non-economic aspects. Its cause may be sudden events of catastrophic nature, e.g.: (Sudoł 2006) which we can also consider a pandemic. The uniqueness of the crisis is due to its complexity, unprecedented in the history of the world economy, which has already experienced many recessions. The crisis hit through various channels both on the supply and demand side. Another aspect is the omnipresent uncertainty, which hinders planning in companies and has a negative impact on the propensity to consume and investment decisions. Non-economic causes of crises usually lie outside the company and come as a surprise each time. (Pracodawcy RP 2021).

It has been established that it is difficult to determine unequivocally what the crisis is related to, what changes it may cause in the organization, whether the effects of these changes will be bad or good. A lot depends on how intensely the crisis affects the enterprise, how long it lasts and in what way it takes place. It is important to manage the enterprise in an appropriate way precisely at the moment of uncertainty and crisis situation (Rysz 2020),

The company's ability to overcome a crisis situation lies primarily in the way it is managed. However, it has to be adjusted to the specific and particular conditions of the crisis and also oriented towards fighting the crisis preferably in its earliest stages. Transforming the organisation's goals may be an opportunity to regain balance. One of the processes that help them survive difficult times is the restructuring process (Sudoł 2006) (Grajda 2021), (Kośka 2021).

When a crisis occurs, an organization's social responsibility towards its employees and the region becomes increasingly important. This is due to the fact that the crisis may be associated with the deterioration of working conditions and lower wages of employe (Elavarasana, Pugazhendh, 2020), (Borowiecki, Jaki 2010). The collapse of a large organization can cause economic and social degradation of a region (Sudoł 2006).

Overcoming the crisis and making the company emerge stronger from it primarily involves making difficult, important and sometimes even drastic decisions (Sudoł 2006) Given that crisis situations are usually unique in their causes and course, it is difficult to formulate a ready-made solution on how to proceed. Each organization must find its own way to overcome a

crisis. Time will tell if the pandemic is a chance for a new, better beginning for the world or a threat to the future fate of our planet ( ptezg.pl 2021), (euractiv.pl 2021) .

### **Efficiency of service enterprises**

Published in 2020 efficiency model by Parkitna in the book Determinants of Small Business Efficiency (Fundacja UEK,20201), ( ptezg.pl 2021 ). to which the research was conducted before the pandemic showed the lack of a clear impact of external factors on the performance of small businesses in the general research group that includes service, retail and manufacturing companies. Therefore, the authors decided in this work to *verify the model of efficiency of a small service company under the conditions of changes caused by the occurrence of the pandemic*.

The choice of service enterprises from the SME sector was dictated by the fact that enterprises are the litmus test of the economy and have the ability to easily adapt to regulations and rules, which is their own way of strategy to protect (Kortelainen, Ratinen, Linnanen, 2012).

### **Assumptions of the efficiency model**

Therefore, taking into account the importance of managing the success and efficiency of small enterprises, the book attempts to solve the research problem of creating a *model of efficiency research*.

The efficiency of an enterprise is a continuous cycle of its components.

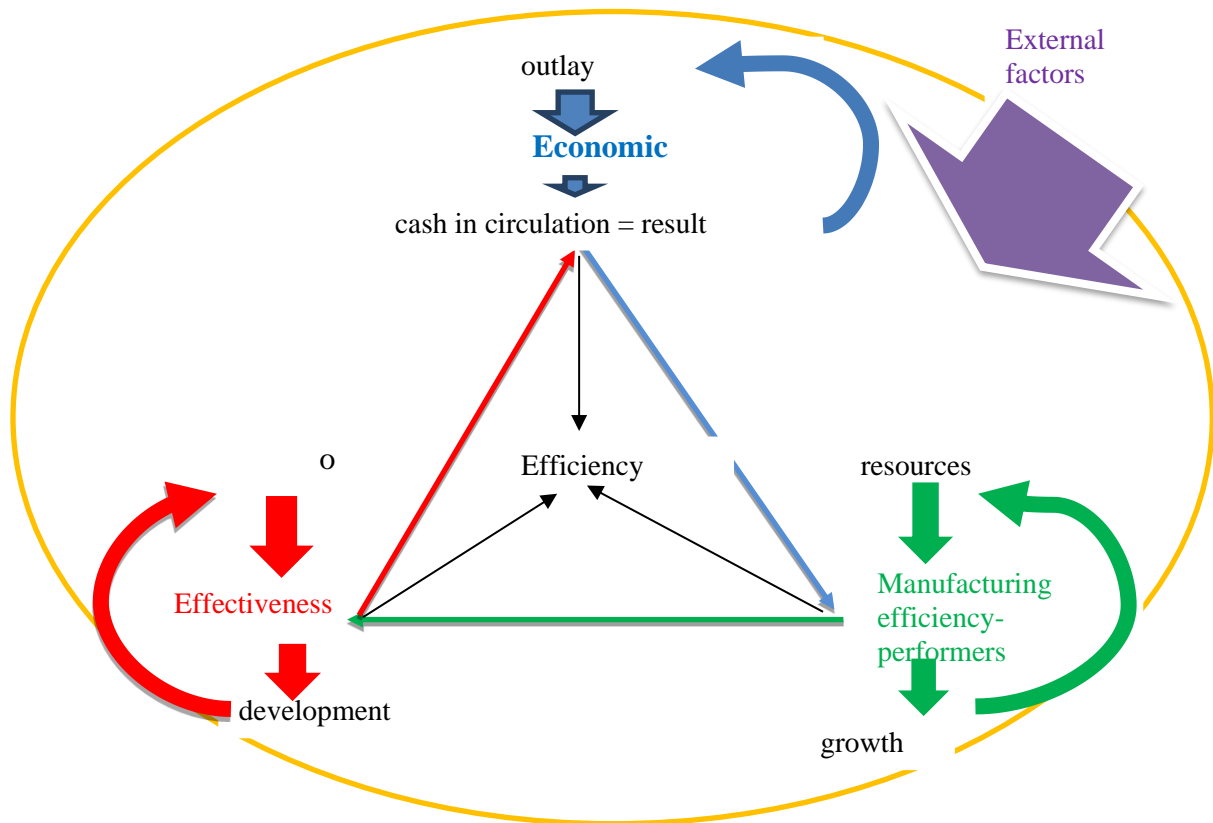
$$Ee_0 \rightarrow Me_0 \rightarrow En_0 \rightarrow Ee_1 \rightarrow Me_1 \rightarrow En_1 \rightarrow Ee_2 \rightarrow \dots$$

The moment of entry in the business register is considered to be the beginning of business activity. At the outset, an enterprise generally has some initial capital, which determines its economic efficiency. This capital leads to the accumulation of resources, the consumption of which determines manufacturing efficiency. The growth of the organisation determines its efficiency on the market. The return from the market determines the economic efficiency of the new cycle, etc. ( Parkitna 2020)

Understand Manufacturing efficiency=performers understood as productivity in service organisations as a means of managing profit, cost effects and revenue effects of changes in the productions system cannot be separated (Grönroos, Ojasalo 2015). Unfortunately, the advances in productivity management under a goods-dominant approach are not applicable to services (Grönroos, Ojasalo 2004) , thus impeding service firms reaching similar productivity improvements than in manufacturers. This occurs due to service intangibility, heterogeneity, inseparability and perishability. The efficient use of resources constitutes a key strategy to guarantee the future viability of companies and their competitiveness. (Ignacio, Romero, Sellers-Rubio 2019). Companies need reliable metrics to assess the efficiency of their distribution decisions. These decisions require counterbalancing companies' performance and the performance of their distribution partners to maintain an adequate commercial relationship (Ailawadi, Farris2017).

The enterprise is set up to exist indefinitely, so there is no possibility of a time limit here. The efficiency triangle cycle runs from the moment the enterprise is established - moment 0, to the subsequent cycles in time – t = 1,..., n.

The efficiency triangle (Figure 1) is exposed to external factors determining the efficiency at a specific point in time *t*.



**Figure 1. Model of the efficiency triangle in time t**

Source: Own elaboration.

The efficiency model of micro and small service enterprises should be considered as a triad, analyzing in sum the relationship between the three dimensions of efficiency: economic efficiency, manufacturing efficiency and operational efficiency. The dimensions these dimensions are defined as:

- economy - an activity in which the achieved result exceeds the expenses incurred to obtain it (Szudy, 2013),
- manufacturing efficiency of the organization (Barasa, Vermeulen, Knobens, et al, 2019; Guinee, Mulholland, Kelly, et al, 2007; Mullen, Williams, Moomaw, 1996; Sarmiento, Byrne, Contreras, et al, 2007), or efficiency (Knedler, 2002), in the context of the original meaning of this concept as a characteristic of action - the proper performance of something in a certain time (Harrington, 1926), productivity (Meyer, Gupta, 1994; Meyer, O'Shaughnessy, 1993),
- effectiveness - an action that leads to the market effect intended as a goal (Kotarbinski, 2000).

The basic assumption of the model is to present the efficiency of each company at moment  $t$  as a point  $E_f = (E_e, E_n, M_e)$  in the Cartesian reference system (three-dimensional space).

The position in space  $R^3$  of each efficiency point is determined (designated) by a set of ordered components:

$$R^3 = \{(E_e, E_n, M_e): E_e, E_n, M_e \in R\}$$

The measure of efficiency can be defined as the length of the vector determined on the basis of the previously discussed parameters  $(E_e, E_n, M_e)$ . The length of the efficiency vector is expressed as (Euclidean standard):

$$\|E_f\| = \sqrt{e_e + e_n + m_e}$$

$\|E_f\|$  - the length of the vector (non-negative value),

$e_e$  - square of the length of the economic efficiency component at moment/time  $t$ , determined as a change in the economic efficiency value:

$$e_e = (E_{e_t} - E_{e_{t-1}})^2$$

$m_e$  - square of the length of the manufacturing efficiency component at moment/time  $t$ , determined as a change in the economic efficiency value:

$$m_e = (M_{e_t} - M_{e_{t-1}})^2$$

$e_n$ - square of the length of the effectiveness component at moment/time  $t$ , determined as a change in the economic efficiency value:

$$e_n = (E_{n_t} - E_{n_{t-1}})^2$$

Therefore, for the first step/cycle/run, the length of the vector determining the efficiency value can be presented as:

$$\|E_f\| = \sqrt{(E_{e_1} - E_{e_0})^2 + (E_{n_1} - E_{n_0})^2 + (M_{e_1} - M_{e_0})^2}$$

$E_{e_0} E_{n_0} M_{e_0}$  the initial values are 0.

At  $t = 0$  the company has no value yet; this is the moment of initiation of business activity, equal to the moment of entry in the register, therefore:

$$\|E_f\| = \sqrt{E_{e_1}^2 + E_{n_1}^2 + M_{e_1}^2}$$

Such a description of an enterprise's efficiency seems to be accurate due to the fact that there is statistical evidence in the source literature which generalises the characteristics of vectors for a multidimensional case, as well as presentation of their selected properties

### ***Verification of the hypotheses of the study of the efficiency of Service Enterprises***

Therefore, Parkitna decided to look at the behavior of small service businesses as a specific market barometer to validate the model for small service businesses. PARP in 2020 reports the total number of service businesses in 2019, which represent 52% of the 2.15 miles of the total business population in Poland = which is 1 047 800<sup>1</sup>. Therefore, determined with the number of 336 returns obtained and the population size, the maximum error of the study set at 5% with a confidence level of 95% and a fraction size of 0.5.

Looking at the economic practice characterizing the market the impact of the pandemic on economic actors we can consider three types of service enterprises.

Type 1- enterprises permanently or temporarily idle as a result of pandemic strictures. In which the model of efficiency does not depend on the management actions of owners and which external factors in the form of pandemics prevented their operation, which in the long run led to their collapse.

Type 2 - enterprises that survived and, thanks to their flexibility and the management actions of their owners, overcame the crisis.

Type 3 - enterprises that took advantage of the pandemic to develop their services, e.g. market digitization and development of the modern business services sector.

Selection of the research sample was purposive, therefore the following results should be treated with caution, in the category of hypotheses and have a fragmentary character. Due to the fact that the research was conducted on entities operating in the first half of 2021, the research did not include bankrupt entities and suspended businesses.

At the stage of operationalization of the research model the main hypothesis was formulated. Therefore, before proceeding to verification, each hypothesis was written down in mathematical form.

### ***Verification of the main hypothesis***

$$H_{P1}: \mu_{Ee} \Leftrightarrow \mu_{En} \Leftrightarrow \mu_{Me} \Leftrightarrow \mu_{Ef}$$

$$H_{O_{P1}}: \mu_{Ee} \not\Leftrightarrow \mu_{En} \not\Leftrightarrow \mu_{Me} \not\Leftrightarrow \mu_{Ef}$$

**H<sub>P1</sub>: There is a statistically significant reciprocal relationship between the elements of the triangle model and the efficiency.**

**H<sub>O<sub>P1</sub></sub>: There is no statistically significant reciprocal relationship between the elements of the triangle model and efficiency.**

<sup>1</sup> Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce 2020, PARP, grupa PRF, s.6.

Given that the variables do not have a normal distribution, Spearman's rank correlation, which is one of the non-parametric measures of monotonic statistical dependence between random variables for independent samples, was used to verify the hypotheses (Table 75). This correlation makes it possible to determine both the direction and strength of the relationship (Kendall, 1948).

**Table 1 Correlation matrix for efficiency triangle and external determinants**

Correlations							
			efficiency	determinants	economic	effectiveness	Manufacturing efficiency
Spearman's rho	efficiency	Correlation coefficient	1.000	.040	.762**	.710**	.835**
		Relevance (two-sided)	.	.468	.000	.000	.000
		N	336	336	336	336	336
	determinants	Correlation coefficient	.040	1.000	.032	-.038	.091
		Relevance (two-sided)	.468	.	.560	.492	.097
		N	336	336	336	336	336
	economic	Correlation coefficient	.762**	.032	1.000	.375**	.444**
		Relevance (two-sided)	.000	.560	.	.000	.000
		N	336	336	336	336	336
	effectiveness	Correlation coefficient	.710**	-.038	.375**	1.000	.432**
		Relevance (two-sided)	.000	.492	.000	.	.000
		N	336	336	336	336	336
	Manufacturing efficiency	Correlation coefficient	.835**	.091	.444**	.432**	1.000
		Relevance (two-sided)	.000	.097	.000	.000	.
		N	336	336	336	336	336

\*\* . Correlation significant at the 0.01 level (two-sided).

Source: Own elaboration.

Due to the correlation coefficient between (Table 1):

- Economy and manufacturing efficiency:  $R = 0,710, p = 0 < 0,01,$
- Manufacturing efficiency and effectiveness:  $R = 0,432, p = 0 < 0,01,$
- Effectiveness and economy:  $R = 0,444, p = 0 < 0,01,$
- Effectiveness and efficiency:  $R = 0,835, p = 0 < 0,01,$
- Manufacturing efficiency and efficiency:  $R = 0,710, p = 0 < 0,01,$
- Economy and efficiency:  $R = 0,762, p = 0 < 0,01,$

then hypothesis **H0P11** should be rejected in favor of **HP11**. Therefore, it should be assumed that **there is a statistically significant mutual relationship between the elements of the model: economy, efficiency and efficiency**.

The analysis of the significance of correlation coefficients should be supplemented by the analysis of the direction and strength of the relationship, since the interpretation of correlation coefficients is as follows: they can take values from -1 to 1; the direction tells about the ordering of the values of one variable in relation to another, and the size of the coefficient informs about the strength of the relationship (Krysicki, Bartos, Dyczka, et al., 2006).

All correlations between the analyzed variables have a positive coefficient, which means that as one characteristic increases, the value of the other increases. There is a moderate correlation between the components of the triangle: economy and effectiveness, and manufacturing efficiency and effectiveness. A fairly strong relationship is found between the individual components of the efficiency triangle and efficiency itself.



$$H_{P12}: \mu_{fact} \Leftrightarrow \mu_{Ef}$$

$$H_{O_{P12}}: \mu_{fact} \not\Leftrightarrow \mu_{Ef}$$

In the next step, the relationship between the environment and the efficiency of enterprises was verified.

**H<sub>P2</sub>: There is a statistically significant relationship between efficiency and external factors.**

**H<sub>O<sub>P2</sub></sub>: There is no statistically significant relationship between efficiency and external factors.**

Because:  $R = 0,040$ ,  $p = 0,468 > 0,01$  (Table 1), There is no basis to reject hypothesis **H<sub>O<sub>P12</sub></sub>: There is no statistically significant relationship between efficiency and external factors.**

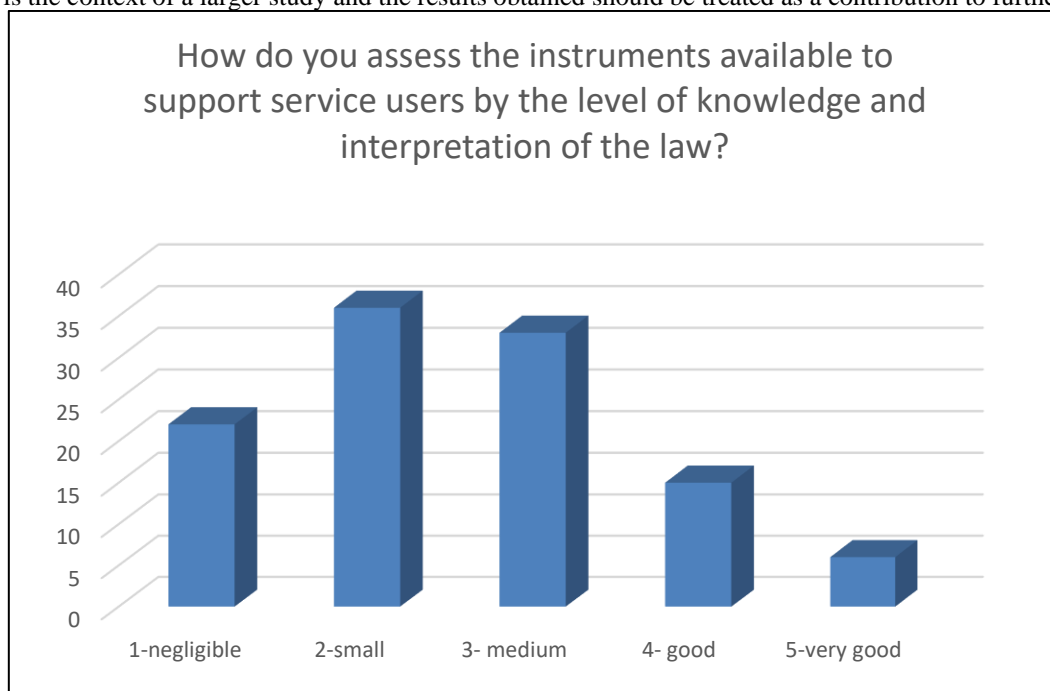
$$H_{P2}: \mu_{past} \Leftrightarrow \mu_{Ef}$$

$$H_{O_{P2}}: \mu_{past} \not\Leftrightarrow \mu_{Ef}$$

The interpretation of this result can be seen in the fact that only operating companies that have not collapsed, i.e. have resisted the changes of the turbulent environment, were examined.

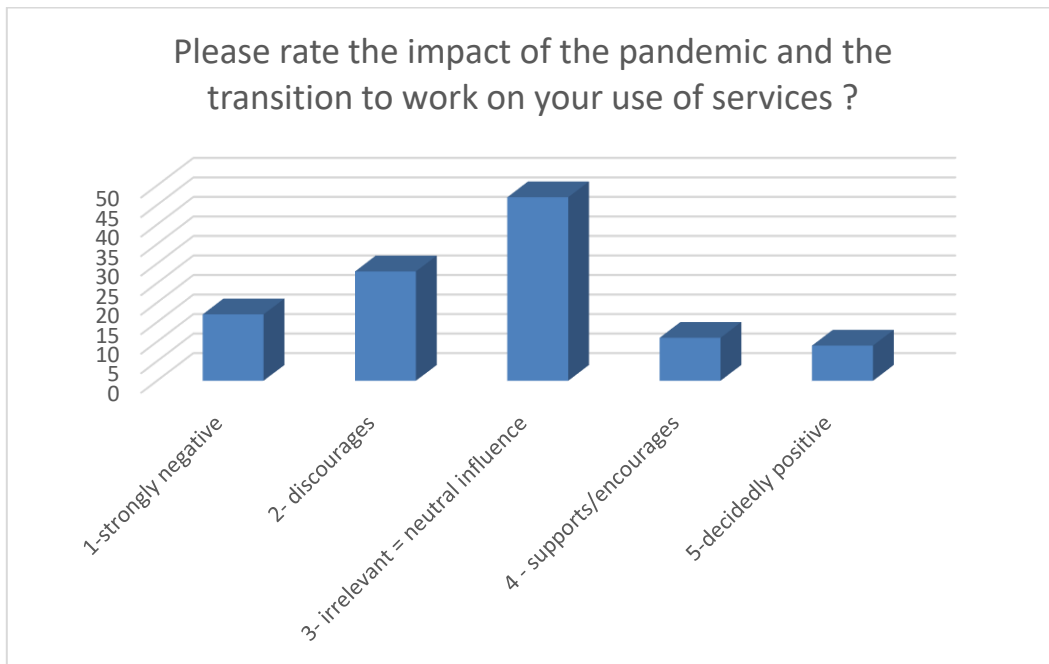
### ***A contribution to further discussion***

To complete this research in 2021 in June-July team of researchers Górski A., Parkitna A., Urbańska K. conducted a survey to check the level of preferences of service users - tenants of real estate in Lower Silesia with a total sample value of 113. Of course, this is the context of a larger study and the results obtained should be treated as a contribution to further discussion.



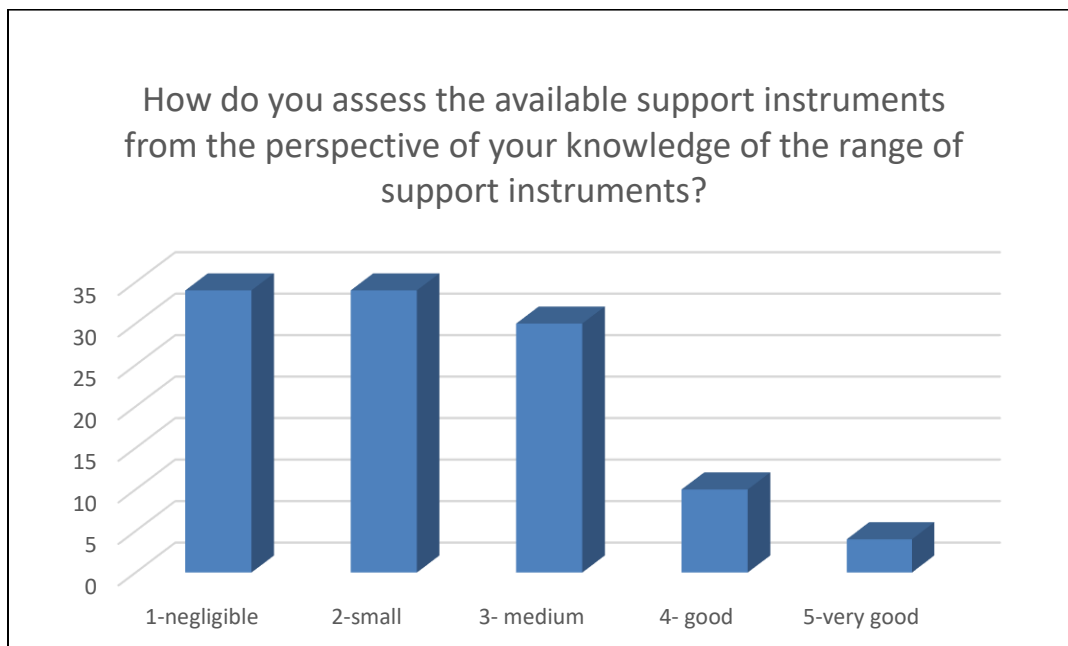
Source: Own elaboration.

Among the questions in the questionnaire, 58 service recipients rated their knowledge and interpretation of support instruments as negligible or low. 33 service recipients rated it as medium. Consequently, this may affect the market effectiveness of the companies offering the services in the market.



Source: Own elaboration.

Looking at the impact of the pandemic on the use of services, 47 respondents indicated a neutral impact while 45 described the impact as negative. Which confirms the observation of the market, which may be due to the habit of COVID -19 strictures and the release of services in June 2021.



Source: Own elaboration.

The assessment of the range of support instruments for service recipients was the worst. 68 people described them as negligible and small. 30 as medium which is 87% of the total surveyed population. In the case of the rental market, this certainly translated into a willingness to purchase rental services.

**Verification of complementary Hypotheses**

These findings led the researcher to propose 3 hypotheses in addition to the model under study. The hypotheses are that past management decisions, present management decisions and plans influence the efficiency of companies in the service industry.

$$H_{P21}: \mu_{past} \Leftrightarrow \mu_{Ef}$$

$$H_{0P21}: \mu_{past} \not\Leftrightarrow \mu_{Ef}$$

**HPU1: Past decisions have a significant impact on corporate efficiency.**  
**H0PU1: Past decisions do not have a significant impact on corporate efficiency.**

**Table 2 A correlation matrix of past and efficiency**

Correlations				
			efficiency	past
Spearman's rho	efficiency	Correlation coefficient	1.000	.321**
		Relevance (two-sided)	.	.000
		N	336	336
	past	Correlation coefficient	.321**	1.000
		Relevance (two-sided)	.000	.
		N	336	336

\*\* . Correlation significant at the 0.01 level (two-sided).

Source: Own elaboration.

Due to correlation coefficient between past and efficiency

(Table 2)  $R = 0,321$ ,  $p = 0 < 0,01$ , then hypothesis **H0P21** should be rejected in favor of **HP21**. It should therefore be assumed that **there is a statistically significant effect between past management decisions and firm performance**. The R level for this pair of variables indicates a weak correlation.

$$H_{PU2}: \mu_{present} \Leftrightarrow \mu_{Ef}$$

$$H_{0PU2}: \mu_{present} \not\Leftrightarrow \mu_{Ef}$$

**HPU2: Present decisions related to the organization's resources (operational management) have a significant impact on the efficiency.**

**H0PU2: Present decisions related to the organization's resources (operational management) have no significant impact on the efficiency.**

**Table 3: A correlation matrix of present and efficiency**

Correlations				
			efficiency	present
Spearman's rho	efficiency	Correlation coefficient	1.000	.431**
		Relevance (two-sided)	.	.000
		N	336	336
	present	Correlation coefficient	.431**	1.000
		Relevance (two-sided)	.000	.
		N	336	336

\*\* . Correlation significant at the 0.01 level (two-sided).

Source: Own elaboration.

As the correlation coefficient between present and efficiency (Table 3)  $R = 0.431$ ,  $p = 0 < 0.01$ , then the hypothesis **H0P22** should be rejected in favor of **HP22**. Therefore, it should be assumed that **there is a statistically significant effect between operations management and firm efficiency**. The R level for this pair of variables indicates a moderate relationship.

$$H_{P22}: \mu_{Ef} \Leftrightarrow \mu_{ter}$$

$$H_{0P21}: \mu_{Ef} \not\Leftrightarrow \mu_{ter}$$

**H<sub>P23</sub>: The level of efficiency influences future decisions (planning).**

**H<sub>0P23</sub>: The level of efficiency does not affect future decisions (planning).**

**Table 4: A correlation matrix between efficiency and planning**

Correlations				
			efficiency	planning
Spearman's rho	Efficiency	Correlation coefficient	1.000	.304**
		Relevance (two-sided)	.	.000
		N	336	336
	Planning	Correlation coefficient	.304**	1.000
		Relevance (two-sided)	.000	.
		N	336	336

\*\* . Correlation significant at the 0.01 level (two-sided).

Source: Own elaboration.

As the correlation coefficient between present and efficiency (Table 4)  $R = 0.304$ ,  $p = 0 < 0.01$ , then the hypothesis **H<sub>0P22</sub>** should be rejected in favor of **HP22**. Therefore, it should be assumed **that there is a statistically significant effect between efficiency and future planning**. The R level for this pair of variables indicates a weak relationship.

### Conclusions

The conclusions of the conducted research indicate that the efficiency triangle is a valid model, and the conducted research proved that it is a falsifiable model. In accordance with the assumptions of the authors it was shown:

- there are mutual dependencies between the individual elements of the model: economy, manufacturing efficiency and effectiveness,
- there is a fairly strong relationship between the individual components of the model and efficiency
- there is a relationship between past decisions and efficiency,
- there is a relationship between operational management and efficiency,
- there is a relationship between efficiency and planning,

The verification of the research hypotheses on the assumptions of the efficiency model and the verification of the supplementary and specific hypotheses showed that the empirical model coincided with the conceptual model by Parkitna, 2020.

Although the research conducted and described in this paper can be considered as a full realization of the research objective, it has some limitations, mainly due to the methodological approach adopted and the drawbacks of the data analysis techniques used. The first limitation is the main perspective that conditioned the theoretical reflections. The paper focuses only on the efficiency of small service enterprises operating during the pandemic, the study did not include large and medium-sized enterprises and those liquidated or suspended due to legal restrictions on operations.

The second limitation is that the results of the conducted research refer only to a limited area of reality. Qualitative research, which is a contribution to further discussion, was carried out only in Lower Silesia, and only in 113 recipients of services. Quantitative research included 336 entities from the whole Poland. In the context of 2 million enterprises it is a representative but small percentage. Nevertheless, the assumptions made at the stage of selecting the research sample allow us to formulate a thesis of broader universality of the confirmed regularities.

The third limitation that was a major problem and research barrier was to reach the research subjects and convince them to participate in the study. Entrepreneurs during the pandemic were very negative towards any type of research.

Nevertheless, the research results obtained through the verification of research hypotheses on the assumptions of the efficiency model and the verification of supplementary and specific hypotheses showed that the empirical model coincided with the conceptual model by Parkitna.

## Literature

- Ailawadi, K.L. and Farris, P.W. 2017, "Managing multi- and omni-channel distribution: metrics and research directions", *Journal of Retailing*, Vol. 93 No. 1, pp. 120-135
- Barasa, L., Vermeulen, P., Knoblen, J., Kinyanjui, B., Kimuyu, P. 2019, Innovation inputs and efficiency: Manufacturing firms in sub-saharan africa. *European Journal of Innovation Management*. *European Journal of Innovation Management*, 2(1), 59-83. Retrieved from: 03.07.2019 z <http://dx.doi.org/10.1108/EJIM-11-2017-0176>
- Borowiecki, R., Jaki, A. 2010, Restrukturyzacja w obliczu nowych wyzwań gospodarczych. Retrieved from: 03.07.2019
- Chowdhury, P., Paul, S.K., Kaisar, S., Abdul, M.Md. 2021, COVID-19 pandemic related supply chain studies: A systematic review. *Transportation Research Part E: Logistics and Transportation Review* 148, 102271, 1-26. <https://doi.org/10.1016/j.tre.2021.102271>, 01.08.2021
- Cifuentes-Faura, J. 2021. Influence of Economic and Political Variables on the Mortality Rate per Covid-19. *European Research Studies Journal*, 24(I2B), 62-67. doi: 10.35808/ersj/2202
- Dabholkar, P.A., Overby, J.W. 2005, Linking Process and Outcome to Service Quality and Customer Satisfaction Evaluations. *International Journal of Service Industry Management*, 16, 10-27
- Dontho, A., Gustafsson, A. 2020, Effects of COVID-19 on business and research. *Journal of Business Research* 117, 284-289. <https://doi.org/10.1016/j.jbusres.2020.06.008>, 10.09.2021
- Elavarasana, R.M., Pugazhendh, R., 2020, Restructured society and environment: A review. Retrieved from: 03.08.2021
- Elavarasan R.M., Pugazhendhi R., 2020, On potential technological strategies to control the COVID-19 pandemic. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7180041/#bb0470> 09.09.2021
- euractiv.pl 2021, „Poważne kryzysy mają poważne konsekwencje”. Jaki będzie świat po pandemii COVID-19?“, <https://www.euractiv.pl/section/praca-i-polityka-spoleczna/news/pandemia-covid19-kryzys-gospodarka-usa-chiny-unia-europejska-biden-trump-populisci-orban-bezrobocie-inflacja/>, 01.08.2021
- Filipiak B., Panasiuk A., „Przedsiębiorstwo usługowe. Zarządzanie” Wydawnictwo Naukowe PWN, Warszawa 2008., 15-20
- Grajda, M. 2021, Co krajowi przedsiębiorcy wiedzą o restrukturyzacji? Retrieved from: 03.08.2021, <https://www.dziennikprawni.pl/pl/a/co-krajowi-przedsiębiorcy-wiedza-o-restrukturyzacji>
- Grönroos, C. and Ojasalo, K. 2004, "Service productivity. Towards a conceptualization of the transformation of inputs into economic results in services", *Journal of Business Research*, Vol. 57 No. 4, pp. 414-423
- Grönroos, C. and Ojasalo, K. 2015, "Service productivity as mutual learning", *International Journal of Quality and Service Sciences*, Vol. 7 Nos 2/3, pp. 296-311
- Guinee, T.P., Mulholland, E.O., Kelly, J., Callaghan, D.J.O. 2007, Effect of protein-to-fat ratio of milk on the composition, manufacturing efficiency, and yield of cheddar cheese. *Journal of Dairy Science*, 90(1), 110–123. Retrieved from: 03.08.2020 [https://doi.org/10.3168/jds.S0022-0302\(07\)72613-9](https://doi.org/10.3168/jds.S0022-0302(07)72613-9)
- Ignacio, C. R., Romero, J., & Sellers-Rubio, R. 2019, Retail services efficiency: Impact of country-specific factors. *International Journal of Retail & Distribution Management*, 47(8), 774-792. doi: <http://dx.doi.org/10.1108/IJRDM-12-2018-0275>, 01.08.2021
- Jędralska K., „Zarządzanie niepewnością”, Wydawnictwo Akademii Ekonomicznej im. Karola Adamieckiego w Katowicach, Katowice 2010, s. 9-16
- Karpen, I.O., Conduit, J. 2020, Engaging in times of COVID-19 and beyond: theorizing customer engagement through different paradigmatic lenses. *Journal of Service Management*, 31(6), 1163-1174. <https://doi.org/10.1108/JOSM-05-2020-0156>
- Knedler, K. 2002, *Audyt wewnętrzny w praktyce – operacyjny i finansowy*. Warszawa: Polska Akademia Rachunkowości
- Kortelainen, J.T., Ratinen, M., Linnanen, L. 2012, Attitudes Towards Energy Efficiency and Renewable Energy in European Small and Medium-Sized Enterprises. W: D.A. Vazquez-Brust, J. Sarkis (red.), *Green Growth: Managing the Transition to a Sustainable Economy: Learning By Doing in East Asia and Europe* (s. 229–243). Dordrecht: Springer Netherlands. Pobrano z <https://doi.org/10.1007/978-94-007>
- Kośka, M. 2021, Firmy w kryzysie. Restrukturyzacja może się okazać koniecznością. Retrieved from: <https://www.money.pl/gospodarka/firmy-w-kryzysierestrukturyzacja-moze-sie-okazac-koniecznoscia-6620856589028160a.html>, 01.08.2021
- Kotarbiński, T. 2000, *Dzieła wszystkie. Traktat o dobrej robocie*. Wrocław: Zakład Narodowy im. Ossolińskich
- KPMG, „COVID-19 zmienił zachowania konsumentów”, Retrieved from: 01.06.2021r., <https://home.kpmg/pl/pl/home/media/press-releases/2020/07/media-press-sklepy-musza-zaferowac-konsumentom-nowe-powody-do-zakupu-w-trybie-offline-koncentrujac-sie-na-cenie-i-wygodzie.html>
- Marchenko, S., Starzyk, M., Klimczyk, M., Badowski, K. 2021, Cyfryzacja łańcucha dostaw. Retrieved from: 07.08.2021 <https://www.pwc.pl/pl/artykuly/cyfryzacja-lancuchadostaw.html>

- Matulewicz, P. 2020, Wykorzystanie technologii w dobie pandemii koronawirusa. Retrieved from: <https://www.pwc.pl/pl/artykuly/wykorzystanie-technologii-w-dobiepandemii-koronawirusa.html>, 10.09.2021
- McKibbin, W., Fernando, R. 2020, Economics in the Time of COVID-19. In: Baldwin, R. and Mauro, B.W., (eds). Economics in the Time of COVID-19. CEPR Press. doi:10.2139/ssrn.3649813
- Meyer, M.W., Gupta, V. 1994, The performance paradox. *Research in Organizational Behavior*, 16, 311–360
- Meyer, M.W., O’Shaughnessy, K. 1993, Organizational design and the performance paradox. W: R. Swedberg (red.), *Explorations in economic sociology* (s. 250–275). New York: Russell Sage Foundation
- Mroczko F., „Warunki funkcjonowania przedsiębiorstw na rynku”, Karkonoska Państwowa Szkoła Wyższa w Jeleniej Górze, Jelenia Góra 2014, s.39- 231
- Mullen, J.K., Williams, M., Moomaw, R.L. 1996, Public capital stock and interstate variations in manufacturing efficiency. *Journal of Policy Analysis and Management*, 15(1), 51-68
- Obłój, K. 2021, Polski biznes w czasie pandemii. Podsumowanie V tury badań. Retrieved from: <https://www.kozminski.edu.pl/pl/review/polski-biznes-w-czasie-pandemiipodsumowanie-v-tury-badan-listopad-2020-styczen-2021>, 09.09.2021
- Obłój, K. 2021, Polski biznes w czasie pandemii. Podsumowanie V tury badań. Retrieved from: <https://www.kozminski.edu.pl/pl/review/polski-biznes-w-czasie-pandemiipodsumowanie-v-tury-badan-listopad-2020-styczen-2021>, 10.09.2021
- Pantouvakis, A. 2010, The relative importance of service features in explaining customer satisfaction: A comparison of measurement models. *Managing Service Quality*, 20(4), 366-387. doi:<http://dx.doi.org/10.1108/09604521011057496>
- Parkitna A., *Determinanty efektywności małego przedsiębiorstwa*, Wrocław , Oficyna wydawnicza 2020, p- 265-267
- Potejko P. „Consequences of the Pandemic and Future Management of the Company”, *European Research Studies Journal* Volume XXIV, Issue 3, 202, pp. 1031-1038
- Pracodawcy RP, 2021, „Mijający rok nie rozpieszczał pracodawców”, Retrieved from: 31.05.2021r., <https://pracodawcyrp.pl/aktualnosci/mijajacy-rok-nie-rozpieszczal-przedsiębiorcow>
- ptezg.pl „Zarządzanie sytuacją kryzysową w przedsiębiorstwie”, Retrieved from: 02.04.2021r., <http://ptezg.pl/Files/files/zn2/danielak.pdf>
- Rajavel, M. 2021, Covid-19 and the Future of Work: A CIO’s Insights. Retrieved from: <https://www.forbes.com/sites/forbestechcouncil/2021/06/02/covid-19-and-thefuture-of-work-a-cios-insights/?sh=7a0d160949a2>
- Raport GUS 2020, „Koniunktura w przetwórstwie przemysłowym, budownictwie, handlu i usługach 2000-2020 (lipiec 2020)”. Wpływ pandemii COVID-19 na koniunkturę gospodarczą – oceny i oczekiwania, Główny Urząd Statystyczny, Polska <https://stat.gov.pl/obszary-tematyczne/koniunktura/koniunktura/koniunktura-w-przetworstwie-przemyslowym-budownictwie-handlu-i-uslugach-2000-2020-lipiec-2020,4,39.html>, 10.09.2021
- Raport. Global Ecotourism Market, Global opportunity analysis and industry Forecast, 2021-2027, Himanshu Vig & Roshan Deshmukh, Allied Market Research, January 2021, p 56
- Raport Sektor nowoczesnych usług biznesowych w Polsce 2020, Raport przygotowany przez Związek Liderów Sektora Usług Biznesowych (ABSL) we współpracy z JLL, Mercer, Randstad Polska oraz Randstad Sourceright, PARP ,2021, pp. 3-14
- Rokicki, T. 2021, Zmiany w koniunkturze gospodarczej Polski w wyniku epidemii COVID19. *Przegląd Prawno-Ekonomiczny*, (3), 105-126, <https://doi.org/10.31743/ppe.10029>
- Rydlewski G., „Political Context of the Fight Against the COVID-19 Pandemic in Poland”, *European Research Studies Journal*, Volume XXIV, Issue 3, 2021a, pp. 1011-1019
- Rydlewski, G., 2021, *Rządzenie w epoce informacji, cyfryzacji i sztucznej inteligencji*, Dom Wydawniczy Elipsa, Warszawa
- Rysz S. J., „Zarządzanie kryzysowe zintegrowane. Wydanie drugie”, Difin S.A., Warszawa 2020, s. 42-45
- Rzeczpospolita 2020, <https://firma.rp.pl/biznes/art17052561-jak-pandemia-zmieniła-nastroje-przedsiębiorcow>, 10.09.2021
- Sarmiento, R., Byrne, M., Contreras, L.R., Rich, N. 2007, Delivery reliability, manufacturing capabilities and new models of manufacturing efficiency. *Journal of Manufacturing Technology Management*, 18(4), 368–386. Retrieved from: 26.08.2021 for <https://doi.org/10.1108/17410380710743761>
- Sheth, J. 2020, Impact of Covid-19 on consumer behavior: Will the old habits return or die? *Journal of Business Research*, 117, 280-283. <https://doi.org/10.1016/j.jbusres.2020.05.059>
- Stryjek J., „Counteracting the COVID-19 Crisis with Innovation Policy Tools: A Case Study of the EU’s Supranational Innovation Policy”, *European Research Studies Journal*, Volume XXIV, Issue 3, 2021, pp. 450-468
- Sudoł S., „Przedsiębiorstwo. Podstawy nauki o przedsiębiorstwie. Zarządzanie przedsiębiorstwem.”, op. cit., s.316-317
- Sudoł S., „Przedsiębiorstwo. Podstawy nauki o przedsiębiorstwie. Zarządzanie przedsiębiorstwem.”, *Polskie Wydawnictwo Ekonomiczne*, Warszawa 2006 s.303-307
- Szczepański M. „Epidemia koronawirusa jako wydarzenie typu „czarny łabędź”.”, „Pandemia – skutki ekonomiczne i społeczne”, *Przegląd ekonomiczny. Czasopismo Polskiego Towarzystwa Ekonomicznego.*, ISSN 2082-3312, Poznań 2020

- Szudy, M., 2013, Efektywność ekonomiczna w ujęciu dynamicznym a sprawność systemu gospodarczego. W: U. Zagóra-Jonszta (red.), *Studia Ekonomiczne*. Uniwersytet Ekonomiczny w Katowicach, nr 176 (pp. 22-29). Katowice: Uniwersytet Ekonomiczny
- Taleb, N.N. 2020, *Czarny Łabędź: Jak nieprzewidywalne zdarzenia rządzą naszym światem*, Zysk i S-ka Wydawnictwo, Poznań, 9. Retrieved from: [https://docer.pl/doc/s150100\\_9](https://docer.pl/doc/s150100_9)
- Vedev A., Drobyshevsky S., Knobel A., Sokolov I. i Trunin P. 2020, Scenariusze rozwoju sytuacji gospodarczej w Rosji w 2020 roku oraz oferty dotyczące polityki makroekonomicznej. *Monitoring perspektyw gospodarczych Rosji: Trendy i wyzwania rozwoju społeczno-gospodarczego*, 106, 3 – 9
- Waliszewski, K., Solarz, J.K., 2021, *Całościowe zarządzanie ryzykiem systemowym. Pandemia COVID-19*, EDU-LIBRI, Warszawa
- Werner-Lewandowska K., Lubiński P., Słonec J. „The Effect of Covid-19 on Consumer Behavior in Poland - Preliminary Research Results”, *European Research Studies Journal* Volume XXIV, Special Issue 2, 2021, p. 405-416
- Zarządzanie - strategia - analiza, UEK - Fundacja UEK, 2021 Kraków, 27., <https://rzecznikmsp.gov.pl/21-02-pandemia-a-polityka-gospodarcza-wobec-msp/>, 10.09.2021