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Risk Influence of Employee Productivity on Business Failure: Evidence Found in Serbian SMEs

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Abstract: This research paper analyzes low productivity of company workforce as the key risk factor to business sustainability of a company, with special attention to small and medium-sized companies. The scope of research involves for-profit, and small and medium-sized companies doing business in Serbia. This paper explores whether poor human resource management, and, more particularly, low productivity of employees represent one of the key reasons for poor business performance and eventually failure of the company. The quantitative part of this research was conducted during 2022, by analyzing 468 small and medium-sized companies with less than 250 employees, who ended their business during 2021. Current theory determines human resource management in companies, the influence of different sorts on overall business performance, and employee productivity and its causal effects on business survival. This study attempts to cover identified literature gaps by analyzing the risk influences of low productivity on the failure of small and medium-sized companies, with special diversification between manufacturing and service-oriented companies. Key findings from this research were defined with the help of statistical learning methods, suggesting direct correlation of low productivity in the case of small services-oriented businesses and medium-sized manufacturing companies. Future work on this research includes extension of the analysis to other countries in the West Balkans region and the comparison of all determined causalities.

Keywords: human resources management; risk; small and medium-sized business; productivity; failure



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1. Introduction

Human resources (HR) play a crucial role in productivity and sustainability of a business. Poor HR management can lead to high employee turnover, low morale, and lack of motivation, which can negatively impact the productivity of company workforce. On the other hand, effective HR management can lead to a motivated and engaged workforce, which can increase productivity and contribute to the long term. Therefore, it is important for businesses, particularly for small and medium-sized companies, to prioritize and invest in effective HR practices to mitigate the risk of low productivity, which affects manufacturing and service-oriented businesses differently [1,2].

The role of HR in a business can be broken down into three main areas: recruitment and selection, employee development and engagement, and performance management [3]. Effective recruitment and selection are crucial to the productivity and sustainability of a business, as it ensures that the right people are in the right roles [4]. When the right people are in place, they are more likely to be motivated and engaged in their work, which can lead to increased productivity and a more sustainable business [5].

If employees are given the opportunity to develop their skills and grow within the organization, they are more likely to be motivated and engaged in their work. This can lead to increased productivity and a more sustainable business. Additionally, when employees feel valued and engaged in their work, they are more likely to stay with the organization for a longer period, which can help reduce employee turnover and increase sustainability [6,7].

Performance management is the most important area of HR that plays a crucial role in productivity and sustainability of a business [8]. This includes setting goals, providing feedback, and evaluating performance [9]. Performance management helps to ensure that employees are meeting the expectations of the organization and that they are working towards achieving the goals of the business.

When employees are held accountable for their performance, they are more likely to be motivated and engaged in their work, which can lead to increased productivity and a more sustainable business. Additionally, it is important for businesses to prioritize and invest in effective HR practices to mitigate the risk of low productivity and ensure the sustainability of the organization [10].

Very few existing research studies focused on analyzing different perspectives and all possible influences on company survival. Key indicators, which appear essential after analysis, are the type of business, company size, and business performance and its correlation with workforce productivity, but their mutual influence has not been analyzed. These important research topics can present a research gap, which may be further extrapolated in empirical research presented within this article [11,12].

Previously, there were no similar research attempts conducted in the Balkans region, but certainly these problems can be observed equally in a global context. Certainly, existing literature contains a lot of research results from this region of Europe, making this topic a trending one and justifying the potential for conducting this kind of novel research [13–15].

One potential research gap on the topic of determining the influence of low productivity on business failure in small and medium-sized companies from Europe could be a lack of quantitative studies specifically focusing on Europe and more particularly on emerging and developing countries such as Serbia.

While there are not many existing studies on the topic of low productivity and business failure, such as Ortega [16] or Kironde [17], there is even a smaller share of research studies that specifically focus on small and medium-sized companies from the Europe and Balkans region. Additionally, there may be a lack of studies that use a multi-disciplinary approach to investigate this issue (quality benchmark examples can be found in papers by Kappagoda [18,19]), looking at factors such as business leadership and employee engagement in addition to productivity.

Another gap could be that there is a lack of research that examines the industry-specific effects (manufacturing, service-oriented companies) of low productivity on business failure; hence, it might be beneficial to focus on industries such as service-oriented companies and manufacturing companies.

Furthermore, a gap in literature could be studies that focus on the long-term effects of low productivity on business failure, since it is not always immediate and hard to determine. Therefore, the authors of this paper started from the following research question in order to address deficiencies within the existing worldwide body of literature:

RQ. Is it possible to determine whether low productivity of employees in small or medium-sized companies can present one of the key reasons for business failure?

The authors of this paper analyzed the influence of poor human resource management in small and medium-sized companies by determining the influence of low productivity on business performance and effecting business failure of an SME.

The identification of key correlations may be determined when examining them integrally through several directions of literature review:

- What are the main causes of low productivity in small and medium-sized companies?
- How does low productivity affect the financial performance and viability of small and medium-sized companies?

- What are the key indicators of low productivity in small and medium-sized companies?
- What are the differences in the impact of low productivity on small and medium-sized companies in different industries?
- What strategies and tactics can small and medium-sized companies use to improve productivity and avoid failure?
- How do external factors such as economic conditions and competition impact the relationship between low productivity and business failure in small and medium-sized companies?
- How do the size and structure of small and medium-sized companies influence the relationship between low productivity and business failure?

Therefore, it is possible to define the following research directions:

- Investigate the relationship between low productivity and business failure in small and medium-sized companies from Europe using statistical analysis to determine the extent to which low productivity is a significant predictor of business failure in this context;
- Identify specific factors that contribute to low productivity in small and medium-sized companies from Europe, such as business leadership, type of business, company size, and employee engagement;
- Analyze the industry-specific effects of low productivity on business failure, comparing and contrasting service-oriented and manufacturing companies, for instance;
- Examine the long-term effects of low productivity on business failure by tracking the performance of companies over a period of time and comparing those with higher productivity to those with lower productivity.

Overall, the goal of this study is to provide a comprehensive understanding of the relationship between low productivity and business failure in small and medium-sized companies from Europe and to offer practical suggestions for improving productivity and avoiding business failure in this context.

Based on the literature review and defined research gap, the main purpose of this research will be to determine key business performance indicators and their influence on SME business failure.

Research methodology in this manuscript involves conducting quantitative research on a selected sample of small and medium-sized companies operating in Serbia (representing adequate testing ground for this research, which is supported in [20] and [21]) by testing two research hypotheses. The authors used the gathered data to find key correlations between all analyzed indicators. Findings and conclusions are discussed in detail in separate parts of this manuscript.

The research itself has been defined through the following four chapters. The literature review chapter covers in adequate level of detail the theoretical review topics, covering productivity as key performance measure of workforce in a company, and as the key risk of business failure, which influences company survival.

Next, a separate chapter is dedicated to methodology, as it displays framework presentation and formulation of research hypothesis, developed in order to find answers to the main research question.

Following that chapter is the specific results chapter, where authors of this paper presented key research results by determining regression between business failure and low productivity of workforce in small and medium-sized companies and by analyzing correlations between all indicators. Special attention has been given to hypothesis testing (followed with appropriate tests).

Finally, research results are followed by conclusions and detailed discussion, which provides feedback from research results across existing theories. This chapter includes short elaborations on limitations, practical implications, and future research of the research team.

2. Literature Review

Low productivity can have a significant impact on the financial performance and viability of small and medium-sized companies [22]. Productivity refers to the efficiency with which a company produces goods or services, and it is often measured by the output per unit of input. When a company has low productivity, it means that it is producing less output than it could be with the same level of input. This can have several negative effects on the financial performance of a company [22].

One of the main ways in which low productivity affects the financial performance of small and medium-sized companies is by reducing revenue, which acts as a sort of indirect effect of lower production of products and services [23]. This fact can lead to lower profits and a weaker bottom line. Low productivity can also lead to higher costs, as the company may have to spend more funds on inputs to produce the same level of output. This can further reduce profit margins and make it harder for the company to survive in the long term [24,25].

In addition to the direct financial effects of low productivity, there are also indirect effects that can harm the viability of small and medium-sized companies. For example, low productivity can make it harder for a company to compete in the marketplace. When a company is producing less output than its competitors, it may not be able to offer low prices or high quality. This can make it harder for the company to attract and retain customers, which can further hurt its financial performance and sustainability in the long run [26].

Another indirect effect of low productivity is on employee morale. When employees are not productive, they may feel demotivated and disengaged [27]. This can lead to a high turnover of the workforce, which can be costly and disruptive for a small or medium-sized company. Furthermore, low productivity can lead to delays and missed deadlines, which can harm the company's reputation and make it harder to win new business [28].

In conclusion, issues with employee productivity can have negative effects on the overall business survival of small and medium-sized companies (supposing the regularity of other conditions, such as the level of market freedom). It can reduce revenue, increase costs, make it harder to compete, and harm employee morale. Therefore, it is important for small and medium-sized companies to monitor their productivity and take steps to improve it in order to stay financially viable and survive in the long term. The key role for enabling that in the SME universe is most certainly the owner of the business [29–31].

Productivity as the Key Risk Factor on Business Sustainability

Business failure refers to the inability of a company to meet its financial obligations or achieve its goals and objectives, leading to the shutdown of company operations. This can be the result of a variety of factors, where the poor management of workforce and other key resources can be identified as one of the primary causes of business failure [32]. This can be a consequence of inadequate leadership of employees, ineffective decision making, and the lack of clear goals and strategies [33]. Additionally, the poor performance of human resources can be influenced by the lack of innovation and market differentiation on one side versus the cost-ineffective use of resources on the other side, with human resources as the most important one [34,35].

The key influence of inadequate human resources management on business survival, found in existing literature, can be the one coming from the ability of companies to attract and retain high-quality employees and provide them with the resources they need to achieve an adequate level of performance [36–38].

Therefore, it can be concluded that the performance of human resources is directed integrally at achieving efficiency and effectiveness of a business. It can also be determined that the essential approach for reducing risk influence on business failure should include the management of influence between human resource productivity and business performance. Lastly, companies should conduct regular assessments of their operations across all performances of employees and the influence of external factors as well (such as

economic shocks or lack of resources), in order to mitigate any detected risk to business performance [39–41].

Low productivity among employees is often a key source of risk influence that contributes to the failure of small and medium-sized businesses. There are multiple ways that low employee productivity can influence the failure of an SME:

- If employees are not productive, the company may struggle to keep up with the competition and maintain its market share, which is particularly true in European countries, including highly to very highly developed markets. The consequences of low productivity on potential business failure have been measured in order to establish the correlation between low productivity and decreased competitiveness (smaller market share), which causes lower revenue and profit margins, thus increasing the risk of business failure [42];
- Low productivity of the workforce can lead to delays in completing tasks and fulfilling orders, which can result in decreased business efficiency and decreased customer satisfaction. This can lead to a decline in sales and a loss of customers, which can be difficult to recover from, and it can result in the worst-case scenario [43–45];
- From the perspective of costs, low productivity can directly influence business failure through highly increased costs of doing business, as it takes longer for tasks to be completed and for orders to be fulfilled. This can put a strain on the company's finances, making it more difficult to meet financial obligations and maintain the viability of the business [46–48];
- From the perspective of differentiation and innovation, employees are not productive in case they do not have the time or energy to develop new ideas. This can result in a lack of differentiation in the market, which can be a major disadvantage in a rapidly changing business environment, increasing the risk of business failure [49].

In order to reduce the risk of business failure, it is important for small and medium-sized businesses to focus on increasing employee productivity, which was analyzed in [50,51] by comparing companies that provided training and development opportunities with companies that did not invest in the creation of a more efficient work environment.

By improving employee productivity, businesses can improve employee engagement in order to achieve better business results (profitability, competitiveness, etc.) and therefore minimize the risk of business failure.

In addition to these causes, low productivity in SMEs is certainly influenced by the lack of resources. Since SMEs often have limited resources, it can be concluded that SMEs are at a greater risk of failing if there are constant delays in providing their employees with the necessary tools and equipment, and it consequently results in low productivity [52,53].

When assuming that the productivity of employees is one of the main reasons for the failure of SMEs, it is important to understand and determine several components. Poor management, the lack of employee engagement, inadequate training and development opportunities, and the lack of resources can all contribute to low productivity [52].

To ensure the success and long-term survival of SMEs, it is essential that they invest in effective management practices, employee engagement programs, training and development opportunities, and resources to ensure that their employees are motivated and productive [51,54].

Additionally, it is essential to have regular check-ins, feedback, and performance evaluations to identify the productivity issues and to take necessary actions to improve it. By addressing these issues, SMEs can improve productivity and increase their chances of success and sustainability [55].

Despite the importance of small-sized, service-oriented companies on the level of the economy as a whole, many of them fail rapidly mostly because of low productivity. From several research studies [32,32,56], it can be concluded that low productivity can have a significant impact on the success and survival of small-sized service-oriented companies, as it can lead to decreased revenue, increased costs, and, ultimately, business failure.

The main reason behind the rationale that smaller companies are at greater risk of failure (if those companies are service-oriented ones) is that individual productivity of employees is essential to the effectiveness of sales, which is not so evident in the case of bigger, medium-sized companies [57,58]. For example, if employees are not productive enough, they may not be able to complete tasks on time, which can lead to missed deadlines and lost customers, effecting decreased revenue.

Additionally, the low productivity of employees can lead to increased costs, as companies may need to hire additional employees to make up for the lack of productivity [59–62]. The methodology used in this research is presented in the next section.

3. Methodology

3.1. Framework

This research presents the results of analysis conducted during 2022 on a sample of 468 small and medium-sized companies, who closed their operations officially in 2021, and thus represent a good testing ground for the estimation of different risk influences of low productivity on business failure. The authors decided to perform a 4-year trend analysis on failed companies in order to detect risk influence variables measured through publicly available parameters such as business performance indicators (as a sort of proxy variables), across a significant time horizon of 4 years prior to the failure of the observed company.

For all companies that were selected to be included in the analysis, dataset preparation was performed in Stata (including descriptive statistics preparation, measures of central tendencies and data distribution, data normalization and transformation, outliers' detection, and eventually exploratory data analysis).

All of this has been performed in order to identify key variables connected with the performance of company human resources, as well as to identify key variables related to business performance. A similar (but not identical) approach was used to statistically analyze data from failed business, with the goal of identifying whether some business performance indicators can suggest company failure [63–65].

Key findings from the literature (Europe in [66] or worldwide in [67]) displayed that companies are under a higher risk regarding long-term survival if business performance indicators are deteriorating. Very few literature references have investigated the internal influence of company human resource performances on company survival [68–70], and this can be perceived as the gap to be analyzed within this research.

After the theoretical review and identification of possible indicators, the scope of quantitative research was shortlisted as follows:

- Human resource management—low investment in employee training, low inflow of new workforce, low rate of highly skilled workforce, high employee turnover rate [71–74];
- Business performance—decrease in revenue, low or negative profitability, revenue decrease [53,75,76].

The total sample consists of contacting 468 failed companies from Serbia, which employed more than 9 employees and up to 249 employees, across all manufacturing or service industries. The research included statistical learning analysis based on regression analysis results, with all tests conducted in Stata and validated regarding statistical significance.

Taking into consideration the measurability and scalability with quantitative methods and techniques, key correlations between business factors were analyzed through methods and techniques of statistical learning, as it represents an integral process of discovering statistically significant inference and correlations between similar sampled companies who were suspected to have failed to survive because of low productivity issues.

3.2. Hypothesis Formulation and Variables Definition

The authors defined two research hypotheses, which could provide answers to which influences are essential for determining what leads to business shutdown and what are

the most important indicators that influence it. Research hypotheses were formulated as follows:

H1: *Business failure of small service-oriented companies is under the direct influence of employees' low productivity.*

H2: *Business failure of medium-sized manufacturing companies is under the direct influence of employees' low productivity.*

All research hypotheses were tested using their respective statistical variance tests. All data (generated with great assistance from Serbian Chamber of Commerce, Belgrade, Serbia) were processed by using Stata16.

3.3. Statistical Methods to Be Used within Quantitative Analysis

Within the quantitative part of this study (which is essential to provide key findings and answers to the research main goal and research hypothesis), the authors defined results through the following methods and algorithms of statistical learning (which is data driven):

1. Multiple linear regression analysis based on the least squares method (which compares predicted versus actual data): This test shall be used to determine the strength and direction of the relationship between low productivity and business failure, as well as the effect of other factors such as company size, type of business, revenue trend, profit trend, costs trend, and workforce migration on this relationship;
2. Logistic regression analysis based on supervised classification algorithm: This test shall be used to analyze the relationship between low productivity and the likelihood of business failure, considering factors such as company size, industry, and the structure of workforce;
3. Time-series regression analysis based on ARIMAX (autoregressive integrated moving average with explanatory variable) forecasting algorithm: This test shall be used to analyze the relationship between low productivity and business failure over time, by tracking the performance of companies over a period and comparing those with higher productivity to those with lower productivity.

These regression tests through several round robin algorithms aim to help in identifying the strength of the relationship between low productivity and business failure, and help in identifying the key factors that contribute to low productivity in small and medium-sized companies from Europe.

4. Results

4.1. Research Sample

The quantitative research consists of analysis related to the estimations of different risk indicators, on company business survival.

With the help of Serbian Chamber of Commerce, the authors analyzed 5 years of data (2017, 2018, 2019, 2020, and 2021) on a sample of 468 former companies, who experienced shutdown during 2021.

On average, the sampled companies employed approximately 57 employees in the time horizon between 2017 and 2021. Taking the official division of companies by size into consideration (fewer than 249 employees and more than 9 employees—small and medium-sized companies), the distribution of the companies in the sample was carried out according to their overall number of employees and by the type of business (Table 1).

Table 1. Segmentation of sampled companies according to their size.

Company Size	10–49	50–249
No of manufacturing-oriented companies (%)	32 (7%)	167 (35%)
No of service-oriented companies (%)	145 (31%)	124 (27%)

The sample does not include companies employing more than 249 employees and micro companies with less than 10 employees. To be able to include a valid sample of companies in terms of size, the precondition was that the company had the status of small or medium-sized and doing business for at least 5 years between 2017 and 2021. In the companies analyzed during the time period in question, there were on average 24,644 employees; in 2021 back to 2017 there were 24,733 and 19,655, respectively. These numbers indicate employment in small and medium-sized companies in Serbia to have increased incrementally, with significant economic growth shown in the national GDP of Serbia during the last period. All sampled companies are profit-oriented and doing business in manufacturing and service industries.

The authors have tried to ensure the representativeness of the sample in terms of regional distribution (all four regions were represented to be proportionally similar) and industry distribution (there are examples of companies across most of the major industries in Serbia). The overall population of companies in Serbia is not defined entirely, as there are little formalized data on private-owned companies. In order to determine whether conclusions to be made are valid and significant for the SME population, all sample data were cross-referenced and tested across several statistics test (the standard deviation of all analyzed business performance parameters, within and between groups of companies of the same size, industry, region, and type of business, compared to the population of SMEs in Serbia, which can be determined from available data) as well as distribution tests and the comparison of appropriate measures (skewness, kurtosis, quartile ranges). In Table 2, statistical tests are displayed, which demonstrates the amount of representativeness that was achieved within the sample selection process compared to the population of SMEs from Serbia.

Table 2. Statistical validity of sampled SME versus SME population in Serbia.

		Central Tendency Tests *						Distribution Tests **				
		Std. Deviation		Median/Mean		Skewness		Kurtosis		Quartiles		
Division by	Group of SMEs	Within group	Between groups	Within group	Between groups	Within group	Between groups	Within group	Between groups	Bottom 25%	IQR	Top 25%
Company size	Sample	0.99	1.01	0.98	0.89	−0.41	−0.54	−2.1	−2.96	−0.64	1.38	0.48
	Population	0.95	1.02	0.95	0.97	−0.55	−0.48	−2.41	−2.56	−0.59	1.35	0.58
Type of business	Sample	0.97	1.04	0.97	0.92	−0.63	−0.54	−2.1	−2.87	−0.64	1.38	0.48
	Population	0.94	1.03	0.94	0.95	−0.58	−0.52	−2.39	−2.56	−0.59	1.35	0.58
Industry	Sample	0.94	0.92	0.94	0.94	−0.62	−0.59	−2.2	−2.98	−0.64	1.36	0.48
	Population	0.96	1.24	0.97	0.90	−1.59	−0.11	−2.44	−2.56	−0.59	1.37	0.58
Region	Sample	0.91	1.00	0.97	0.92	−0.60	−0.34	−2.3	−3.44	−0.64	1.22	0.48
	Population	0.99	1.02	0.97	0.95	−0.57	−0.61	−3.01	−3.89	−0.59	1.29	0.58

* For normal distribution, expected values for std. deviation are around 0, for median/mean are around 1. ** For normal distribution, expected values for Skewness are between −2 and +2, for Kurtosis are between −7 and +7, for IQR—around 1.34, and for quartiles—between −0.67 and +0.67.

According to the results displayed in Table 2, it can be concluded that the selected sample includes a sufficient level of representativeness of the population of Serbian SMEs, and all conclusions to be made within the research can be considered as valid. Regarding the division of SMEs by industry, it must be noticed that test results are different in the case of sample versus population but keeping in mind the limited amount of available data and the low diversity of industries in the sample, it can be concluded that these results are expected. In order to translate (or generalize) this to other countries in Europe, it would be necessary to adjust the statistical tests for additional measures, so that sample size from different countries or regions of Europe could vary to some extent (in the case of larger economies, the sample of SMEs would include a larger portion of companies, with additional divisions and groups, where the statistical tests would be applied to).

Finally, regarding geographical (regional) representativeness, the authors collected data from 468 companies that are registered across 4 main regions of Serbia herein noted:

- Belgrade—257 companies (11,000 in total, of which 5000 generate 80% of the total revenue for this region);
- Vojvodina—143 companies (4000 in total, of which 1000 generate 80% of the total revenue for this region);
- Western Serbia—49 companies (2500 in total, out of which 1000 generate 80% of the total revenue for this region);
- South and East Serbia—19 companies (800 in total, of which 300 generate 80% of the total revenue for this region).

The research findings are presented in the next section.

4.2. Research Findings

Quantitative research findings based on a sample of 468 failed small and medium-sized enterprises (SMEs) from 2021 analyzed the basic correlation of low productivity with business shutdown through linear regression. Key results suggest the following:

- A statistically significant relationship has been discovered in the case of sampled failed SMEs (p value below 0.05) between several business performance indicators and low employee productivity (displayed with flag “yes” in Table 3) with the help of the multiple linear regression test. Revenue from sales of products and service, operating costs, employee turnover rate, and profitability were determined as statistically significant indicators, influencing low productivity with a complex combination of influence on the fact whether the business will fail or not. Main results can be seen from table below, where low revenue from sales and high operating costs were key correlators with business failure in the case of small companies, and low or negative profitability and high employee turnover rate were most significant in the case of medium-sized companies.

Table 3. Results of multiple linear regression test.

Business Performance Indicator	Low Productivity (Flag: Yes, No)	Failed Company Size	Regression Coefficient	p -Value	t -Test
Low Revenue from sales	Yes	Small	1.44	<0.05	1.75
	Yes	Medium	0.65	>0.05	0.89
High operating costs	Yes	Small	1.66	<0.05	1.74
	Yes	Medium	0.77	>0.05	0.99
Low or negative profitability	Yes	Small	0.54	>0.05	0.76
	Yes	Medium	1.88	<0.05	1.53
High employee turnover rate	Yes	Small	0.56	>0.05	0.45
	Yes	Medium	1.23	<0.05	1.02

- A quantification of the impact of low employee productivity on business failure—since the research used statistical methods through logistical regression to quantify the magnitude of the relationship between low employee productivity and business failure, it was determined that the proportion of SMEs that failed due to low productivity is directly driven by mostly revenue from sales of products and services, followed by large spikes of operating costs. Results (displayed in Table 4) confirm that business failure can be predicted through several business performance indicators.

Table 4. Results of logistical regression.

Dependent Variable	Independent Variable	Overall Logistics Regression Statistics	Statistical Significance (p -Value)
Business failure	Revenue from sales	0.74	<0.05
	Operating costs	0.69	<0.05
	Manufacturing company	0.46	<0.05
	Services-oriented company	0.23	<0.05
	Small-sized company	0.14	<0.05
	Medium-sized company	0.11	<0.05

- A trend analysis for the consideration of time series of business performance data—since it was necessary to overcome the problem in some cases of companies where failure was a the result of several years of declining, the authors transformed data into trend variables and analyzed regression in more detail, discovering that medium-sized companies are declining slower with graduate collapse of business, and on the opposite, small companies tend to become unsustainable more quickly, making it harder to detect the risk of business failure soon enough. This can be visualized by observing Table 5, where the best results of time series regression were obtained with 2-year trend data in the case of small service-oriented companies, and also in the case of 4-year and 5-year trend in the case of medium-sized manufacturing companies. Therefore, one possible finding is that small service-oriented companies suffer from low productivity quicker than medium-sized manufacturing companies.

Table 5. Results of time series regression tests.

Regression Coefficient with Time Series Trend Data						
Type of Business	Company Size	2-Year Trend	3-Year Trend	4-Year Trend	5-Year Trend	p-Value
Manufacturing	Small	0.25	0.66	0.76	0.75	<0.01
Services	Small	1.83	1.63	1.33	1.06	<0.01
Manufacturing	Medium	1.22	1.20	1.67	1.95	<0.01
Services	Medium	0.11	0.12	0.16	0.19	<0.01

- A comparison of the impact of low employee productivity on different types of SMEs, between manufacturing and service-oriented ones. The research used multiple regression in order to compare the impact of low employee productivity on different types of SMEs, discovering a possible correlation between small companies that are service-oriented as well as medium-sized companies that are manufacturing-oriented. Results are displayed in Table 6.

Table 6. Results of multiple linear regression.

Dependent Variable	Type of Business	Company Size	Regression Coefficient	Stat. Significance
Business failure	Manufacturing	Small	0.36	<0.05
	Services	Small	0.83	<0.05
	Manufacturing	Medium	0.78	<0.05
	Services	Medium	0.11	<0.05

The next section is a subchapter regarding hypothesis testing.

4.3. Hypothesis Testing

Statistical ANOVA tests were conducted in order to test the statistical significance within and between groups of data. Results can be viewed in Table 7.

Table 7. ANOVA tests for research hypothesis.

Hypothesis	Sum of Squares		Mean of Squares		F-Test p-Value
	Between Groups	Within Groups	Between Groups	Within Groups	
H1	46,244	8951	7232	2622	F 10,21 p-value < 0.05
H2	63,361	7926	11,352	4122	F 10,33 p-value < 0.05

From the results of ANOVA test, regarding groups of data within and between groups are sufficiently representative to be tested for correlations. With the help of the sampled companies from Serbia, a great deal of variability was described within independent variables (based on the values of the sum of squares and mean of squares, which are significantly larger than zero).

It can be concluded that from the point of statistical significance of used data within the research, all hypotheses can be confirmed.

5. Discussion and Conclusions

5.1. Key Findings and Conclusions

This research aimed at identifying key risk indicators on business survival of a company measured through the influence of low productivity on company shutdown, depending on company size, the type of business, and the set of key business performance indicators such as revenue, costs, profit, and employee turnover. With provided results and analysis, it can be claimed that the goal has been fulfilled. The key focus of this paper was to analyze small and medium-sized businesses in Serbia, which represent the backbone of the economy and are facing heavy consequences of all global shocks and risks coming to life. This research narrowed the literature gap by (1) profiling which types of SMEs are more prone to failure because of low productivity and (2) identifying and analyzing key correlations discovered with the help of trend analysis of a series of parameters.

Key correlations were determined for the total of four parameters—revenue from sales of products/services, operating costs of doing business, profitability, and employee turnover rate, which were analyzed and correlated with the type of business, company size, and lastly, whether the observed company failed to survive. One finding that particularly needs to be broadened with more detail in the future is the determined fact from this research that low productivity of workforce causes failure of small service-oriented companies (only 2 years) quicker than it in the case of medium-sized manufacturing companies (4-year trend analysis is necessary to determine this).

Considering everything analyzed throughout this research, to comprehensively understand the problem, the existing rationale about the influences on survival of SMEs in the long run can now be understood adequately when considering the type of business and company size.

5.2. Discussion of Research Findings

Research on the topic of the influence of low productivity on business failure in small and medium-sized companies from Europe has provided a range of findings. Specifically for West Balkans region, this research offers answers to why low productivity of workforce can pretend as one of the key risk influences for business failure in SMEs, which extends on similar research performed by Ivković [77].

While there is a consensus that low productivity can increase the risk of business failure, the specific factors that contribute to low productivity and how they affect business failure vary depending on the study.

The results and findings from this research paper are in line with previous research by Đorđević [78] and Đorđević [79] regarding relationship between employee turnover and productivity, while the results of this research specifically identified that the productivity of workforce in

- medium-sized manufacturing companies is under direct correlation of high employee turnover rate and
- small-sized, service-oriented companies is not under direct correlation of high employee turnover rate.

These two identified correlations are suggesting that company size and type of business present the key difference in human resource management approach when it comes to allowing high rates of workforce fluctuation in a company and not influencing company sustainability.

Also, the findings from this research defined HR performance (productivity) and employee migrations (turnover rate) as internal factors, which extends on previous research by Galka and Radlowski [80] (who identified management quality and influence of macroeconomic conditions, on a sample of companies from the Czech Republic, Poland, and Slovakia).

This research provided a focused approach on financial performance indicators as the key risk influence of low productivity on business failure. Compared to other similar research (conducted in medium-sized manufacturing companies from Europe and Asia) that were conducted on a sample of medium-sized manufacturing SMEs, the following difference in scope is essential, since Kim and Lee [81] analyzed on a general basis the financial performance of a company opposed to business failure risk, Zhang and Chen [82] analyzed the costs of research and development against business failure, and lastly, Laats and Lukason [83] differentiated the financial performance between companies doing business locally against those who are internationalized.

When attempting to discuss the findings from this paper around correlations discovered in small service-oriented companies from Europe, there are several similar papers that can be observed. Within these papers, the relationship between human resource management practices and low productivity and business failure risk has been analyzed in the case of small service-oriented companies doing business in Europe. The authors from these papers analyzed the low productivity of workforce versus business failure risk, but the difference is that they observed low productivity as the consequence of very high inflow of workforce on one side [84] and very low level of automatization on the other side [85], not determining the direct correlation between business performance indicators and business failure. This research paper analyzed the impact of technology on the low productivity of workforce and business failure risk in small service-oriented companies in Europe. The authors use a sample of firms from several European countries and analyze the impact of internal factors, such as the adoption of new technologies, and external factors, such as technological change and digitalization, on business failure risk.

It is also important to consider how human resource managers (or business owners in case of SMEs) can combine research results from this paper with previous research results about workforce engagement, which has been analyzed by Gargantini [86] and Bakker [87], following on the assumption that the key impact of employee engagement depends on the engagement of their management.

While these studies provide different perspectives on the influence of low productivity on business failure in small and medium-sized companies from Europe, they all suggest that effective investment in technology and automatization of business processes, employee training and engagement, management practices, employee retention, and also the internationalization of business activities can play a key role in improving productivity and reducing the risk of business failure.

Future research should focus on identifying the specific combination of factors that can lead to low productivity and business failure in small and medium-sized companies from Europe and how they can be addressed.

5.3. Limitations of Conducted Research

This research study had several limitations, apart from the fact that there is an economic crisis rising in Europe, but also a raging war on European soil. Possible research limitations include

- Historic period of observation for forecasting trend: According to the Serbian Chamber of Commerce, there are limited historic data about failed SMEs from Serbia, which goes until the year of 2017.
- Sample bias: The sample of small and medium-sized companies used in the study may not be representative of the population of small and medium-sized companies from Europe, potentially leading to inaccurate conclusions.
- Measurement error: The measures used to assess productivity and business failure may not accurately capture the constructs of interest, leading to inaccurate or unreliable results.
- Causality: It can be difficult to determine causality between low productivity and business failure as there may be other factors that contribute to business failure that are not captured in the study.

- Data availability: The data needed to conduct research may not be readily available or accessible, making it difficult to obtain the necessary information to conduct the research.
- Data quality: The data used in the research may not be of high quality, leading to inaccurate or unreliable conclusions.
- Longitudinal studies: The duration of the study may not be long enough to capture the long-term effects of low productivity on business failure.
- Interdependence: It can be difficult to determine the interdependence of different factors that contribute to productivity and business failure.
- Generalization: The findings from the study may not be generalizable to other small and medium-sized companies from different regions or industries.

It is important to keep these limitations in mind when interpreting the results of the study and to consider how they may have affected the findings.

5.4. Practical Implications

Practical implications include

- Identification of key factors that contribute to low productivity: The research may identify specific factors that contribute to low productivity in small and medium-sized companies from Europe, which can inform interventions and policies to improve productivity.
- Improved business sustainability: By identifying the relationship between low productivity and business failure, the research may help small and medium-sized companies from Europe to improve their sustainability and reduce the risk of failure.

Improved management practices: The research may provide insights into management practices that can improve productivity, which can be implemented by small and medium-sized companies from Europe to improve their performance.

- Improved employee engagement: The research may provide insights into how to improve employee engagement and motivation, which can lead to higher productivity and improved business sustainability.
- Improved employee retention: The research may provide insights into how to improve employee retention, which can lead to higher productivity and improved business sustainability.
- Improved decision making: The research may provide insights into how to improve decision making in small and medium-sized companies from Europe, which can lead to higher productivity and improved business sustainability.

It is important to keep these practical implications in mind when interpreting the results of the study and to consider how they may have affected the findings.

5.5. Future Research Plans

Future research plans of authors of this research study (who are coming from different departments and areas of expertise in human resources management, SME business management, and academia) for the next time period on the topic of determining the influence of low productivity on business failure in small and medium-sized companies could include

- Conducting a large-scale, longitudinal study to track the performance of small and medium-sized companies over a period of time and analyzing the relationship between low productivity and business failure in these companies.
- Examining the relationship between low productivity and business failure in small and medium-sized companies from different European countries to determine if there are any country-specific factors that contribute to low productivity and business failure.
- Analyzing the effect of digitalization and automation on productivity and business failure in small and medium-sized companies and the implications for future business sustainability.

- Investigating the role of employee engagement and motivation in productivity and business failure in small and medium-sized companies and developing strategies for improving engagement and motivation.
- Examining the relationship between low productivity and business failure in small and medium-sized companies in different industries to identify industry-specific factors that contribute to low productivity and business failure.
- Developing and testing a framework for measuring productivity in small and medium-sized companies and comparing the measurement methodologies used by different companies.
- Conducting comparative analysis of the productivity and business failure of small and medium-sized companies in different regions of Europe to identify regional differences that may affect productivity and business failure.
- Exploring the impact of government policies on productivity and business failure in small and medium-sized companies from Europe.
- Investigation and comparison of SMEs to determine whether the market share of the SME itself can make the key influence on sustainability, since in majority share or monopoly situations, low productivity is not an issue.

All mentioned possible research paths should be analyzed with methods and techniques of machine learning models, which could result in better profiling of determined correlations between different indicators and failed SMEs. Machine learning can also aid in discovering deeper connections between larger scope of input parameters, which is not available in the case of small samples and datasets.

Overall, future research on this topic should focus on identifying the specific factors that contribute to low productivity and business failure in small and medium-sized companies from Europe and developing strategies for improving productivity and avoiding business failure in this context.

Gathering and analyzing more knowledge about businesses from the Balkans region, which contribute the most significant share of economic activity within their countries will certainly provide a better understanding of the wider variety of risk influences.

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