

Changes in the Perception of Business Risks to the Threat of Bankruptcy Due to COVID-19

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Abstract: The aim of the article is to compare the impact of selected business risks on the threat of bankruptcy of small or medium-sized enterprises (SMEs) before COVID-19 and during the first wave of the COVID-19 pandemic. 688 SMEs from the business environment of the Slovak Republic participated in the research. Business risks, such as market, financial, personnel, operational and strategic risk were examined. Correlation and regression analysis were used to evaluate formulated hypotheses. The results yielded several significant findings. The three most important business risks before COVID-19 include market, financial and personnel risk according to entrepreneurs. Financial risk is the most significant business risk affecting the threat of bankruptcy in the SME segment in the Slovak Republic after the outbreak of COVID-19. The company's financial performance indicators and the ability of respondents to manage financial risk influence the threat of the company's bankruptcy more strongly during the pandemic. The findings are important for state organizations in mitigating the impacts of the COVID-19 pandemic on the business environment of SMEs in the Slovak Republic, as well as for entrepreneurs themselves and organizations that help SMEs.

Keywords: business risks, COVID-19, SMEs, financial risk, Slovak Republic, threat of bankruptcy

1. Introduction

The outbreak of the new coronavirus COVID-19 has led to a global public health catastrophe and to a global economic crisis and has severely affected industries around the world (Lu et al., 2021; Zhang & Sogn-Grundvåg, 2022). Many areas of activity were directly affected, not only tourism, passenger transport (Gazze et al., 2022), hospitality and catering services (Pocinho et al., 2022), but also many other negative phenomena have arisen, including fluctuations in the prices of financial instruments, information asymmetries, financial instability, corporate bankruptcies and rising unemployment (Boratynska, 2021).

Available research points to these most significant business risks: product sales (Zhou et al., 2021), financial performance/indicators (Ganlin et al., 2021) and the availability of human capital (Mikołajczak, 2021; Rozsa et al., 2021). SMEs are generally exposed to financial and non-financial risks, but the pandemic has added another risk of uncertainty to maintaining the continuity of their business (Zutshi et al., 2021). The impact of COVID-19 in the study on Polish SMEs was demonstrably more disruptive for micro-enterprises, very young companies and single-person companies (Wieczorek-Kosmala et al., 2021).

The case study maps changes in the risk perception of selected business risks to the threat of bankruptcy of SMEs. The results of the study are unique because they compare the perception of risk at the time of the economic peak (09/2019 to 03/2020) and at the time of the peak of the first wave of COVID-19 in the business environment of Slovakia.

The paper is structured as follows. The first part provides an overview of the latest available research studies mapping the impacts of the COVID-19 pandemic on the business environment of different countries with respect to the SME sector. The next part defines the aim, statistical hypotheses, methodology of the sample selection and describes the methods used in detail. The results of the study include an evaluation of the most significant business risks and the impact of business risks on the threat of bankruptcy of SMEs before and during the COVID-19 pandemic. Finally, the most important findings, the limits of this study and possible directions for future follow-up research activities are summarized.

2. Literature review

Significant political support for companies in the early stages of the COVID-19 crisis has prevented a major wave of corporate insolvency and corporate bankruptcies (Dorr et al., 2022). The pandemic directly threatened businesses as a result of forced lockdowns and an economic downturn. Due to the key role of SMEs in innovation (Kolková & Ključnikov, 2021; Erdei et al., 2022) and the economy (Civelek et al., 2020; Civelek et al., 2021;

Ključnikov et al., 2021), including export activities (Civelek & Krajčák, 2022; Ključnikov et al., 2022; Virglerova et al., 2020), their existential threat was the reason for the introduction of massive financial support schemes around the world (Oláh et al., 2019a; Oláh et al., 2019b; Torres et al., 2022). For example, a study on English companies shows that during the first and second waves of COVID-19 in 2020, up to 92.1% of the total volume of debt provided to companies was covered by the UK government, which is less than 5% under normal circumstances (Calabrese et al., 2022).

The authors Lu et al. (2021) presented a study from the Sichuan region in China in February 2020, the first country to experience the negative effects of the global pandemic. The subject of the research was the immediate impact of the pandemic on primary production, wholesale, retail, the accommodation and catering sector and the new economy industries. In a sample of 3,194 SMEs, there were significant differences in the effects of the pandemic, depending on the industrial sector. The manufacturing sector has faced poor logistics, and the problem of supply chain, in the wholesale and retail sectors an urgent need to accelerate the delivery of online services was created. The most affected hospitality sector showed cash flow shortfalls. All SMEs in the research reported a short-term decline in income, inability to continue working and production.

A study from a primary survey on a sample of 284 SMEs in Bangladesh showed that SMEs faced many problems due to COVID-19, mainly declining demand (92.96%), order cancellations (85.56%), liquidity crises (74.30%), delayed shipments, (72.53%), unsecured work environment (68.31%), lack of raw materials (63.73% and absence of employees (62.67%). SMEs recorded a 40% decrease in production volume compared to the year before the pandemic (Sarker et al.; Mura et al., 2021).

Interesting are the results of a study aimed at examining company-specific factors affecting financial distress and the potential for bankruptcy in the acute stage of the COVID-19 pandemic in a sample of approximately 9000 companies in 25 countries. Empirical results have shown a higher propensity for bankruptcy and corporate financial distress in companies with problematic access to financial resources, in younger companies and in more indebted companies. Financial failure is also affected by the size of the company and the years of experience of its managers (Bozkurt & Kaya, 2022; Szeiner et al., 2022).

A systematic analysis of 34 articles examining SMEs' practices for mitigating the pandemic crisis shows that the most frequently investigated issues regarding business risks were cost and financial problems, business disruptions and the existential problems of SMEs (Zutshi et al., 2021).

Large number of firms entered the pandemic with limited cash buffers what had a direct effect on their financial distress and risk of bankruptcy according to the Reserve Bank of Australia (2020). If it were not for the income support policies in the developed countries, business failures would have risen. For example, a recent study in France showed that the number of bankruptcies in the country decreased by 36% by 2020 compared to 2019 (Cros et al., 2021). Similarly, a study of a sample of around 1.5 million companies in Germany showed that without government support, smaller companies in particular would have gone bankrupt (Dorr et al., 2022).

3. Aim, methodology and methods

The aim of the article is to compare the impact of selected business risks on the threat of bankruptcy of small or medium-sized enterprises (SMEs) before COVID-19 and during the first wave of the COVID-19 pandemic.

The collection of the entrepreneurs' attitudes was carried out using a questionnaire. Data collection took place in two phases: i. before COVID-19: in the period from 01.09.2019 to 04.03.2020; ii. during COVID-19: in the period from 11.05.2020 to 17.05.2020.

The statistical unit is characterized as an entrepreneur (owner or senior manager) of a small or medium-sized enterprise (SME), which operates in the business environment of the Slovak Republic (hereinafter referred to as the "respondent"). 688 SMEs completed the questionnaire; 368 (53.5%) before COVID-19 and 320 (46.5%) SMEs during COVID-19.

The Cribis database provides paid or publicly available information about companies, organizations and sole traders in the Slovak Republic. The procedure for applying the method of random selection of respondents from databases was as follows:

i. define and determine the basic set of respondents according to the selected criteria (up to 249 employees); ii. give each respondent a serial number (in alphabetical order); iii. generate random numbers using the mathematical function "Randbetween" (range of the function: lowest value - 1, largest value - total number of respondents); iv. assign individual respondents to randomly generated numbers; v. find out the telephone or e-mail contact of the respondent. The above procedure was applied to each NUTS III region of the Slovak Republic

The respondents' were obtained by the method of questioning in the form of filling in the questionnaire in its online or printed version.

More than 10,100 SMEs in the Slovak Republic were contacted by e-mail; from 01.09.2019 to 31.12.2019 an average of 500 respondents per week. To increase the representativeness, the respondents were contacted by telephone in the period from 01.01.2020 to 04.03.2020. The above form ensured a ratio where the number of completed questionnaires for a given region to the total number of respondents in the region was approximately the same as the total number of respondents in the region to the total number of respondents in the whole SR.

Data collection also took place online in the form of inquiries through the MNFORCE SK & CZ panel, on a sample of 320 respondents (SR). The sample of respondents was created using a random selection of SMEs from the business environment of selected countries. The average questionnaire completion time was 11 minutes and 45 seconds. The criterion for selecting SMEs was the maximum number of self-employed persons in the sample, which could not exceed 60%. The following business risks were assessed using the Likert scale of answers (1 - strongly agree with the statement; ...; 5 - strongly disagree with the statement):

X1: I consider the market risk (lack of sales for my company) to be reasonable.

X2: Our company uses innovative ways to gain new markets and retain existing customers.

X3: I evaluate the financial performance of our (my) company positively.

X4: I can manage financial risk in my (our) company.

X5: I consider the personnel risk in the company to be adequate and it does not have a negative impact on my business.

X6: Indicate the most significant business risks (possibility to indicate max. 3 types of business risks).

Y: Our (my) company is not in danger of going bankrupt in 5 years.

To meet the aim of the article, the following statistical hypotheses were formulated:

H: Sales adequacy for the company (H_X1); using innovative ways to gain new markets or retain existing customers (H_X2); financial performance of the enterprise (H_X3); ability to manage financial risk (H_X4); the adequacy of the personnel risk in the company (H_X5) does not affect the threat of bankruptcy of SMEs before the COVID-19 (H1) pandemic and during the COVID-19 (H2) pandemic.

Linear regression modeling (LRM) was used to evaluate the formulated statistical hypothesis. LRM is a suitable statistical method because the selected variables (Y - dependent variable; X1, ..., X5 - independent variables) are the same metrics. The authors designed the questionnaire in such a way that if the respondents answered in agreement with the selected business risks, then the linear business is not in danger of business failure. The assumption of linearity was verified using a scatter plot. The assumption of a normal distribution was verified by calculating descriptive characteristics (skewness and sharpness).

If the skewness and kurtosis value were in the range of -2 to 2, then the assumption of a normal distribution is accepted (James, 1964). A correlation matrix was used to determine the relationship between the variables. Student's t-test was applied to verify the significance of the regression coefficients of the independent variables. The regression coefficient in the regression model is statistically significant if the p-value of the t-test is lower than the level of significance. The linear regression function has a general form:

$$Y = \theta_0 + \theta_1 \times X1 + \theta_2 \times X2 + \theta_3 \times X3 + \theta_4 \times X4 + \theta_5 \times X5 + \epsilon_t, \quad (1)$$

where: Y – dependent variable (threat of bankruptcy); X1, ..., X5 – independent variables (selected business risks); θ_0 – intercept; θ_1 ; ...; θ_5 – regression coefficients of independent variables; ϵ_t – random component.

We determine the quality of the regression model by calculating and interpreting the regression characteristics: Degree of freedom (DF); Sum of Squares (SS); Mean of Square (MS); Standard Error (SE); Multiple correlation coefficient (R); Coefficient of Determination (R^2) and adjusted R^2 (Adj. R^2); Sig - Significance; F-test (ANOVA). The coefficient of determination (R^2) gives the percentage explanation of the variability of the dependent variable,

which can be explained by the chosen regression model (Lancaster & Hamdan, 1964). The F-test was used to verify the statistical significance of the entire regression model (de Waal, 1977).

The required p-value of the F-test must be lower than the significance level ($\alpha = 0.05$) for the LRM to be statistically significant. We verify the assumption of multicollinearity in the regression model using the Variance Influence Factor (VIF - test) (Liao & Valliant, 2012). If the value of the VIF test for the independent variable is less than 5, then this coefficient is not affected by multicollinearity (Arnold, S. F., 1980). Bartlett's test was used to verify the assumption of homoscedasticity. This assumption is accepted if the p-value of the Bartlett's test criterion is higher than the level of significance (Snedecor et al., 1989). The presence of autocorrelation in LRMs has not been detected, due to the fact that it is not a time series data (Breusch, 1978).

Demographic structure of respondents (before COVID-19: n = 368 / during COVID-19: n = 320): company size: 106/61 small enterprises (from 10 to 49 employees), 216/201 micro-enterprises (up to 9 employees), 46 / 58 medium-sized enterprises (from 50 to 249 employees); legal form of enterprise: 59/161 self-employed, 266/113 limited liability company, 21/25 joint stock company, 22/21 other type of legal form; period of operation of the company in the business environment: 53/107 business up to 5 years, 52/77 business from 6 to 10 years, 263/136 business more than 10 years; gender: 253/173 men and 115/148 women; age of entrepreneur: 66/105 age of respondent up to 35 years, 79/96 age of respondent from 36 to 45 years, 106/81 age of respondent from 46 to 55 years, 117/38 age of respondent more than 55 years; position of respondent in the company: 285/192 business owner and 83/128 senior managers in the company.

4. Results and discussion

4.1 The most significant business risks

The total number of possible statements from respondents to claim X6 represented the following sample: 1104 responses before COVID-19 and 960 responses during COVID-19. Respondents used the opportunity to express their position a total of 837 times (75.8%) before COVID-19 and 660 times (68.7%) during COVID-19. The obtained results show that the respondents more often used the opportunity to mark several offered answers in the given question. The absolute and relative numbers of selected business risks listed by the respondents as the three most significant are summarized in the Table 1.

Table 1: Comparison of respondents' assessment of the most significant business risks

Type of risk	Before COVID-19		During COVID-19	
Strategic risk	67	18,2%	50	15,6%
Market risk	201	54,6%	196	61,3%
Financial risk	130	35,3%	191	59,7%
Personnel risk	231	62,8%	94	29,4%
Legal risk	157	42,7%	60	18,8%
Operational risk	51	13,9%	69	21,6%
Number of respondents	368		320	
Chi-square test (p-value)			98,383 0,000	

Source: Own research.

The results show that the three most significant risks at the peak of economic growth were: personnel risk (62.8%); market risk (54.6%) and legal risk (42.7%). The three most significant risks at the time of the COVID-19 pandemic were: market risk (61.3%); financial risk (59.7%) and personnel risk (29.4%).

Furthermore, it can be stated that while respondents considered personnel risk to be the

most significant before COVID-19 (62.8%), during COVID-19, personnel risk was considered only the third most significant (29.4%). On the other hand, the number of respondents who rated financial risk as one of the three most important business risks almost doubled due to the COVID-19 pandemic (from 35.3% of respondents to

59.7% of respondents). The respondents' perception of the three most significant business risks changed due to the COVID-19 pandemic in the Slovak business environment (p-value = 0.000).

4.2 The impact of business risks before and during COVID-19 on the threat of corporate bankruptcy in the Slovak Republic

The results of the graphical analysis (scatter plots) confirmed the linear relationships between the variables before COVID-19 and during COVID-19. The following table (see Table 2) summarizes the results of the descriptive statistics for each variable before and after COVID-19. The assumption of a normal distribution is fulfilled for each variable before and during COVID-19.

Table 2: Selected descriptive characteristics of business risks and corporate bankruptcy

DCH	Before COVID-19					
	Y	X1	X2	X3	X4	X5
Mean	2.5000	2.6386	2,5163	2,3668	2,1875	2,7283
SD	1.0849	0.9438	0,9958	0,9869	0,8386	1,0960
Skewness	-0.3681	-0.3223	-0,6516	-0,2864	0,0873	-0,8036
Kurtosis	0.3733	0.3286	0,1712	0,5626	0,4991	0,1805
DCH	During COVID-19					
	Y	X1	X2	X3	X4	X5
Mean	2.5875	2.6656	2.6344	2.8469	2.5188	2.7313
SD	0.9883	1.0373	1.0174	1.0437	0.9164	1.0488
Skewness	-0.3591	-0.7056	-0.2544	-0.6217	0.3196	-0.7101
Kurtosis	0.3138	0.4841	0.5656	0.3268	0.7806	0.3913

Note: DCH – Descriptive characteristics; SD – Standard deviation; Y, X1, ..., X5 – variables. Source: Own research.

Table 3. summarizes the results of the pair dependencies between selected business risks as well as the results of the pair dependencies between selected business risk and the threat of bankruptcy before COVID-19 and during COVID-19.

Table 3: Correlation matrices of dependencies between variables before COVID-19 (CM1) and during COVID-19 (CM2)

CM1	Before COVID-19					
	Y	X1	X2	X3	X4	X5
Y	1					
X1	0.0838	1				
X2	0.2396	0.0860	1			
X3	0.3703	0.1690	0.3224	1		
X4	0.3070	0.2270	0.2590	0.4369	1	
X5	0.2337	0.1682	0.2288	0.2284	0.2750	1
CM2	During COVID-19					
	Y	X1	X2	X3	X4	X5
Y	1					
X1	0.1555	1				
X2	0.2673	0.2165	1			
X3	0.4279	0.3203	0.4047	1		
X4	0.3339	0.2787	0.4192	0.5028	1	
X5	0.2435	0.2889	0.2925	0.4090	0.3901	1

Note: Y- dependent variable; CM – Correlation matrix; X1, ..., X6 – independent variables. Source: Own research.

The results (see Table 3) from CMs confirmed rather weak positive dependencies between selected business risks (CM1: $r \in <0.086; 0.4369>$; CM2: $r \in <0.2165; 0.5028>$). According to the respondents, the strongest positive dependence is between the financial risk statements X3 and X4 (CM1: $r = 0.4369$; CM2: $r = 0.5028$). The strongest positive dependence is between the respondents' attitudes to the threat of a corporate bankruptcy and the company's positive financial performance (CM1: $r = 0.3703$; CM2: $r = 0.4279$). All of the above pairwise correlation coefficients are statistically significant at the level of significance.

The following tables summarize the results of the verification of the impact of selected business risks on the corporate bankruptcy by respondents who responded to the questionnaire before the COVID-19 pandemic (see Table 4: LRM1) and during the COVID-19 pandemic (see Table 5: LRM2).

Table 4: Verification of the impact of selected business risks on the threat of bankruptcy before the COVID-19 pandemic

LRM1 – Before COVID-19					
R	0.4320		Adj.R ²		0.1754
R ²	0.1866		SE		0.9852
Verification of the significance of the LRM1					
ANOVA	DF	SS	MS	F-ratio	
Regression	5	80.6137	16.1227	16.610	
Residual	362	351.3863	0.9707	Sig. (p-value)	
Total	367	432		8.99E-15	
Statistical testing of regression coefficients					
Variables	β	SE	t-Stat	Sig. (p-value)	VIF
Intercept	0.914	0.221	4.128	0.000	
X1	-0.023	0.056	-0.400	0.690	1.073
X2	0.104	0.044	1.969	0.042	1.162
X3	0.278	0.060	4.632	0.000	1.328
X4	0.186	0.071	2.627	0.009	1.333
X5	0.117	0.050	2.334	0.020	1.135

Source: Own research.

The results (see Table 4) show that LRM1 is statistically significant (F-ratio: p-value = 8.99E-15). LRM1 explains 17.54% of the variability of the dependent variable. Statistically significant business risks are: use of innovative ways to acquire new markets or retain existing customers (X2; t-Stat: p-value = 0.042), positive perception of the company's financial performance (X3; t-Stat: p-value = 0.000), the ability to manage financial risk (X4; t-Stat: p-value = 0.009) and the adequacy of personnel risk in the company (X5; t-Stat: p-value = 0.020). The impact of the adequacy of sales of products/services for the company (t-Stat: p-value = 0.690) is not a statistically significant factor that would affect the threat of bankruptcy of SMEs. The linear regression function has the form:

$$Y = 0.914 - 0.023 \times X1 + 0.104 \times X2 + 0.278 \times X3 + 0.186 \times X4 + 0.117 \times X5, \quad (2)$$

where: Y – dependent variable (threat of bankruptcy); X1, ..., X5 – independent variables (selected business risks).

Multicollinearity is not present in LRM1 (see Table 4). Homoskedasticity was confirmed (Bartlett's test: p-value = 0.187). The normal distribution of deviations was confirmed by S-W test (S-W test: p-value = 0.267). Hypothesis H1_X1 cannot be rejected; hypotheses H2_X2, H1_X3, H1_X4 and H1_X5 were rejected.

Table 5: Verification of the impact of selected business risks on the threat of bankruptcy during the COVID-19 pandemic

LRM2 – During COVID-19					
R	0.4562		Adj.R ²		0.1955
R ²	0.2081		SE		0.8864
Verification of the significance of the LRM2					
ANOVA	DF	SS	MS	F-ratio	
Regression	5	64.8474	12.9695	16.5074	
Residual	314	246.7026	0.7857	Sig. (p-value)	
Total	319	311.55		1.8E-14	
Statistical testing of regression coefficients					
Variables	B	SE	t-Stat	Sig. (p-value)	VIF
Intercept	1.104	0.197	5.615	0.000	
X1	-0.011	0.052	-0.207	0.836	1.169
X2	0.072	0.056	1.286	0.199	1.307
X3	0.302	0.059	5.097	0.000	1.551
X4	0.138	0.067	2.074	0.039	1.520
X5	0.042	0.054	0.778	0.437	1.311

Source: Own research.

The results (see Table 5) show that LRM2 is statistically significant (F-ratio: p-value = 8.99E-15). LRM2 is statistically significant (F-ratio: p-value = 1.8E-14). The proposed regression model explains 19.55% of the variability of the dependent variable. Statistically significant business risks are: positive perception of the company's financial performance (X3; t-Stat: p-value = 0.000) and the ability to manage financial risk (X4; t-Stat: p-value = 0.039). Statistically insignificant factors that do not affect the threat of bankruptcy of SMEs are the adequacy of sales of products/services for the company (X1; t-Stat: p-value = 0.836), the use of innovative methods to gain new markets or retain existing customers (X2; t-Stat: p-value = 0.199), the adequacy of personnel risk in the company (X5; t-Stat: p-value = 0.437). The linear regression function has the form:

$$Y = 1.104 - 0.011 \times X1 + 0.072 \times X2 + 0.302 \times X3 + 0.138 \times X4 + 0.042 \times X5, \quad (3)$$

where: Y – dependent variable (threat of bankruptcy); X1, ..., X5 – independent variables (selected business risks).

Multicollinearity is not present in LRM2 (see Table 5). Homoskedasticity was confirmed (Bartlett's test: p-value = 0.314). Normal distribution of deviations was confirmed by S-W test (S-W test: p-value = 0.152). Hypotheses H2_X1, H2_X2, H2_X5 cannot be rejected; hypotheses H2_X3 and H2_X4 were rejected.

According to the respondents' attitudes in the Slovak Republic before COVID-19, the perception of the threat of bankruptcy was influenced by indicators of market, financial and personnel risk. The impact of significant business risks is positive. The more positively the respondents perceive the individual indicators of selected business risks, the more positively they perceive the future of the company/business (the company is not in danger of bankruptcy). The company's financial performance indicators (financial risk indicator; $\beta = 0.278$) are the most significant business risks that have the greatest impact on the company's bankruptcy threat. Slightly less important is the ability to manage financial risk by respondents (financial risk indicator; $\beta = 0.187$), positive perception of the adequacy of personnel risk in the company ($\beta = 0.117$) and the least significant impact, but still statistically significant, is the use of innovative methods to gain new markets or retaining their customers (market risk, $\beta = 0.104$).

Indicators of financial risk according to the acquired respondents' attitudes in the Slovak Republic during COVID-19 affect the perception of the threat of bankruptcy. The impact of market (X1: t-test: p-value = 0.836; X2: t-test: p-value = 0.199) and personnel risk (X5: t-test: p-value = 0.437) indicators was not confirmed. The impact of financial risk indicators is positive. Result: the more positive respondents perceive the individual financial risk indicators, the more positively they perceive the future of the company / business. The company's financial performance indicators (X3: $\beta = 0.302$) and the ability of respondents to manage financial risk (X4: $\beta = 0.138$) influence the threat of the company's bankruptcy. The strength of the impact of the company's financial performance indicators is more significant than the impact of the ability to manage financial risk on the threat of the company's bankruptcy ($\beta = 0.302 / \beta = 0.138$).

5. Conclusion

The aim of the article was to compare the impact of selected business risks on the threat of bankruptcy of small or medium-sized enterprises (SMEs) before COVID-19 and during the first wave of the COVID-19 pandemic.

The case study shows significant changes in the perception of business risks to the threat of bankruptcy before and during the COVID-19 pandemic. Research has its limitations. Partial data collection took place at the time of the first wave of COVID-19, it is possible that respondents' answers would have been different if they had been interviewed in the later stages of the 2-year pandemic.

Further research should focus on examining the perception of business risks towards the sustainability of SMEs in the SME segment after the end of the pandemic and return to normal and expand it territorially, e.g. other V4 countries. It could also be interesting to verify if there is a similar relationship between going bankrupt and the indicated variables if the variable is not the self-estimation of probability of bankruptcy but the real state of falling into bankruptcy as it was shown that sometimes being optimistic about future means falling into problems (see e.g. Forlicz, Rólczyński, 2019).

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