An Analysis of Inventory Management Strategies in Times of Crisis Exemplified by Manufacturing Companies From the Energy Industry

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Abstract: -In recent years, the world has experienced numerous crises that have had serious consequences for the functioning of the global economy and have directly affected the energy sector. To ensure energy stability in the country, it is crucial to maintain energy infrastructure in good condition at all times. Die-casting foundries play a key role in ensuring the continuity of energy production, making them a strategic sector. This article aims to identify and evaluate inventory management strategies in die-casting foundries in Poland, with particular attention to crisis periods. The study shows that during crises, companies in the energy sector more frequently adopt defensive inventory management strategies, which allow for the continuity of production but are associated with higher costs. The results indicate the need for more flexible inventory management strategies and increased cooperation within purchasing groups, especially among SMEs.

Key-Words: - energy industry, energy crisis, inventory management, die-casting foundries, management strategies, sustainable development.

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1 Introduction

Crises in recent years have had a significant impact on the global economy and have directly affected the energy sector. The crisis and times of uncertainty have shown how important it is for every country to ensure energy security. Financial markets during crises have seen sudden changes and declines in the value of individual financial assets, unexpected by investors, and dynamic changes in commodity markets. Later, unexpected announcements have been followed by further sudden, dynamic changes. Today, investors are virtually unsure daily what will happen in financial markets, how and why prices for energy

commodities, precious metals, cryptocurrencies, and other financial assets will change.

Recent years have clearly demonstrated the powerful impact of politicians' statements on price fluctuations. A prime example of market instability, especially regarding oil and other energy commodities, is the information coming from US President Donald Trump and his entourage. The announcements regarding tariffs imposed on individual countries and the EU are causing significant unrest and a sell-off in markets, or a sharp increase in selected indices and commodity prices. In Poland, the situation on the eastern border, and above all, the war in Ukraine, poses an additional serious problem. In 2021, the actions of Russia and Belarus, using migrants to attack Polish borders, resulted in the closure of several border crossings and lengthening queues. Supply chains after the COVID-19 crisis and war crisis were disrupted, negatively impacting many industries, [1], [2], [3], [4]. A lack of raw material supplies is a serious problem that can result in financial problems for companies in virtually every industry. However, in every country, some industries cannot afford a supply chain disruption, and companies operating in the energy sector are a prime example. It must be firmly stated that the energy crisis in Europe is one of the most important challenges facing the continent. As a result of the war that Russia initiated in Ukraine in 2022, Europe was forced to face a sharp rise in energy prices and the need to rethink and change its energy strategy. Therefore, it is necessary to phase out the use of Russian hydrocarbons and coal. This will require accelerated investments for the EU, but also, as recent years have shown, a visible desire among society to save electricity in homes. The search for alternative energy sources, primarily renewable energy sources, such as wind, solar, hydroelectric, ocean energy, geothermal energy, biomass, and biofuels, will foster independence. Maintaining energy stability in the country requires continuous monitoring and maintenance of energy infrastructure. Die-casting foundries play a key role in ensuring the continuity of production of components for the energy sector, making them a strategic sector. Castings for the energy sector play a key role in various energy sectors, providing essential components for energy production. Aluminum castings play a key role in the renewable energy sector, and this industry is now very important during the transition towards green energy. Thanks to aluminum castings, solar energy can be efficiently harnessed to generate clean energy without negatively impacting the environment. The role of die-casting foundries in ensuring the proper functioning of energy producers is therefore invaluable. It is crucial that die-casting foundries can operate without interruption and continue their operations, supplying their products to energy producers. In recent years, various crises around the world have had a huge impact on supply chains and caused interruptions in the supply of goods and materials transported by land, sea, or air, [5], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18]. To achieve this capability, they must have an efficiently organized supply chain and implement appropriate inventory management strategies optimal for each industry.

This article aims to identify and evaluate inventory management strategies in die-casting foundries in Poland, with particular attention to crisis periods. The authors propose the hypothesis that during crises, companies in the energy sector more frequently adopt defensive inventory management strategies, which allow for the continuity of production but are associated with higher costs. The article presents a literature review on inventory management strategies, discusses the research methodology, and presents the results of empirical analysis. The final section contains conclusions and recommendations for practitioners and decision-makers

2 Literature Review

Companies can set various goals, which can be achieved through the use of an appropriate inventory management strategy. In the literature, three main inventory management strategies are distinguished, [19], [20], [21]:

- defensive (conservative),
- offensive (aggressive),
- moderate (intermediate).

Conflicts and various types of crises, such as COVID-19 in the world, have a huge impact on the choice of inventory management strategy, [22], [23]. The simplest solution in times is a safe-defensive strategy. A defensive, or conservative, strategy is a safe inventory management strategy. Its goal is to ensure the continuity of the company's operations and an inventory level that allows the maintenance of production and sales, [24], [25], [26]. Companies that employ this type of management have high inventory levels and liquidity, but low profitability. Inventories can pose a very high share of current assets, [25]. A large inventory reserve is created, but maintaining it is costly. It could be argued that these costs are

unjustified; they allow for excessive financial security, minimizing the risk of inventory shortages. The only justification for this situation is the desire to ensure the continuity of the company's operations. A conservative strategy is therefore costly, and commercial enterprises employing it often lack any methods or tools to support the inventory management process. In manufacturing companies, methods derived from logistics management to support the inventory management process are very common.

The second method of inventory management is the offensive, or aggressive, strategy. This strategy involves minimizing and reducing inventory levels, [25]. Companies strive to optimize inventory levels to a level that allows the unit to operate at a given time. This strategy is based on the basic principles of the Just-In-Time strategy, and it is risky today, in times of crisis. Applying this "just-in-time" system requires strict discipline, especially among employees. And importantly, production department employees, which is unfortunately very difficult for management to enforce. Primary production department employees are a crucial link in the supply chain, as they must constantly monitor the condition of every item used in production and stored in the warehouse. Standardized quality management systems are key to achieving success when choosing aggressive inventory management methods because they increase the level of inventory control, which reduces warehouse management costs, [26], [27].

A moderate inventory strategy is a middle ground between aggressive and conservative strategies. This type of inventory management minimizes the weaknesses of the strategies described above and leverages the strengths of both aggressive and conservative strategies.

Moderate inventory management strategies can be divided into moderate-conservative and aggressive-conservative strategies.

The moderate-conservative strategy is based on the principles of a conservative policy, but through the implementation of appropriate inventory management systems, it leads to a reduction in inventory reserves, especially those with low turnover.

The moderate-aggressive strategy is based on the principles of the aggressive strategy. In this strategy, managers strive to establish certain minimum inventory reserves for the fastest-moving inventory, which will prevent production or sales disruptions.

Inventory managers should strive to systematically monitor inventory levels to prevent an increase in slow-moving inventory.

Inventory is an area of a company where implementing appropriate methods and logistics tools can easily improve its management efficiency,. [26], [28], [29]. Typically, many unnecessary costs in inventory management arise from the negligence of warehouse employees or those responsible for ordering goods. Managers developing inventory management strategies often face the choice of focusing the new strategy on increasing profits or operating the business conservatively, which will ultimately reduce profits. Building an appropriate inventory management strategy and organizing the supply chain is worth supporting with artificial intelligence (AI), [30], [31]. Artificial intelligence (AI) significantly improves inventory management efficiency. This is very important because, according to many studies, inventory management costs are still an area of incurring unjustified costs, [2], [25], [27]. Controlling costs in inventory management through the use of even the simplest AI solutions will lead to cost reductions, which in turn generate higher profits. If profits remain, the company's financial liquidity will improve, which is crucial in times of crisis. Profits will lead to an increase in equity capital, which, according to many researchers, is considered the foundation of enterprise development, [26], [27], [28]. Therefore, when managing inventory during a crisis, it is crucial to first control processes related to inventory management and minimize inventory costs. These are the simplest tasks, performed by the company's own employees, process controllers.

3 Results

The research was conducted using a quantitative approach, analyzing financial data from the financial statements of 19 die-casting foundries operating in Poland. The study focused on eight key financial indicators related to inventory management. Data were collected from publicly available financial statements and analyzed using descriptive statistics, ANOVA, t-Student tests, Mann-Whitney U tests, and correlation analysis. This section presents a comparative descriptive analysis of eight key financial indicators across six consecutive years (2018–2023), encompassing periods of global uncertainty such as the COVID-19 pandemic and geopolitical tensions, including the Russia–Ukraine conflict. The research was conducted on a group of 19 die casting foundries operating in Poland. These are the largest factories

in the analyzed pressure die casting industry in Poland and cover almost 90 percent of the Polish market. This industry is closely linked to the energy sector as it supplies many components for the Polish energy sector. The research period was divided into three periods:

- Pre-COVID pandemic
- Covid pandemic
- Post-COVID pandemic – the period of the war in Ukraine

The analyzed companies were divided by size into large enterprises and SMEs.The dataset, cleaned from missing values, allows a robust exploration of liquidity positions, profitability levels, and asset structure changes among firms operating in different contexts. Table 1 presents the detailed results of selected indicators.

Between 2018 and 2023, financial liquidity (FL) and the quick ratio (Q) exhibited substantial year-to-year variability. Liquidity peaked in 2019, with financial liquidity nearly 2,40 and a quick ratio 1,7. These results indicate excess liquidity. These results certainly allowed companies to survive the difficult period of the crisis. This is indicated by the results of the following years, in which the indicators continue to decline until 2023. The average time taken to collect receivables increased significantly after 2019. Likewise, inventory turnover in days followed a similar trend, rising from 42 days in 2019 to 56 days in 2022. These results indicate a decrease in the efficiency of current asset management, which is confirmed by the results of the operating cycle. The shortest cycle was recorded in 2019 (95 days), while the most prolonged occurred in 2022 (126 days). Managers should improve inventory management efficiency. The increase in receivables turnover ratios may result from a strategy related to competing for customers by offering attractive trade credits. With such a high level of financial liquidity, such a strategy may be risky.

Return on sales, which stood at a robust 0.139 in 2019, deteriorated substantially in subsequent years, falling to 0.0238 in 2022 and barely recovering to 0.0389 in 2023. This downward trend underscores the persistent margin pressure experienced by firms, likely stemming from inflationary cost increases, demand volatility, and price-based competition in post-crisis markets. Inventory and receivables as proportions of current assets displayed an upward tendency in the post-2020 period. The decline in liquidity levels following the COVID period should be viewed positively.

Table 1. Descriptive Analysis

Year: 2023								
	FL	**Q**	**RTD**	**ITD**	**OC**	**RS**	**ICA**	**RCA**
N	19	19	19	19	19	19	19	19
Missing	0	0	0	0	0	0	0	0
Mean	1.55	0.90	62	49	112	0.039	0.40	0.45
Median	1.60	0.80	51	45	101	0.020	0.45	0.44
Standard deviation	0.68	0.47	42	22	53	0.048	0.14	0.13
Min	0.10	0.20	21	7	28	0.00	0.17	0.27
Max	2.60	2.00	211	99	288	0.20	0.66	0.73
Year: 2022								
	FL	**Q**	**RTD**	**ITD**	**OC**	**RS**	**ICA**	**RCA**
N	19	19	19	19	19	19	19	19
Missing	0	0	0	0	0	0	0	0
Mean	1.64	0.97	69.5	56	126	0.02	0.38	0.44
Median	1.70	1.00	55	52	115	0.02	0.42	0.44
Standard deviation	0.70	0.49	52.	25	63	0.067	0.151	0.14
Minimum	0.30	0.20	29	6	35	-0.12	0.15	0.25
Maximum	2.70	1.80	257	117	34	0.18	0.65	0.76
Year: 2021								
	FL	**Q**	**RTD**	**ITD**	**OC**	**RS**	**ICA**	**RCA**
N	19	19	19	19	19	19	19	19
Missing	0	0	0	0	0	0	0	0
Mean	2.19	1.32	63.2	56	119	0.04	0.37	0.40
Median	2.10	1.00	54	56	106	0.03	0.39	0.40
Standard deviation	1.36	0.92	49.9	28	62	0.06	0.15	0.14
Minimum	0.50	0.20	20	7	34	-0.05	0.06	0.10
Maximum	6.30	3.40	254	118	341	0.22	0.63	0.70
Year: 2020								
	FL	**Q**	**RTD**	**ITD**	**OC**	**RS**	**ICA**	**RCA**
N	19	19	19	19	19	19	19	19
Missing	0	0	0	0	0	0	0	0
Mean	2.13	1.42	64	53	118	0.08	0.33	0.41
Median	2.00	1.20	60	53	127	0.02	0.36	0.41
Standard deviation	1.19	1.02	33.8	27	39	0.20	0.15	0.15
Minimum	0.40	0.30	22	1	51	-0.06	0.01	0.10
Maximum	5.20	4.00	183	107	222	0.90	0.56	0.75
Year: 2019								
	FL	**Q**	**RTD**	**ITD**	**OC**	**RS**	**ICA**	**RCA**
N	19	19	19	19	19	19	19	19
Missing	0	0	0	0	0	0	0	0
Mean	2.39	1.67	52.2	42	94	0.14	0.34	0.41
Median	1.60	0.70	53	42	90	0.04	0.37	0.42
Standard deviation	2.68	2.53	26.2	19	35	0.27	0.14	0.17
Minimum	0.50	0.30	9	8	22	-0.07	0.06	0.08
Maximum	12.1	11.5	135	81	168	0.90	0.51	0.75
Year: 2018								
	FL	**Q**	**RTD**	**ITD**	**OC**	**RS**	**ICA**	**RCA**
N	19	19	19	19	19	19	19	19
Missing	0	0	0	0	0	0	0	0
Mean	2.00	1.23	56.3	43	99	0.07	0.36	0.45
Median	2.00	1.10	50	40	93	0.44	0.42	0.42
Standard deviation	1.23	0.76	27	23	37	0.10	0.14	0.12
Minimum	0.5	0.20	23	16	59	-0.1	0.09	0.18
Maximum	6.00	3.30	126	109	186	0.38	0.57	0.70

Source: created by the authors

However, the increased share of inventories and receivables in current assets represents a cost. Costs reduce profits, and the company should strive to optimize these current assets.

The one-way ANOVA results (Table 2) presented above reveal no statistically significant differences across the three analyzed periods for the primary inventory management indicators. While none of the indicators reached the conventional significance threshold ($p < 0.05$), a few variables, including Inventory Turnover in Days (ITD), Operation Cycle (OC), and Return on Sales (RS),

exhibited p-values approaching marginal significance.

Table 2. ANOVA Results for Inventory Management Indicators by Period

Indicator	F-value	p-value	Statistically Significant (p < 0.05)
Financial Liquidity (FL)	2.032	0.1360	No
Quick Ratio (Q)	1.867	0.1594	No
Receivables Turnover in Days (RTD)	0.932	0.3968	No
Inventory Turnover in Days (ITD)	2.694	0.0720	No (borderline)
Operation Cycle (OC)	2.403	0.0951	No (borderline)
Return on Sales (RS)	2.460	0.0901	No (borderline)
Inventory in Current Assets (ICA)	0.890	0.4135	No
Receivables in Current Assets (RCA)	0.902	0.4089	No

Source: created by the authors

Table 3. Comparison of SMEs and Large Firms (T-Test and Mann-Whitney U Test Results)

Indicator	T-Test p-value	Significant (T-Test)	Mann-Whitney p-value	Significant (M-W)
Financial Liquidity (FL)	0.9850	No	0.4150	No
Quick Ratio (Q)	0.2605	No	0.1135	No
Receivables Turnover Days (RTD)	0.0906	No	0.5436	No
Inventory Turnover Days (ITD)	0.0580	No	**0.0301**	**Yes**
Operation Cycle (OC)	0.7001	No	0.4009	No
Return on Sales (RS)	0.7002	No	0.8246	No
Inventory in Current Assets (ICA)	**0.0000**	**Yes**	**0.0000**	**Yes**
Receivables in Current Assets (RCA)	0.2779	No	0.2170	No

Source: created by the authors

The comparative analysis (Table 3) between SMEs and large firms using both independent samples t-tests and Mann-Whitney U tests reveals several insights into how inventory-related metrics differ by firm size. Most indicators did not exhibit statistically significant differences. However, two exceptions were identified. First, Inventory Turnover in Days (ITD) showed a significant difference according to the Mann-Whitney test ($p = 0.0301$), indicating that larger firms may be turning over their inventory more efficiently than SMEs. Second, and more prominently, Inventory in Current Assets (ICA) revealed highly significant results in both the t-test and Mann-Whitney test, reflecting a substantial divergence in how inventory is structured within current asset allocations. Large companies take advantage of economies of scale, which allows them to manage inventories more effectively, which translates into high sales margins.

Table 4. Pearson Correlation Matrix (Averaged Values, 2018–2023)

	FL	Q	RTD	ITD	OC	RS	ICA	RCA
FL	1.000	0.925	0.015	-0.050	-0.012	0.180	-0.118	-0.330
Q	0.925	1.000	0.058	-0.265	-0.083	0.282	-0.385	-0.288
RTD	0.015	0.058	1.000	0.163	0.878	0.620	-0.261	0.562
ITD	-0.050	-0.265	0.163	1.000	0.616	0.149	0.756	-0.360
OC	-0.012	-0.083	0.878	0.616	1.000	0.568	0.159	0.274
RS	0.180	0.282	0.620	0.149	0.568	1.000	-0.244	0.160
ICA	-0.118	-0.385	-0.261	0.756	0.159	-0.244	1.000	-0.270
RCA	-0.330	-0.288	0.562	-0.360	0.274	0.160	-0.270	1.000

Source: created by the authors

The correlation analysis based on averaged values across six years (2018–2023) provides insightful patterns among key inventory and financial performance indicators (Table 4). The strongest correlation was observed between Financial Liquidity and Quick Ratio. This is a normal situation because the indicators are from the same group of financial indicators. Additionally, RTD and Return on Sales are positively associated, which may indicate that firms with efficient receivable systems convert revenue into profitability more effectively. Controlling and managing receivables is the most challenging area of financial management. An efficiently developed receivables management policy is beneficial because it improves profitability. The company reduces the level of credit exposure to customers, which lowers costs.

Interestingly, Inventory Turnover in Days (ITD) shows a strong positive correlation with Inventory in Current Assets (ICA) ($r = 0.756$), pointing toward a consistent pattern where firms that frequently cycle through inventory also allocate

a higher portion of current assets to stock. Maintaining inventory is expensive. High inventory levels are generally viewed negatively, but in times of uncertainty and crisis, they can bring financial benefits if the company achieves high sales margins. In times of crisis and supply chain disruptions, such a strategy can be profitable at the end of the reporting period.

Some moderate negative correlations are also evident. Quick Ratio (Q) is inversely related to ICA ($r = -0.385$), implying that higher liquidity might be associated with lower reliance on inventory as a portion of working capital.

Although the correlation findings are clearly interpreted in the study, how these relationships are reflected in inventory strategy typologies could be addressed in greater detail. For example, the strong positive relationship between RTD and OC indicates that a slowdown in receivables collection significantly extends the business cycle, leading firms to adopt a more defensive inventory approach under crisis conditions. This is consistent with firms preferring higher levels of ITD and ICA to maintain production and sales continuity and manage customer pressures when demand and payment uncertainties increase. Similarly, the inverse relationship between ICA and FL indicates that firms experience a trade-off between two key strategic elements during periods of uncertainty: the need to maintain financial liquidity, on the one hand, and the necessity to increase ICA levels to limit the risk of supply disruptions, on the other. This dual pressure reveals that businesses attempt to balance both cash buffer creation and inventory buffer increase strategies simultaneously during crisis periods. Therefore, the correlation matrix not only reveals technical relationships but also makes visible the behavioral logic behind inventory strategies such as defensive stockpiling, risk spreading, and operational buffering that companies implement in crisis environments.

4 Conclusions

The ANOVA tests applied in this study did not reveal statistically significant differences between periods ($p > .05$). However, the presence of trends approaching borderline significance in some indicators (ITD, OC, RS) provides important signals regarding behavioral changes in inventory strategies during crisis periods. The supply chain management literature emphasizes that changes in business indicators during crisis periods may not always be captured by strong statistical validations; however, the direction and magnitude of the effect are more critical in terms of businesses' strategic decision-making mechanisms, [32], [33]. On the other hand, it is stated that the concept of economic/practical significance in the interpretation of operational performance indicators should be considered beyond mere statistical significance, [34]. Therefore, rather than evaluating ANOVA results alone as a definitive tool for determining differences, it seems more appropriate to consider them as part of a triangulation approach, together with structural trends in descriptive statistics and correlation analyses, [35]. Thus, while considering the possibility of statistical power deficiency arising from limited sample size, economically meaningful transformations are not overlooked.

The analysis clearly indicates that, now that the COVID-19 crisis has passed, companies are trying to manage their inventories safely. Unfortunately, the world has become accustomed to the war in Ukraine, and individual economies are learning to operate in the new reality of neighboring countries where war is raging. Previous research on inventory management strategies in trading companies has indicated that companies are trying to reduce inventory levels, [26], [36], [37]. In the case of the analyzed companies, which operate in a sector crucial to the country's energy security, such entities cannot afford the risk of reducing inventory levels. Numerous examples of supply chain disruptions resulting from armed conflicts, pirate attacks on ships sailing maritime routes, border blockades, and the conflict in the Middle East demonstrate the value of maintaining safety stocks. In the analyzed companies, an increase in inventory levels and a longer inventory turnover ratio is visible after the Covid crisis. A cautious inventory management strategy is evident, which will certainly ensure business continuity in the event of problems with replenishment. Economies of scale were also observed in the analyzed companies. Large companies generating significant sales revenue have more opportunities and manage inventory more effectively, which allows for lower costs and higher profits. This seems to be the norm in this type of industry. In the future, smaller entities should begin collaborating within purchasing groups.

Numerous studies have been conducted that indicate the numerous benefits that SMEs gain by operating within purchasing groups, specifically in the areas of inventory management and business profitability [36], [37], [38] Today, with armed conflicts erupting around the world and supply chains for raw materials and goods being disrupted, it seems that building economies of scale within purchasing groups will certainly improve the

financial security of smaller entities and positively impact profitability.

To sum up, the analysis shows that during crises, companies in the energy sector more frequently adopt defensive inventory management strategies, which allow for the continuity of production but are associated with higher costs. The results indicate the need for more flexible inventory management strategies and increased cooperation within purchasing groups, especially among SMEs. For SMEs, this is an opportunity to improve their financial security. Collaborating with non-competitors also provides an opportunity to exchange experiences and make joint investments, which will undoubtedly allow them to become more competitive in the market.

The findings of the study clearly indicate that, in the post-COVID period, companies in the energy sector are increasingly adopting defensive inventory management strategies to ensure business continuity. The ongoing war in Ukraine and global supply chain disruptions have reinforced the importance of maintaining safety stocks. Large companies, due to their economies of scale, manage inventory more efficiently than SMEs. The study suggests that SMEs should consider joining purchasing groups to improve their financial security and profitability.

The liquidity deterioration, prolonged business cycles, and rising inventory/receivables ratios identified in this study are argued to stem from crisis-induced supply shocks and inflationary cost pressures. However, considering alternative mechanisms that may be associated with these variables enhances the comprehensiveness of the analysis. Indeed, the literature emphasizes that firms diversify their inventory strategies during periods of uncertainty; they not only build safety stock but also seek to increase supply chain resilience through multiple sourcing, pre-positioning, strategic inventory, or flexible supply contracts [39],[40]. While these strategies offer proactive measures to reduce fragility on the supply side, they may appear in financial statements as inventory increases and current asset expansion. Furthermore, the supply chain risk management literature indicates that price volatility and commodity/market price shocks lead companies to rearrange their pricing strategies, showing that, in this context, long-term contracts or agreements containing price-adjustment clauses are widely used and have significant effects on inventory, production, and cash flow policies—particularly in capital commitment/liquidity management [41]. In this context, the current findings may indicate a strategic response based on price and supply contracts, alongside defensive inventory strategies. Therefore, when interpreting the study's findings, it is emphasized that factors such as price-demand balance strategies, contract structure, and customer/final demand sector composition may also contribute, not just supply disruptions or inflation. Consequently, future research is recommended to include micro-level data analysis covering firms' contract portfolios, pricing policies, and customer sector distribution. This approach will be consistent with the multi-dimensional supply chain resilience models proposed in the literature, while also providing an analytical framework rich enough to better explain the observed capital stress structures.

One of the key strengths of this study is that the sample includes foundries supplying the Polish energy sector, and these foundries represent approximately 90% of the national market. This indicates that the findings have high representativeness at the sectoral level and significantly increase the generalizability of conclusions regarding structural working capital dynamics. However, data availability has some limitations. Future research using a multi-source design enriched with more detailed corporate data in various sectors and industries, surveys or qualitative interview methods will deepen the empirical framework offered by this study and increase its causal analysis capacity.

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