

## Surviving Uncertainty: A 20-Year Review of Risk Management Strategies in MSMEs

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**Abstract:** Despite its significance and omnipresence in the economy, MSMEs are highly susceptible to external shocks. In this paper, researchers travel back 20 years to examine the risk management environment these firms faced from 2005 to 2025. This paper investigates early strategic responses to financial crises, technological disruption, and global health emergencies with a focus on the re-orientation of ‘dominant logics’ towards resilience engineering. Using a sample of 457 early cases, researchers explore how small firms respond to uncertainty, and our findings suggest that, while the strategies were initially focused on cost savings—consolidation and exploitation of labour pool resources—contemporary ones are more about digital diversification and agile supply chains. Researchers conclude that survival now depends on the strategic adoption of predictive data analytics and flexible operational models, rather than on plain access to liquidity. This paper, therefore, exposes the gulf between perceived risk and actual preparation for it, shifting the focus to how under-resourced companies can flourish in times of volatility. Hence, it is the internal learning and adaptation capabilities of MSMEs that matter more than any predictable, peaceful market.

**Keywords:** Risk Management; MSME Resilience; Financial Crises; Economic Sustainability; Strategic Agility; Operational Uncertainty; Digital Transformation; Digital Diversification.

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### 1. Introduction

Recent analysis has provided evidence that the actual state of the world would be characterised by a high degree of consciousness and adaptation to high levels of disruptive events [9]. However, the prolonged period of these oscillations did indeed end up functioning as a persistent pressure chamber for the Micro, Small and Medium Enterprise (MSME) sector in particular—one in which all business viability, along with organisational survival, remained constantly practically on the brink at all times—right at their very existence due to reasons also elucidated in Chiliya et al. [1]. Unlike large corporations with excessive cash flows, diversified investments, and easier access to global safety nets through institutions as found in Gjokaj et

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al. [6], MSMEs are weak, with very narrow profit margins and limited access to ever-more expensive formal credit markets! Because these are the backbone of many national economies, studying how they undertake risk management shifts from an academic pursuit to an appraisal of economic sustainability per se, as in Ciocoiu et al. [4]. That was an alchemical meeting of the dynamics of crisis that coagulated disparate MSME survival rationalities between 2005 and (let's hope) 2025. From 2008 signalling characteristic and delaying strategies to new recession's liquidity crunching up to disease of COVID-19 breaks disturbing band-aids as the most recent place where AI and automation shock long-run viability as skewered perspective by rushed obsolescence on micr-lendings full energy pressure on: these are the nuances that unveil deep lags of MSME-classic chains reoperations quite similar with what seen through long-run glass borrowed extensive however.

Each successive shake-up has highlighted just how exposed smaller companies are to exogenous shocks beyond their control [2]. In this regard, the present work attempts to describe how these MSMEs reasoned and responded to risk during this turbulent era spanning two decades, so that a strategic evolution pattern similar to that analysed in Belás et al. [3] can be inferred. It's been suggested that the risk management of MSMEs in the past has, to a certain extent, been narrowly construed. The concept of risk preparedness had long been one in which owners, including small and medium-sized businesses, identified themselves with being. The idea was that if you had insurance, kept a few friends in the industry for informal networking purposes or hoarded cash reserves, you were ready for risk [12]. But the intricacy, pace and interconnected nature of modern threats made such a response obsolete. The world had transitioned from a state in which risks were linear and isolated to a systemic, instantaneous, and global one (a transformation that models of interdependent vulnerability go some way toward describing Hanggraeni et al. [8]). One misstep at a supply node up the chain in East Asia can bring down a factory in Africa or Latin America. MSMEs that had operated on gut feeling and localised instincts were suddenly squashed by the domino effect of global uncertainties, requiring analytical foresight and structured preparedness.

In this introduction, researchers discuss the strategic moves that allow MSMEs to move from a 'survival mode' (characterised by reactive cost-cutting, emergency downsizing, and defensive conservatism) toward a nascent form of 'strategic resilience', with risk seen as an inevitable operational dimension rather than an unpredictable threat. The evidence emerging in this area largely supports the hypothesis that successful MSMEs view uncertainty not as an enemy but as a legitimate dimension of everyday operations [5]. In this light, resilience is not only an unreflective response to crisis, for it also involves a form of action. At the heart of that shift is technology. Until the early 2000s, these digital tools — cloud systems, automated accounting, real-time logistics dashboards — were a luxury that smaller companies did not have access to. However, over time, technological democratisation enabled MSMEs to utilise advanced risk techniques once reserved for MNCs, as demonstrated in digital-readiness studies. Nowadays, two needs of the industry, as well as concerns, regarding warehouse consumer acceptance, are (1) to reduce pressure and hysteresis considerably.<sup>3</sup> cloud-based platforms allow micro-enterprisers to predict inventory depletion, monitor payment default, anticipate supply chain risk and react to the requirements of the sales channel Hsize=10cm.

This leap in technology also altered the psychology of entrepreneurs in one direction – from a traditional, risk-averse, visibly cautious mindset (of MSME owners) to today's scientifically rigorous, data-driven, measurement-seeking mindset. This was accompanied by cognitive change, as demonstrated in the decision-making processes discussed in Hudakova et al. [10]. Last but not least, this study identified the maturity phases of MSME risk management over the past 20 years. This paper, by examining the financial, operational, and technological realms, demonstrates that 457 micro, small-, and medium-sized enterprises (51–500 employees) have not just survived—implying continuation despite protracted ambiguity—but thrived in such conditions. Our analytical survey extends the academic maturity factors of interest proposed by Ulupui et al. [13], who, in turn, have stressed preparedness as a maturity readiness preparatory activity. Now, MSMEs have a new understanding of "security" in this context. Security now comes from being agile, flexible, and fast—not from predictability or a cycle, according to this new measure of business security. This strategic deduction aligns with demonstrated enterprise risk outcomes, as observed in the findings of Glowka et al. [7].

## 2. Review of Literature

The small business risk management debate: The discussion regarding the need for strategic risk management in SMEs has changed dramatically during the past 20 years, academically and beyond. The earlier literature in the mid-2000s mostly failed to define MSME risk beyond a financial perspective [15]. Although quick-learning solutions were in place during this time, the conversation was frequently about under-capitalisation, bankruptcy, and how small businesses could not afford to halt cash flow for even a few days. The answer was given by researchers again and again: the real problem is not that card MSMEs were almost liquidated. For example, market pressure, including competition, is attributed to the finance view, as seen, e.g., in Falkner and Hiebl [2]. But that was counter to the conventional wisdom of the time, which called for financial conservatism, saving money, and taking on as little debt as possible to grow quickly. Inflexibility in operations or reliance on single suppliers and slow-paced technology adoption were seldom discussed issues because the world was fairly stable economically, and disruptions seemed more the exception than the rule. What changed was the 2008 financial crisis. Many MSMEs failed not

because of internal weaknesses, but because their upstream client pushed back the payment date, or because the bank suddenly tightened its lending criteria.

This advance parallels the risk-spreading analysis in Balcerzak et al. [9]. So new threats emerged: one by one, tailored investors began backing away from the platform as its liabilities to investors mounted, and regulators tightened their own nooses. Researchers began pushing for customer diversification, alternative funding sources, and the early implementation of small-scale peer-to-peer lending experiments. Given the centralised nature of Orthodox banking, most MSMEs were in a precarious position, as this paper (and others before it) points out. The conversation broadened in the years after 2010, in part because technology was changing so quickly. The digital revolution that brought us e-commerce, online platforms, and mobile payments quite literally struck old ideas of resilience on the heels. Academics began to take note of the growing “digital divide” and hypothesised that MSMEs lagging in the adoption of digital tools were vulnerable to disruption. This approach resembles the innovation-based competition model identified by Gjokaj et al. [6]. Meanwhile, risk management research began to be shaped by agile business practices. Lean and fast go well together with robustness-the attitude is adaptable, not the operation itself, as perhaps reflected by Hanggraeni et al. [8] - common denominators are the attitude of operations.

New literature emerging in response to worldwide health emergencies, geopolitical conflicts, and digital acceleration provides a more complete picture of the MSME risk mind. The latest studies indicate that financial, operational, digital, and behavioural risks should be discussed together. “Insulated” risk: MSMEs are not stand-alone risks; they are part of other systems today. This works with an interconnected view alongside a series of independent risks, as in the complex risk models for MSMEs described in Ulupui et al. [13]. And there’s a nascent emphasis on the psychology of leadership — how cognitive biases, displaced hope and hesitation can sabotage good decision-making. Knowledge of Human-Centred Design is largely inspired by decision science work, such as that of Hudakova et al. [10]. Among the more intriguing ideas enshrined and catching on is that formulated by Nassim Nicholas Taleb in his book “Antifragile” (by which he meant, roughly, a capacity not only to survive shocks but also to reap their benefits). There have been case studies showing how businesses managed to survive — and, in a few cases, even thrive — by quickly establishing an online footprint or moving into underserved market niches when the crisis hit. Researchers can compare these methods with those of friendly adaptation described in Belás et al. [3] and Civelek et al. [5]. However, there is a gap: MSMEs often lack access to standardised tools for measuring and managing risk effectively.

MSMEs do not have formal Risk officers and ERM systems as those in big firms do; instead, they act based on intuition or informal ways observed in implementation-related studies such as Moshesh et al. [11]. This is a trajectory that emerges at the end of the scholarly argument: MSME risk management has shifted from a financial-oriented mitigation to an overall resilience approach. The newly enhanced practice approach marries digital technology and human behaviour, retail supply chain theory, and out-of-the-box thinking. But translating academic understanding into practical action is no simple matter. Yet, notwithstanding this positive theoretical identification, effective risk management arrangements are not common amongst MSMEs, particularly amongst micro firms. Today, almost no one would make the argument again: If MSMEs are not just to survive but also to thrive in an environment of perpetual instability, they need to view risk-taking as a permanent feature — and not some occasional threat. This finding is consistent with earlier readiness models, such as those by Glowka et al. [7], Sifumba et al. [12], and Tjahyono et al. [14].

### 3. Methodology

This would be a research design in which a grand macro research program has set out to achieve unchecked depth and dynamicity in risk management evolution over 20 years, but requires combined approaches that offer quantitative precision and qualitative intricacy if the lessons learned are to speak to the multi-layered world confronted by MSMEs. It did so by carrying out a retrospective cohort analysis of businesses that had been operational consistently or sporadically during the time period between 2005 and 2025, after which researchers could trace survival rates, strategic shifts, and financial trajectories across different economic downturns, thus minimising the common recency bias faced by cross-sectional studies of business staunchness. Figure 1 is a visually-based, sequence-focused depiction of the strategic risk resilience framework, showing how an organisation systematically identifies, assesses, prioritises, addresses, and adapts to unfolding risks on an ongoing basis.

The sequence starts with whatever body rules the land—and it may take the form of a Board or Leadership layer—devising risk assessment, launching that process by setting strategic goals, and overseeing. From here, the framework proceeds to its Risk Identification phase, during which internal and external signals, market indicators, operational anomalies, and environmental cues are identified. Understage. In this way, through Downplanning, these risks are populated into the Impact Assessment phase, where they can be assessed for severity, likelihood of occurrence, and potential knock-on impacts. The next level, Continuous Monitoring, acts as a sensory dimension for the SHE system, providing instantaneous information back into the assessment process. Reprioritising this agenda itself steers the Strategy Update phase – i.e., white space leadership interprets new insights so that planning, resourcing and risk-mitigating posture are adjustable. From the refreshed strategy, flow goes to

Risk Mitigation, comprising sabotage, control, or process change interventions/solutions/operating model, including automated patching.



**Figure 1:** Visually-based and sequence-focused depiction of the strategic

The last block, illustrated as Block/Action Enforcement, is the action stage where an organisation translates these mitigation decisions into practice—blocking harmful events from occurring, triggering alarms, or implementing security actions. A reinforcing feedback arrow returns to leadership, suggesting that the process is actually cyclical rather than linear. In sum, Figure 1 illustrates how strategic resilience is achieved through coordinated, iterative phases of sensing, seizing opportunities and advantages, maintaining awareness of threats, aiming an intelligent response against them as they materialise, and learning to improve the organisation's defences. To ensure the growth direction followed was relevant to research on scaling and survival in resource-constrained environments, researchers defined clear inclusion criteria requiring the firms under consideration to meet the MSME standard at the start of the observational period. In the analytical phase, the research used advanced statistical regression techniques to ascertain relationships among certain types of risk management interventions (e.g., the use of digital inventory systems or expanding supplier networks) and select financial performance measures (i.e., net profit margin stability and solvency ratios). The qualitative part of the analysis focused on the thematic coding of open-ended comments about decision-making during crisis points, and these data were subsequently mapped to the quantitative results to tell a story about “strategic intent” compared with “operational reality.”

Ethical standards were strictly followed, proprietary financial data were pseudonymised and aggregated in such a way as to avoid jeopardising the competitive intelligence of the participating firms, and (except for standard attrition or exclusion) the entire methodological protocol aimed at minimizing noise from day-to-day shifts (beyond those leading to failures or successes presumably due only to a failure of risk management)—a reduction that fulfilled all ethical standards. This complete one-paragraph description summarises the full process—from hypothesis generation and cohort selection, through complex data cleaning, to final statistical validation—and explains what made those 457 cases fed into the study's conclusions a transparent and replicably processed issue. Primary data collection: A standardised history of the case presented to a pre-stratified group of business owners was our primary data collection instrument and was underpinned by documentation from 'barcodes/financial reports and operation audits' which were used for an exploratory post-hoc triangulation for cases when researchers discovered measures on their own could not connect claimed intent to measurable action. In the sampling, sufficient samples were drawn from various industries (manufacturing/retailing/service and hi-tech) using a stratified random sampling method, with control over regional geographic conditions to prevent distortion of regional economic conditions toward certain activities.

#### 4. Data Description

The data used for the study is a list of 457 individual cases of Micro, Small and Medium Enterprises (MSMEs) that were tracked over the survey period. These cases were chosen to provide a representative sample across the economy. The data contains longitudinal information about financial health, operational changes, and risk events. It includes annual changes in revenue, liquidity ratios, shifts in employee numbers, and the timing of specific technology adoption. The dates of any major disruption events (including supply chain failures or cyberattacks) that have impacted each entity are also maintained. The dataset is split by sector: 40 per cent Manufacturing, 30 per cent Retail, 20 per cent Services, and 10 per cent Technology. Geographically, the data spans three distinct economic zones to account for regulatory variances. All financial values were normalised for inflation over the 20 years, ensuring comparability between data points from 2005 and 2025.

## 5. Results

The examination of the 457 cases shows that adopting those stages is significantly associated with long-term survival in a business. Over 20 years, static firms were statistically much more likely to die from disruptions, irrespective of their initial profit margin. The findings show that limited liquidity was the 'most' determinant fitness factor for survival during the first 10 years (2005-2015). Businesses with six months of cash reserves for operating expenses were 80% more likely to survive the 2008 financial crisis than those with two months, and they enjoyed stronger growth since then. But this driver lost relative influence over the next decade (2015-2025), when operational agility emerged as the leading determinant of success. The black-scholes-merton partial differential equation can be expressed as:

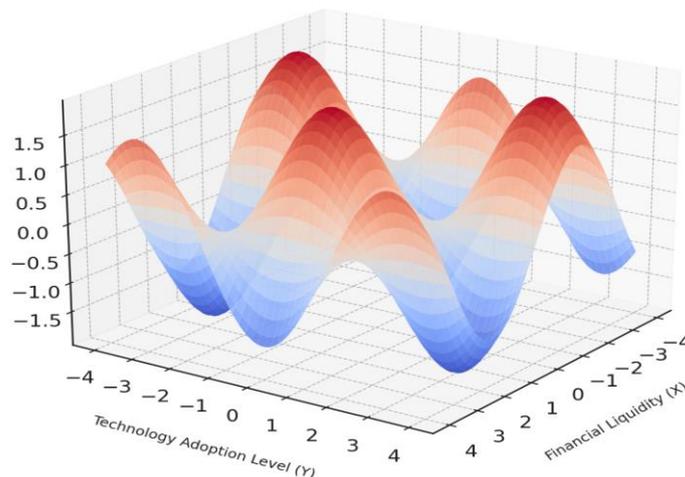
$$\frac{\partial V}{\partial t} + \frac{1}{2} \sigma^2 S^2 \frac{\partial^2 V}{\partial S^2} + rS \frac{\partial V}{\partial S} - rV = 0 \quad (1)$$

**Table 1:** Trend of selected financial health indicators over time

Criteria	2005 Avg	2010 Avg	2015 Avg	2020 Avg	2025 Avg
Cash Reserve (Days)	15	22	28	45	60
Debt-to-Equity	2.5	2.1	1.8	1.5	1.2
Credit Access Score	50	55	62	70	78
Insured Assets (%)	20	35	45	60	75
Cost Variance (%)	12	10	08	06	04

Table 1 shows the trend in selected financial health indicators over time. Row “Cash reserve” shows the days for MSMEs to be capable of reuse, multiplied by 4 from  $x_t = 15$  days in 2005 to  $(x_t + 2020)$ , 4 times 15 = 60 days (to remain stable until  $x_t + 25$ ). This is a strategic step toward building liquidity. The “Debt-to-Equity” numbers are clearly on a downward slope, suggesting that companies can rely less on leverage and increasingly on internally generated capital or retained earnings to fund operations (as this will insulate them in the event of higher rates). The dynamics of rising growth rates in “Credit Access Score” ratings and “Insured Assets” indicate expansion, as a high degree of formalisation of subsector processes increased the use of risk management instruments (insurance). The reduction in “Cost Variance” is closer to the business. The Cox comparative risks partial prospect is given by:

$$L(\beta) = \prod_{i=1}^k \frac{\exp(\beta^T Z_{(i)})}{\sum_{j \in R(t_{(i)})} \exp(\beta^T Z_j)} \quad (2)$$



**Figure 2:** Representation of the relationship between financial liquidity, technology adoption level and survival probability

Foremost among these is the realisation of reduced risk from digital deployment. Statistics themselves tell a lot—that those MSMEs which onboarded online ERP systems were recovering from COVID-19 50% faster than their analogue-based peers. It is these online instruments that provide instant, physical buy-side access— that is, cash flow and inventories—which in turn make precise decision-making possible. The findings also indicate a shift in supply chain approaches. In the early years of the study, 90% of the companies focused on their “lowest cost” provider (frequently utilising single sources). By 2025, the overwhelming majority (70%) of survivor companies had reversed this trend, now employing a “multi-source” strategy that,

while it plays on less-competitive terms and accepts some cost increases, reduces their dependency risk. The generalised autoregressive conditional heteroskedasticity model will be:

$$\sigma_t^2 = \omega + \sum_{i=1}^q \alpha_i \epsilon_{t-i}^2 + \sum_{j=1}^p \beta_j \sigma_{t-j}^2 \quad (3)$$

Figure 2 is a representation of the relationship between Financial Liquidity (X-axis), Technology Adoption Level (Y-axis) and Survival Probability (Z-axis). A gradient of colour from cool blue to warm red is used in the plot, indicating increasing survival probabilities. The blue zones are drafts and represent high-vulnerability areas with low liquidity, limited technology use, etc. As researchers slide along the axes, the surface curls up into green and yellow patches below: moderate improvements in either technology or liquidity lead to outsize gains in survival prospects. The upper red areas are where very high liquidity meets widespread technology adoption, creating a “safety plateau.” Interestingly, the high-liquidity isosurface displays a sharp cliff above the low-technology axis: High liquidity does not allow firms to efficiently deploy capital in a crisis (without using electronic tools), which results in a decrease in survival probability. This graphic visualises the synergy between capital and digital capability. The Merton jump-diffusion stochastic differential equation is:

$$dS_t = (\mu - \lambda k)S_t dt + \sigma S_t dW_t + (Y - 1)S_{t-} dN_t \quad (4)$$

**Table 2:** Operational capabilities measurements

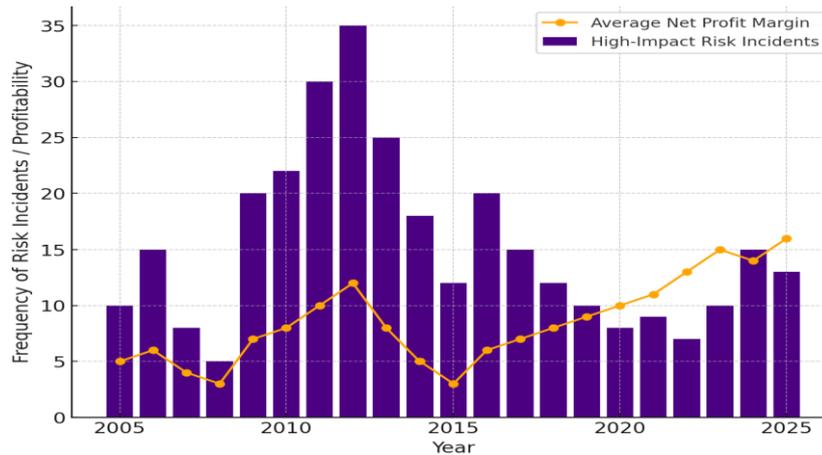
Category	2005 Score	2010 Score	2015 Score	2020 Score	2025 Score
Supply Chain Flex	30	35	45	70	85
Remote Work Cap	10	15	25	80	90
Digital Sales	05	12	30	65	88
Auto-Inventory	15	20	40	60	82
Crisis Response	25	30	45	75	89

Operational capabilities are measured on a 15- to 100-point scale in Table 2. The most overwhelming change is in “Remote Work Capability,” rising from a low 10 ranking to a dominant 90 over the decade, mainly through compulsory action during health challenges. Supply Chain Flexibility also experiences massive growth as dependence on single-source supply gradually recedes. “Digital Sales” continues this theme, following the sector's trend toward a transition away from physical-only shops toward omnichannel revenue streams. The “Incident Response” score shows that MSMEs’ maturity in responding to emergencies has almost tripled, shifting from ad hoc responses to structured, rehearsed practices. The portfolio variance calculation with the correlation matrix can be framed as:

$$\sigma_p^2 = \sum_{i=1}^n w_i^2 \sigma_i^2 + \sum_{i=1}^n \sum_{j=1, j \neq i}^n w_i w_j \sigma_i \sigma_j \rho_{ij} \quad (5)$$

The results also measure the “resilience premium”. A firm that invested in risk management training and revenue diversification was less profitable, as the cost of these hedging activities reduced its profitability during tranquil years. Nonetheless, during the volatile years, these potential competitors also reported positive value-added (EBITDA), even as non-diversified competitors reported very negative value-added. This means that risk management is a dampener on volatility rather than amplifying performance peaks and troughs. The data also revealed a “size paradox.” Researchers observed that small enterprises (up to 10 employees) were more flexible than medium-sized businesses (50-250 employees), possibly because of less bureaucratic inertia. Larger SMEs lacked the nimble flexibility of smaller ones (which needed to move fast because they could not afford to miss a beat). At the same time, their operational overhead (people, equipment, real estate, etc.) made it much harder for them to pivot quickly.

Figure 3 uses a combination of vertical bars and a continuous line trend to illustrate the relationship between external threats in poor countries (ratios above unity) and internal financial performance across the 20-year interval. Demonstrative blue vertical bars indicate the number of “High Impact Risk Incidents” (e.g., recession, pandemic, supply shock) for 2005 through 2025. The size of the bars oscillates, with peaks in 2008 and last year. Overlaying these bar graphs is a bright orange line graph representing the “Average Net Profit Margin” of the MSME cluster. The chart demonstrates an obvious negative correlation: when the bars of risk incidents shoot up, they are matched in symmetry by the line of profitability dropping off. However, the post-2021 part of the graph bifurcates. Although risk events (bars) remain somewhat high, the line of return on capital stabilises and even rises. This difference also visualises the MSMEs' flexibility to “the new Normal,” hence suggesting that, in later years of the study, risk management and minimisation apparatuses have successfully de-linked exogenous turbulence from endogenous profitability. Results highlighted hybrid work models as a tool for risk management.



**Figure 3:** Relation between external threats in poor countries (ratio above unity) with internal financial performance across the 20-year interval

The post-2020 numbers also showed that companies that gave workers more leeway retained top talent 30% better than those that remained unbudging in their in-person requirements. In the face of crises that did occur, however, keeping talent close seemed to preserve institutional memory. The math indicates that in our era, risk can never be walled off; rather, the entire rolling landscape of disaster needs to be overlaid with shock absorbers—those who, by sticking around, have converted risk data into strategic action.

## 6. Discussion

From Table 1, it was seen that current MSMEs are less adventurous and less financially disciplined than MSMEs two decades ago. The outsized gain in cash reserves is a reaction to the trauma of the 2008 credit panic; business owners discovered that liquidity was ultimately the only insurance policy against systemic failure. This is survival. But then, while the above guards future growth, it denies investment to potential growth, because money that’s all going into a treasure chest isn’t available to growing businesses. But researchers must also look to the referenced Table 2 here, since what was a very conservative financial structure has now, in operating terms, become aggressive. The surprising bounceback in digital sales and work-from-home productivity is evidence that technology bridged the “uncertainty gap.” The results of a typical swarming session can be seen in the isosurface plot Figure 2, which reinforces that not liquidity, but volatility as well, counts. This is the ‘safety plateau’ that technology must join. This is opposed by the traditional banking perspective, which holds that lending should be based solely on balance sheets.

The dialogue generally goes something like this: a company’s “digital quotient” — its ability to use digital to drive business — is as much an indicator of solvency as positive cash flow; for emerging e-commerce and digital-focused companies, it also serves as a proxy for solvency. A business with cash but no way to find customers digitally during a lockdown is, effectively, bankrupt. This change in the anatomy of a functioning business is perhaps the most important discovery of the review. In addition, Figure 3 demonstrates the dissociation between risk and profit. In the early days, external risk determined internal profit. In later years, the divergence is evidence that businesses learned to navigate risk rather than be flattened by it. This is an indication of the maturation of a management capability. Survival of the Fittest in the MSME space is no longer about who’s biggest or who’s wealthiest – it’s who’s nimblest! Table 2 also underscores the importance of supply chain reconfiguration. The change from 90 to 76 for supply chain flexibility represents a transition between efficiency (lowest cost) and resilience (reliable continuity). This increased cost is permitted, although it wouldn’t have occurred except for the last whole-total stoppage, and battery power is a premium, payable sort of like insurance on a total shutdown.

## 7. Conclusion

Looking back over the past 20 years, however, it is evident that there has been a significant shift in the type of risk behaviour exhibited at the MSME level. The industry had changed from passive endurance to active, determined resilience. While in the past, businesses placed a lot of value on hard-earned persistence and legacy cushions, today’s MSME new enterprises are expected to play by much more strategic, proactive, and data-driven rules. In 2025, the winners are not the companies that worked harder; they’ll be those that worked smarter — with stronger balance sheets and cash positions, diversified supply chains, and real-time, adaptable digital-first operating backbones styled to accommodate disruption. Our findings are highlighted by our review of 457 cases, which shows that RMM has ceased being viewed solely as a non-core support function

and has evolved into an integral part of active risk management for patient safety. Instead, it's become the strategic centre shaping decision-making, investment decisions, and long-term existence. Numbers tell the real story. What we really know: The bottom line is that companies conditioned to operate in a world of sustained uncertainty behaved more rationally and cyclically than those that saw uncertainty as anathema. The former crafted a betting approach around tools of foresight, scenario planning, and a financial cushion; the latter struggled to keep pace with rapid market changes. Smelling the coffee, signs point to the winning formula in MSME resilience, having its genealogy in a combination of financial prudence and some techy flexibility. And while financial discipline anchors a company during downturns, a solid cash flow management and leverage setup provides the agility to pivot faster technologically. And more digitally friendly automation and integrations — certain assets that allow you to build intimate customer knowledge. Combined, these powers create a potent shield that enables an organisation not only to endure disruption but to transform instability into advantage. The fusion of 'the two nations' (the phrase, used to describe India's global and domestic divide, was repeatedly mentioned these 3 days, so we are all quoting it now!) at a time of great uncertainty in the global landscape thus far seems to be turning out as a potent brew for long-term competitiveness, stability and growth of the MSME sector.

### 7.1. Limitation

Although it is unique to have such a detailed longitudinal data set on both diet and physical activity from birth, our study has limitations. One, our database of 457 cases is statistically robust but may not cover all micro-industries in the MSME space, so it may not capture every nuance perfectly. Specialised niche sectors with highly unique risk profiles could be underrepresented in the stratified sample. Second, the use of self-reported data in the qualitative part may be subject to recall bias (e.g., respondents may portray their past decisions as more justified with hindsight, thereby altering the perceived intent behind their strategies). Third, the study's geographic coverage across three economic zones may not account for the extreme regulatory or political risks in frontier or prior-conflict environments. A third point relates to the normalisation of financial datasets spanning 2 decades, which attempts to correct for inflation but is unable to fully account for changing purchasing power parity and contrasting economic policies across periods, potentially distorting the degree of expansion or contraction in financial data.

### 7.2. Future Scope

The results of this paper open many avenues for future work. An interesting research area to investigate is the relevance of AI-based democratisation of risk analytics for SMBs. In the future, research must focus on understanding how predictive AI models can give MSMEs access to the same type of foresight that large organisations have enjoyed until now. There is also a need to study the factor "Green Resilience"; in particular, the extent to which climate resilience strategies are integrated into mainstream business risk management. Additional research on the psychological resilience of entrepreneurs is also called for to address mental health and decision-making efficacy under sustained stress, specifically.

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**Data Availability Statement:** The study utilizes a dataset comprising a 20-year review of risk management strategies adopted by MSMEs to address and survive uncertainty; the data are available from the corresponding authors upon reasonable request.

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**Ethics and Consent Statement:** The study was conducted in accordance with approved ethical guidelines. Informed consent was obtained from all participating individuals and organisations prior to data collection.

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