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HOW EGYPTIAN MANUFACTURING SMEs CAN PROTECT WORKING CAPITAL DURING INFLATION?

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Abstract: This study examines how Egyptian manufacturing small and medium-sized enterprises (SMEs) endured and adapted to the severe inflationary period of 2022–2024. Using an integrated mixed-methods approach that combines qualitative interviews with multiple case studies, the research identifies, analyzes, and validates practical strategies that enhance SME financial resilience during periods of acute macroeconomic instability. The study extends theoretical understanding of SME resilience under macroeconomic crises by integrating dynamic capabilities, working capital management, and inflation adaptation into a unified framework tailored to emerging markets. It contributes localized, evidence-based insights to the business administration literature, demonstrating how firm-level agility can mitigate systemic inflationary pressures. From a managerial perspective, the findings provide a tested strategic roadmap for SME owners and financial managers to strengthen liquidity management, optimize fixed-cost allocation, and sustain profitability throughout inflationary cycles. For policymakers and financial institutions, the study highlights the need for structural reforms to improve SME access to foreign currency, affordable credit, and energy-efficiency investments. The research concludes that inflation, while inevitable, can be effectively managed through coordinated micro-level strategies that safeguard liquidity, stabilize working capital, and protect profitability. By transforming inflation from an uncontrollable external shock into a navigable

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economic reality, Egyptian manufacturing SMEs can sustain productivity, preserve employment, and contribute to national economic stability.

Keywords: Inflation, Small and Medium-Sized Enterprises (SMEs), Working Capital, Egypt.

1. INTRODUCTION

Small and medium-sized enterprises (SMEs) are key contributors to employment and GDP globally, accounting for nearly 90% of firms and over 50% of jobs worldwide (World Bank, 2020). In developing economies like Egypt, their role is even greater, representing approximately 40 % of GDP and forming the backbone of the manufacturing sector. Despite this importance, SMEs remain vulnerable to macroeconomic shocks, particularly inflation, due to their limited financial resources, restricted access to credit, and small operational buffers (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2011).

Inflation erodes purchasing power, raises input and energy costs, and increases interest rates, collectively straining SMEs' liquidity and working-capital cycles. Inflation also disrupts inventory management, delays customer payments, and elevates borrowing costs (Altman & Hotchkiss, 2010; Karadag, 2015). Egyptian SMEs faced these challenges acutely in 2023 when inflation surged beyond 40 %. The resulting increases in direct material (DM) costs and operational expenses destabilized working-capital efficiency and gross margins, leaving many firms financially distressed. Manufacturing SMEs in Egypt experience substantial financial stress during inflationary periods because of their limited flexibility and dependence on imported inputs. Rising costs and reduced liquidity lead to production cuts, late payments, and, in severe cases, business failure. Figure 1 depicts the relationships of this study. The main purpose of this is to identify applicable strategies that mitigate inflation's negative impact on working capital and liquidity, reducing the risk of liquidation. In particular, determine what strategies can Egyptian manufacturing SMEs implement to mitigate the effects of inflation on working capital and improve liquidity? Identify and analyze inflation's effect on SMEs' working capital and liquidity. Examine adaptive strategies employed by Egyptian manufacturing SMEs during high inflation. Develop a strategic framework that enhances SME financial resilience. Validate the proposed model for theoretical and practical relevance.

This study contributes to the literature on SMEs, by offering evidence-based financial practices; to policy makers, by highlighting institutional reforms necessary to facilitate SME finance; to financial institutions, by improving understanding of SME risk structures; and to academia, by bridging the gap between macroeconomic theory and micro-business financial resilience in developing economies (Beck & Demirgüç-Kunt, 2006).

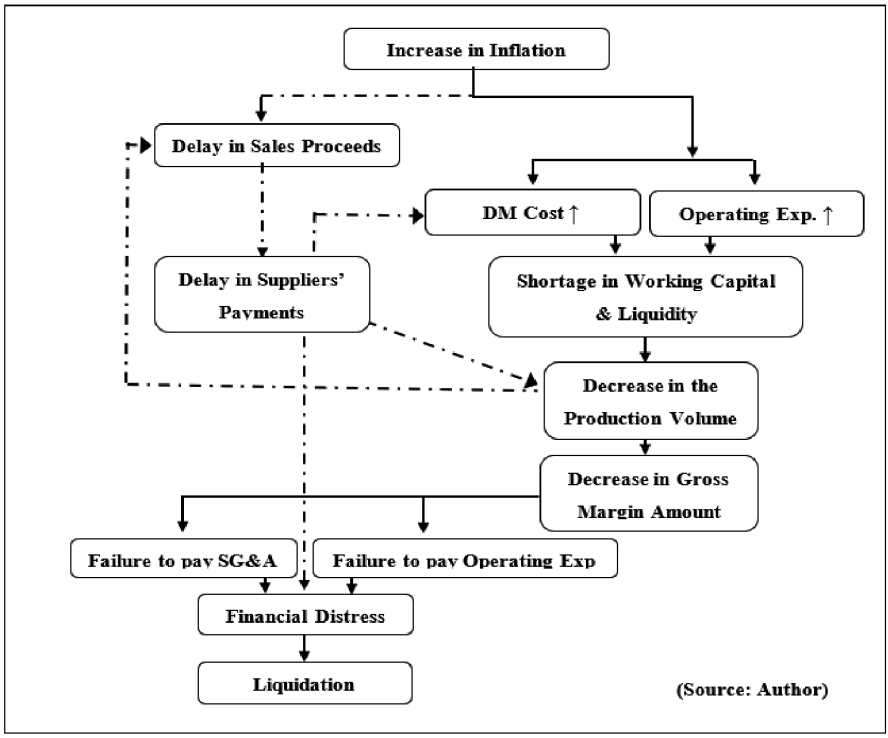

Figure 1: Main relationships in the study

Source: Authors' own creation

2. LITERATURE REVIEW

2.1. Main Consequences of Inflation

Inflation has several consequences on firm operations, liquidity, costs and profits. Working capital defined as the difference between current assets and current liabilities is a critical measure of short-term financial health (Deloof, 2003).

Inflation disrupts this equilibrium by raising input costs and operating expenses faster than revenues, therefore, SMEs face a working-capital

squeeze as outflows accelerate while receivables remain static (Banos-Caballero, García-Teruel & Martínez-Solano, 2010).

Profitability declines, reinvestment ability weakens, and financial vulnerability increases (Lazaridis & Tryfonidis, 2006).

Liquidity, the ability to convert assets into cash to meet short-term obligations, is paramount for SME survival (Kimutai, 2022). Inflation diminishes liquidity by increasing both production and borrowing costs. Higher interest rates imposed by central banks tighten monetary conditions, raising financing expenses (Gertler & Gilchrist, 1994). As access to credit declines (Carpenter & Petersen, 2002), SMEs rely on more expensive short-term finance or reduce operations, exacerbating insolvency risk.

Inflation lengthens the cash conversion cycle the time taken to transform inventory into cash from sales. Rising input costs and delayed customer payments extend CCC durations, further depleting liquidity (Gill, Biger, & Mathur, 2010), especially during pandemics and market crash periods (Said & ElBannan, 2025). SMEs serving financially strained customers experience compound effects, as receivable delays cascade across value chains.

Inflationary responses by central banks increase interest rates, inflating the cost of borrowing. This constraint is particularly severe for SMEs, which have limited access to affordable credit (Ayyagari et al., 2010). Banks, acting pro-cyclically, tighten credit standards, and SMEs lose financing options (Ayyagari et al., 2010).

Inflation compresses profit margins when rising input prices cannot be fully passed on to customers. SMEs operating in competitive markets encounter substantial margin erosion (Deloof, 2003). Reduced profitability shrinks internal financing sources, forcing dependency on costly external credit, intensifying liquidity risk.

Emerging markets are characterized with weak financial systems, high information asymmetry, high inflation, which amplifies liquidity and credit challenges (Farooq & ElBannan, 2019; ElBannan & Farooq, 2019; ElBannan & ElBannan, 2015). African evidence indicates that inflation and macroeconomic instability exacerbate working-capital constraints among SMEs (Bigsten et al., 2003). Inflation volatility, weak institutions, and limited collateral availability make small firms disproportionately vulnerable (Ayyagari et al., 2010).

2.2. Mitigating the Impact of Inflation on (SMEs)

The academic literature emphasizes that successful mitigation of inflationary pressures requires a comprehensive strategic approach that integrates financial prudence, operational optimization, customer engagement, and technological transformation.

First, build resilience through proactive planning. Scenario planning prepares SMEs for multiple future outcomes under uncertain conditions (Schoemaker, 1995).

Second, reduce reliance on one product or market. Diversification across products, services, or market segments reduces dependence on any single source of income, thereby moderating inflation exposure (Markides, 1997. Third, strengthen liquidity, improve collection, manage debt. During inflationary phases, accelerating receivable collections and renegotiating payment terms with suppliers can preserve liquidity (Shin & Soenen, 1998). Fourth, share resources, reduce procurement costs, improve bargaining power. Collaborative networks enhance resource sharing and reduce procurement costs (Dyer & Singh, 1998). Fifth, boost productivity, spread costs, improve competitiveness. Digital transformation and technological scaling are indispensable for increasing productivity and offsetting rising cost pressures (Brynjolfsson & Hitt 2000). Sixth, diversify suppliers, negotiate better terms, control costs. Effective supply chain management is vital to mitigate risks associated with inflation (Christopher & Towill, 2001). Seventh, adjust prices in real time, transfer costs to customers. SMEs need to evaluate their product value in relation to consumer perceptions instead of solely focusing on production costs (Elmaghrab & Keskinocak, 2003). Eighth, build loyalty, retain customers despite price increases. Enhancing customer experience is a key differentiator during inflationary times (Prahalad & Ramaswamy, 2004). Ninth, sincentives, subsidies, or regulation support. Effective engagement with policymakers and regulators can shape favorable business environments during inflationary periods (Hillman, Keim, and Schuler, 2004). Tenth, reduce waste, improve margins, and sustain profitability. SMEs should analyze their operational processes to identify inefficiencies and explore automation to reduce labor costs (Porter, 2008). Eleventh, protect against FX/energy risk through derivatives or insurance. Financial risk management through derivative instruments or insurance serves as a buffer against exchange rate volatility

and energy price shocks (Bartram, Brown, and Fehle (2009). Twelfth, retain skilled employees despite inflation pressures. During inflationary periods, maintaining a skilled workforce becomes increasingly difficult as real wages decline (Bryant, and Vardaman (2010). In addition, access foreign currency revenues to offset local inflation. Expansion into foreign markets provides a natural hedge against domestic inflation and currency depreciation (Love & Ganotakis, 2013). Finally, lower cost structures through automation & digital tools. Digital transformation is a strategic mechanism to reduce operational costs and foster resilience (Vial, 2021). However, applying these strategies within the Egyptian manufacturing SME context remains challenging. Many firms face structural barriers, restricted access to finance, low degrees of digitalization, limited export exposure, and regulatory inertia that constrain strategic flexibility. Consequently, while the global literature provides a robust framework for inflation resilience, localized adaptation is essential. The next phase of this research builds on these theoretical insights to determine which strategies can be most effectively tailored to the operational realities of Egyptian manufacturing SMEs.

3. METHODOLOGY

3.1. Research Design

The study employed a mixed-methods approach combining qualitative exploratory interviews and multiple case studies, consistent with Creswell and Plano Clark (2017). This design enables triangulation between perceptional and behavioral evidence, enhancing validity and depth of understanding. Figure 2 depicts the research design where Three interconnected phases structured the research: **Phase I — Qualitative Interviews:** Twenty-five semi-structured interviews were conducted with SME CFOs and financial managers across five industrial zones (Sadat, Abo-Rawach, 6 October, New Cairo, 10 Ramadan) identified via the Federation of Egyptian Industries (FEI) to explore the impact of inflation on SMEs, understand the coping strategies applied to mitigate the impact of inflation and their effectiveness, and explore the challenges faced SMEs while applying these strategies. **Phase II — Multiple Case Studies:** Five case studies; three for successful SMEs to identify the common success patterns across several SMEs in different areas and different industries. Two case studies for struggling SMEs

to identify the common struggling patterns across different SMEs in different industries and in different areas. **Phase III — Framework Development and Validation:** Themes emerging from qualitative and case data were synthesized into the Integrated Inflation-Resilience Framework, which was validated using Lincoln and Guba's (1985) trustworthiness criteria: credibility, dependability, confirmability, and transferability and reformed by Yin (2018) to Construct & Internal Validity, Reliability, Construct Validity, and External Validity.

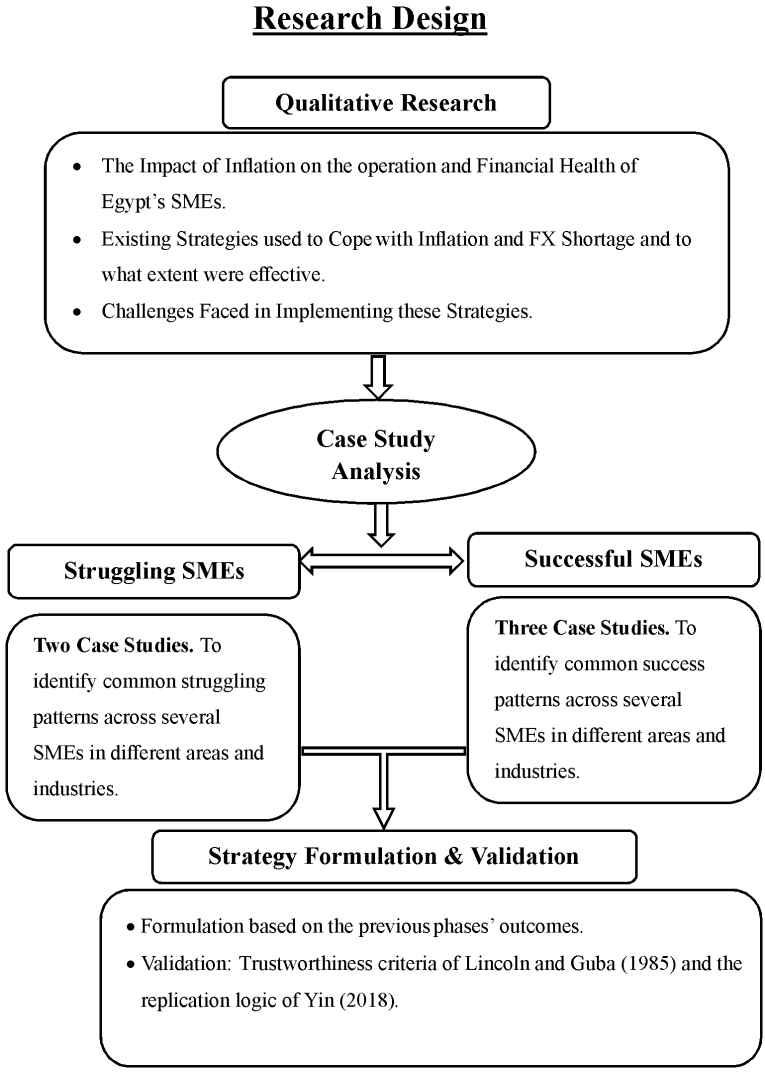

Figure 2: Research Design

Source: Authors' own creation

3.2. Data Collection and Analysis

The sample size includes 25 SMEs, selected through purposive sampling "Criterion Sampling" to ensure diversity in firm size, industry, and location, interviews conducted with CFOs and Financial Managers of Egyptian manufacturing SMEs located in Five Egyptian industrial areas (Sadat, Abo-Rawach, 6 October, New Cairo, and 10 of Ramadan). Table (1) presents the SMEs included in our sample with 50-200 employees and with total revenues between EGP 50M – EGP 200M engaged in manufacturing sectors such as textiles, cooling and ventilation, plastic manufacturing, medical supplies, and food processing. Regarding the data analysis, Gioia methodology was adopted following the interpretive procedures described by Magnani and Gioia (2023). The Gioia approach provides a systematic inductive framework for concept development that connects participants' lived experiences (1st-order concepts) to higher-order theoretical themes and finally to aggregate dimensions that contribute to new theoretical understanding.

Table 1: Sample breakdown

SME Area	*SME Sector*	*Enterprise Size*		*Number of Interviews*	*Face-to-Face*	*Virtual*
		Medium	*Small*			
10th of Ramadan	Medical Devices and Supplies	1		1	1	
	Metal Furniture	2		2	1	1
	Plastics Manufacturing		1	1		1
	Ventilation & Cooling Devices	1		1	1	
		4	1	5	3	2
6th of October City	Electronics Manufacturing	1		1		1
	Medical Devices and Supplies	2		2	2	
	Plastics Manufacturing		1	1		1
	Ventilation & Cooling Devices	1		1		1
		4	1	5	2	3
Abo-Rawach	Carton Manufacturing		1	1	1	
	Foam Plats and Packing	1		1		1
	Manufacturing Self-Adhesive Tapes		1	1	1	
	Metal Packs		1	1		1
	Ventilation & Cooling Devices	1		1	1	
		2	3	5	3	2
New Cairo	Food Processing	1	1	2	1	
	Manufacturing		1	1	1	
	Manufacturing (Textiles)	1		1	1	
	Plastics Manufacturing	1		1	1	

SME Area	*SME Sector*	*Enterprise Size*		*Number of Interviews*	*Face-to-Face*	*Virtual*
		Medium	*Small*			
		3	2	5	4	0
Sadat City	Food Processing	1		1	1	
	Manufacturing (Textiles)		2	2	1	1
	Medical Devices and Supplies		1	1	1	
	Printing & Packing	1		1	1	
		2	3	5	4	1
		15	10	25	16	8

4. DATA ANALYSIS AND RESULTS

4.1. Phase 1 Results - Qualitative Research

4.1.1. Impact of Inflation on SME Operations and Financial Health

The analysis of 25 semi-structured interviews revealed that inflation had a pervasive and damaging effect on all aspects of SME operations and financial stability in 2023, when inflation in Egypt exceeded 40%. Nearly all respondents (92%) reported severe liquidity tightening that led to delayed payments, growing debt, and disrupted production cycles, confirming prior research that inflation destabilizes firms' financial fundamentals (Deloof, 2003; Baños-Caballero et al., 2010).

Raw-material costs rose by 35–40%, especially in import-dependent industries such as plastics, textiles, and metal fabrication, where currency depreciation compounded procurement costs. Energy and transportation expenses also surged, forming roughly 20% of total overheads. Labor costs increased as 68% of firms raised wages to offset the rising cost of living, further straining cash flow. Additionally, 64% of participants reported foreign-currency shortages that delayed imports of spare parts and caused production stoppages.

Working-capital cycles lengthened for 72% of firms as customers delayed payments and suppliers shortened terms, forcing many SMEs to rely on expensive short-term debt—illustrating the pro-cyclical behavior of financial institutions in tight-money conditions (Kimutai, 2022; Demirgüç-Kunt et al., 2017). Ultimately, all firms (100%) experienced reduced profit margins, with average erosion of 15–25 percentage points. Managers attributed this to higher input and energy costs, exchange-rate volatility, and the inability to pass price increases to consumers in Egypt's highly price-sensitive market (Karadag, 2015; Bigsten et al., 2003).

Table 2: Perceived Primary Effects of Inflation on SME Operations

Perceived Primary Effect	*SMEs Reporting %*	*Description / Observed Effect*
Increase in raw-material costs	96%	Identified as the main driver of inflationary pressure and margin erosion; average cost escalation = 35 - 40 %.
Higher energy and transportation costs	84%	Substantial Increase in fuel and electricity prices led to higher distribution and production costs.
Increased labor cost / wage pressure	68%	Frequent salary increases are required to retain skilled staff; further strain on payroll budgets.
Foreign-currency scarcity	64%	Delayed imports and supplier payment bottlenecks due to limited USD availability.
Reduced liquidity / stretched cash flow	72%	Working-capital squeeze resulting from late receivables and rising borrowing costs.
Drop in profit margins	100%	Direct consequences of inflation-driven cost rise and price-sensitive domestic market

Source: Author's analysis based on interview dataset

In summary, this section shows that the inflationary environment of 2023 affected virtually every input cost and liquidity parameter of the sampled firms. Inflation not only increased production and administrative spending but also disrupted the timing of cash flows, leading to constrained financial flexibility and declining operational stability. These observed effects provide the empirical basis for discussing coping strategies and their relative effectiveness in the following section.

4.1.2. Coping Strategies and Their Effectiveness

Participants reported adopting multiple overlapping strategies to mitigate the impact of inflation on their businesses and maintain the normal profit margin they are doing every year. These strategies are in line with the international research covered in the literature review (Porter, 2008; Elmaghraby & Keskinocak, 2003; Brynjolfsson & Hitt, 2000).

Table 3: Implemented Inflation-Mitigation Strategies

Strategy Type	*Intended Goal*	*SMEs Applying %*
Dynamic Pricing Strategies	Adjust prices in real time, transfer costs to customers	68%
Supply Chain Optimization	Diversify suppliers, negotiate better terms, control costs	60%
Cost Management Initiatives	Reduce waste, improve margins, sustain profitability	72%
Financial Prudence / Tightening Credit Terms	Strengthening liquidity, improving collection, and managing debt	40%
Risk Hedging / Price Agreements	Protect against FX/energy risk through derivatives or insurance	24%
Export Diversification	Access foreign currency revenues to offset local inflation	16%
Technology Investment	Boost productivity, spread costs, improve competitiveness	20%

Source: Author's analysis based on interview dataset

Interview findings revealed wide differences in how effective SMEs perceived their anti-inflation strategies to be. Most firms applied several tactics; dynamic pricing, cost control, and supplier renegotiation, but success depended on factors such as market position, dependency on imported inputs, and liquidity strength.

Dynamic pricing was judged the most effective tool, cited by about 40% of participants as crucial for balancing cost recovery with customer retention. Around 24% found supplier renegotiation or hedging helpful, particularly in import-reliant sectors like plastics and metals, though many noted suppliers often broke fixed-price deals. Only 12% reported export diversification as effective, using foreign-currency earnings to ease liquidity stress, while 8% saw results from cost-efficiency initiatives such as waste and energy reduction. Finally, 16% said none of their responses worked, blaming rigid industrial structures, weak demand, and limited financial flexibility.

Dynamic pricing proved the most effective response for SMEs capable of leveraging customer trust and data-driven pricing. Many reviewed prices monthly or per production batch, matching adjustments to supplier cost changes

Table 4: Ranked Effectiveness of Implemented Coping Strategies

Strategy Implemented	*SME Ranking as Most Effective (n)*	*Percentage (%)*	*Interpretation / Key Insight*
Dynamic Pricing	10	40%	Enabled short-term adjustments to recover partial cost increases and maintain operating liquidity.
Supplier Renegotiation / Hedging	6	24%	Provided limited stability; effective only when suppliers honored locked-in prices or extended payment terms.
Export Diversification	3	12%	Generated new foreign-currency inflows, reducing reliance on the volatile Egyptian pound.
Cost & Efficiency Improvements	2	8%	Offered marginal gains; impact overshadowed by scale of input inflation.
Non-Effective / Negative Outcomes	4	16%	Strategies failed due to systemic constraints (foreign-currency scarcity, price rigidity, weak purchasing power).

Source: Author's analysis based on interview dataset

and maintaining customer loyalty through transparent communication, tiered pricing, and discounts. These results echo Elmaghraby and Keskinocak (2003), showing that data-based, customer-oriented pricing sustains margins and competitiveness during inflation.

About one-quarter of firms achieved moderate success with supplier renegotiation and hedging, using bulk purchases, long-term contracts, and price-locking to curb raw-material volatility, particularly in plastics, metals, and electronics. Yet suppliers often breached agreements as market rates rose, and foreign-exchange instability made such arrangements unreliable without access to derivatives (Bartram et al., 2009).

Roughly 12 % of SMEs benefited from export diversification, gaining liquidity stability and FX revenue that offset domestic inflation, in line with Love and Ganotakis (2013). Still, most faced regulatory, certification, and logistical barriers that restricted export growth.

Only 8% reported meaningful gains from cost-cutting or efficiency initiatives, such as waste and energy reduction. Workforce downsizing often reduced productivity, illustrating Porter's (2008) warning that excessive cost leadership can undermine operational capacity.

4.1.3. Challenges in Implementation and Contextual Variation:

While Egyptian manufacturing SMEs adopted multiple coping strategies to mitigate the impact of inflation, the effectiveness of these strategies was significantly constrained by both implementation challenges and contextual variations related to firm size, industry characteristics, and geographical location.

Respondents consistently underscored that even carefully developed strategies, including dynamic pricing, supplier renegotiation, or cost management, produced negligible outcomes when faced with structural market obstacles, institutional limitations, and infrastructural inefficiencies.

More than 90 percent of participating SMEs confirmed facing substantial barriers in executing their inflation-response strategies. The dataset revealed the three most pressing categories of challenges as shown in Table (5).

Table 5: Key Implementation Challenges Reported

Challenge Category	*Firms Reporting (%)*	*Description / Observed Outcome*	*Representative Quote*
Customer resistance to price increases	88%	Weak domestic purchasing power: price revisions led to volume declines ≥ 25 %.	"Customers refused every new price list; we lost clients to informal competitors."
Access to foreign currency	76%	Hard-currency scarcity hindered import of raw materials and spare parts.	"Suppliers demanded payment in USD upfront; procurement halted for weeks."
Limited access to finance / high interest rates	68%	Borrowing costs increased beyond sustainable limits; liquidity gaps widened.	"Banks raised rates to 27 %, blocking working-capital renewal."
Supplier inflexibility	60%	Suppliers increased minimum-order requirements, refusing long-term contracts.	"Suppliers stopped shipping orders; only cash in advance cash payments were accepted for new orders."

Challenge Category	*Firms Reporting (%)*	*Description / Observed Outcome*	*Representative Quote*
Supply-chain and logistics delays	44%	Port queues, high freight costs, and slower customs clearance disrupted production.	"Import clearance too more than two months instead of three weeks."
Workforce retention and salary escalation	40%	High employee turnover due to wage erosion; difficulty in retaining skilled staff.	"Key technicians left for Gulf jobs; we trained replacements from scratch."

Source: Author's analysis based on interview dataset

The findings showed a strong alignment with prior research emphasizing that SMEs are more vulnerable to financing constraints, credit market imperfections, macroeconomic shocks (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2010; Beck et al., 2005).

4.1.4. The Impact of Inflation on Key Financial Indicators:

The analysis examines variations in four key performance metrics: production and sales volumes, total revenue, gross profit margins, and net profit margins, across the three-year span from 2022 to 2024, encompassing the pre-inflation stability, the inflationary shock of 2023, and the ensuing partial recovery phase of 2024.

Findings indicate that inflation had significant impacts on both operational capacity and financial structure. While nominal revenues increased due to price adjustments, real profitability declined substantially because the rate of cost inflation outpaced pricing flexibility. Several participants stressed

Table 6: Average Production and Sales Volume Trends

Year	*Mean Change (%)*	*Relative Index (2022 = 100)*	*Description / Observation*
2022	Baseline (0 %)	100	Operations at full capacity; stable domestic and export demand.
2023	–28 %	72	Contraction caused by supply shortages, raw-material price surges, and customer demand suppression.
2024	22 % (vs 2023)	88	Partial recovery enabled by improved input availability, enhanced inventory management, and enhanced demand.

Source: Author's analysis based on interview dataset

that the apparent increase in revenue was mostly "nominal" and did not lead to improvements in cash flow or profits.

Across all sectors, production and sales volumes demonstrated a sharp (28%) decline in 2023, reflecting the height of the inflationary crisis and associated demand decline and supply-chain disruptions.

Although production volumes dipped, nominal total revenues exhibited an upward trajectory across the three-year horizon, primarily driven by inflationary price adjustments rather than real growth. On average, total revenues increased by 10 percent in 2022, 12 percent in 2023, and a further 23 percent during 2024.

Table 7: Average Nominal Revenue Change (2022–2024)

Year	*Mean Revenue Change (%)*	*Revenue Index (2022 = 100)*	*Interpretation*
2022	10%	110	Steady market demand; minimal inflationary effects; stable pricing strategy.
2023	12%	123	Inflationary pricing offset volume loss—cost pass-through effect evident.
2024	23%	151	Improved local demand, minor stable currencies, and efficiency gains generated nominal growth.

Source: Author's analysis based on interview dataset

The combination of rising raw-material, energy, and wage costs led to a steep decline in average gross-profit margins, dropping from approximately

Table 8: Average Gross Profit Margin Trend (2022–2024)

Year	*Average Gross Profit Margin (%)*	*Year-on-Year Change (percentage points)*	*Interpretation*
2022	32%	-	Pre-inflation baseline indicating healthy production efficiency.
2023	12%	-20	Drastic margin erosion due to input-cost escalation and inability to fully pass increases to customers.
2024	26%	14	Partial recovery achieved through dynamic pricing, operational efficiency, and localized procurement.

Source: Author's analysis based on interview dataset

32 percent in 2022 to 12 percent in 2023. This 20-percentage-point reduction represents the most dramatic profitability contraction recorded in the study period.

At the net-profit level, SMEs experienced substantial financial strain. While 2022 registered average net profits of 12 percent, the severe cost shocks of 2023 drove many into temporary losses (average –3 percent). By 2024, the average net margin improved to approximately 9 percent, reflecting gradual stabilization and efficiency gains through automation, supplier diversity, and demand increase.

Table 9: Average Net Profit Margin Change (2022–2024)

Year	*Average Net Profit (%)*	*Year-on-Year Change (percentage points)*	*Description / Interpretation*
2022	12%	Baseline	Healthy margin sustained by managed costs and stable demand.
2023	-3%	-15	Loss period; sharply higher costs and exchange-rate losses.
2024	9%	12	Recovery driven by productivity optimization, subdued inflation, and demand increase.

Source: Author's analysis based on interview dataset

4.2. Phase 2 Results - Case Study:

4.2.1. Case Studies: Successful SMEs

This subsection concentrates on the experiences of three medium-sized Egyptian enterprises that successfully navigated the 2023 inflation crisis. When inflation surged past 40 percent, most manufacturing companies faced simultaneous challenges: sharp increases in the cost of raw materials, scarcity of foreign currency, and reduced consumer demand. Despite this challenging backdrop, the featured companies managed to sustain both operational continuity and financial stability by implementing targeted, forward-thinking strategies customized to their specific sectoral realities.

The first successful case is the SME1, an Egyptian company founded two decades ago and specializing in the production and development of high-quality cosmeceuticals, effectively mitigated the negative impacts of the 2023 inflation crisis, during which Egypt faced inflation rates surpassing 40%. In the face of increasing raw material costs, foreign currency shortages, and

heightened operational expenses, the company adopted a proactive approach focused on diversifying export markets, negotiating strategically with suppliers and clients, and implementing creative pricing models. This case study provides a comprehensive analysis of Successful SME1's methods, the problems faced, and the consequent outcomes, creating a pragmatic model for Small and Medium Enterprises (SMEs) aiming to cultivate resilience and maintain growth in unstable economic conditions.

The company successfully navigated inflation by diversifying into export markets with more stable currencies, generating foreign currency revenues that stabilized cash flow and reduced reliance on the local FX market. It strengthened liquidity through improved supplier payment terms, faster customer collections, and collaboration with banks to secure Letters of Credit. A gradual and adaptive pricing strategy helped retain local customers while maintaining competitiveness in export markets, supported by production optimization and targeted international marketing. As a result, the firm achieved sustained growth despite economic instability, with rising production volumes, strong revenue increases in 2023 and 2024, and largely stable gross and net profit margins, demonstrating effective resilience to inflationary pressures.

The company's 2023–2024 financial and operational results demonstrate strong resilience to inflation, with strategies that stabilized operations and supported growth. Production and sales volumes increased by 10% in 2023 and a further 20% in 2024, driven mainly by export market expansion. Revenues grew by 25% in 2023 and an additional 20% in 2024, reflecting reduced dependence on the local market and successful export diversification. Despite inflationary pressures, gross and net profit margins remained largely stable, highlighting the firm's ability to protect profitability compared to peers that experienced significant margin declines.

The second successful case SME2, a long-established medical devices and supplies manufacturer, successfully navigated Egypt's severe inflationary environment in 2023, when inflation exceeded 40%, without major financial or operational disruption. Through a balanced strategy combining restrained pricing, operational efficiency, and full utilization of production capacity, the company-maintained profitability while strengthening its market position. By limiting price increases to below market levels, the firm attracted new

customers, stimulated demand, and maximized production volumes, which helped offset rising costs.

These strategies translated into strong operational and financial outcomes. Unlike many competitors that experienced sharp declines in demand, Successful SME2 achieved growth in production and sales volumes, increasing by 5% in 2023 and a further 18% in 2024. Improved cash flow from shorter client payment terms supported stable operations and timely procurement. As a result, the company recorded significant revenue growth of 30% in 2023 and 18% in 2024, demonstrating sustained resilience and the effectiveness of its integrated approach to managing inflationary pressures.

The third successful case SME3, is an Egyptian manufacturer of ventilation and cooling devices, effectively navigated the severe inflationary environment of 2023, marked by inflation exceeding 40% and acute foreign currency shortages. By adopting a controlled pricing strategy, maximizing operational efficiency, and enforcing strict cost management, the company-maintained stability while strengthening its competitive position. Limiting price increases to below market levels helped attract new customers, boost demand, and increase production volumes, reducing fixed costs per unit and supporting liquidity through shorter payment cycles.

These strategies delivered strong operational and financial outcomes. Production and sales volumes increased by 20% in 2023 and continued to grow in 2024, while revenues rose sharply by 40% in 2023 and a further 18% in 2024. Despite short-term cost pressures, the company maintained high profitability relative to competitors, achieving solid gross and net profit margins and demonstrating its ability not only to withstand inflationary shocks but also to achieve sustainable growth.

4.2.2. Case Study: Struggling SMEs

The Egyptian economy in recent years, particularly during the inflationary surge of 2023, presented severe challenges for Small and Medium Enterprises (SMEs) across various sectors. With inflation rates exceeding 40%, many SMEs faced insurmountable financial and operational pressure. Unlike larger firms with access to diversified revenue streams, extensive resources, and robust financial tools, SMEs often lacked the capacity to adapt quickly to such volatile economic conditions.

While some SMEs managed to implement innovative strategies to mitigate the impact of inflation, others struggled to survive. This section introduces two case studies of manufacturing SMEs in the Egyptian market that were unable to effectively navigate the inflationary crisis. Despite their efforts, these firms faced significant operational disruptions, revenue losses, and long-term financial instability. By examining their challenges and limitations, these case studies provide insight into the obstacles that prevent SMEs from successfully mitigating the effects of inflation.

Struggling SME1, a mid-sized manufacturer of ventilation and cooling devices, failed to effectively manage Egypt's severe inflationary pressures in 2023 despite attempting several conventional coping strategies. Efforts to reduce costs through waste minimization and local supply chain adjustments proved insufficient, as rising input, energy, and raw material costs outweighed any savings. The company's response of raising prices by 35–40% and introducing lower-quality products triggered strong customer resistance, leading to declining sales volumes, customer dissatisfaction, and loss of market share. These challenges were intensified by limited access to affordable financing, labor unrest driven by wage pressures, and escalating energy costs due to power outages. Together, these factors undermined operational stability and financial performance, highlighting how inadequate strategic adaptation and structural vulnerabilities can amplify the negative impact of inflation on manufacturing SMEs.

Struggling SME2, a privately owned plastics manufacturer, was unable to effectively manage Egypt's inflationary crisis in 2023 despite implementing several conventional mitigation strategies. Efforts to cut costs through workforce reductions reduced productivity and operational efficiency, while supplier negotiations failed as all suppliers faced similar inflationary pressures. Aggressive price increases of 35% triggered strong customer resistance in a weakened local market, leading to declining demand and loss of market share, while reduced production volumes further increased unit costs and constrained revenues. These difficulties were compounded by structural vulnerabilities, including heavy dependence on imported raw materials, limited access to affordable financing and foreign currency, weak bargaining power, and operational disruptions caused by delayed imports. Together, these factors amplified the impact of inflation and demonstrate how generic cost-cutting

and pricing strategies can be ineffective for SMEs operating in highly volatile and constrained economic environments.

Between 2022 and 2024, Struggling SME2 was severely impacted by the 2023 inflationary crisis. Sales volumes fell sharply by 26% in 2023 due to higher costs and reduced customer demand, while a 10% revenue increase that year was driven solely by price hikes, masking the underlying volume decline. Profit margins collapsed, with Gross Profit falling from 37% to 17% and Net Profit from 14% to 2%, reflecting ineffective cost-management strategies. Although volumes and revenues improved in 2024, this recovery was from a depressed base and largely due to broader economic improvement rather than strategic adjustment. Overall, the company's strategies failed to mitigate the inflationary impact, resulting in a year of near-total financial instability before a partial rebound.

5. DISCUSSION AND STRATEGIC FRAMEWORK DEVELOPMENT

5.1. Synthesis of Empirical Findings and Literature

The integration of results from the interviews' answers dataset of the qualitative interviews offers a cohesive understanding of inflation's multifaceted effects. Table (16) below summarizes the convergence between theoretical expectations and empirical observations.

Table 10: Convergence Between Literature and Empirical Findings

Thematic Area	*Literature Proposition*	*Empirical Evidence (2022–2024)*	*Interpretation*
Working Capital Pressure	Inflation increases cost of inputs, prolongs CCC (Banos-Caballero et al., 2010).	92 % of firms reported cash-flow compression and delayed receivables.	Strong support; confirms global theory in Egyptian context.
Liquidity Constraints	Inflation raises borrowing and operational costs (Kimutai, 2022).	72 % observed acute liquidity shortages and short-term debt rollover.	Fully aligned; localized evidence demonstrates limited financial-instrument access.
Profit Margin Compression	Inflation erodes profit by reducing pricing flexibility (Deloof, 2003; Karadag, 2015).	(100% of firms) Gross margin ↓ from 32 % to 12 %; net margin ↓ from 12 % to –3 % in 2023.	Consistent with theory; extreme in Egypt due to Egyptian FX instability.

Thematic Area	*Literature Proposition*	*Empirical Evidence (2022–2024)*	*Interpretation*
Export Diversification Benefit	Exports yield FX hedge and stable demand (Love & Ganotakis, 2013).	Export-active firms (12 %) reported 18 % liquidity improvement.	Empirical confirmation of natural-hedging validity.
Cost Optimization	Efficiency gains sustain profitability (Porter, 2008; Simon et al., 2019).	Cost-efficient firms recovered margins to 26 % in 2024.	Aligns; demonstrates tangible rebound via cost management.
Operational Capacity Scaling	Higher utilization lowers unit fixed cost (Shin & Soenen, 1998).	Firms running at ≥ 90 % capacity had 25 % higher net margins.	Confirms efficiency leverage effect.

Source: Author's analysis based on dataset

The evidence strongly corroborates the theoretical claims that inflation undermines SMEs' short-term solvency by distorting working-capital cycles. Yet, Egyptian SMEs that succeeded; such as Afri Medical, Egy Freeze, and S.T. Health Line, were distinguished by (a) export exposure generating foreign-currency inflows, (b) volume-based cost absorption, and (c) discipline in operational efficiency.

5.2. Strategic Interpretation: Why Some SMEs Succeeded

5.2.1. Determinants of Success

Empirical cross-case synthesis identified three recurring drivers among successful SMEs; export diversification strategy as shown in Successful SME1, caused the revenue to increase by 40 percent in 2023 with production volume and sales increase by 10 percent compared to 2022. Successful SME2, the other successful SME, and because they have no access to international market, they implemented a gradual and very caution price increase to not lose demand and keep the production running by the maximum capacity. Successful SME3 implemented the same gradual increase with applying cost optimization strategies.

The divergence demonstrates that strategic agility, FX earnings, and operational scalability constitute decisive differentiators during macroeconomic turbulence. To understand the effectiveness of implementation of such strategies, below (Figure 6) compares the performance of successful SMEs compared to the struggling SMEs:

Table 11: Determinants of SME Inflation Resilience

Factor	*Mechanism of Impact*	*Evidence / Case Illustration*
Export Diversification (Natural Hedge)	Generates FX inflows stabilizing liquidity, enabling material imports.	Successful SME1 increased FX revenue by 40 %.
Capacity Maximization (Volume-Based Cost Control)	Spreads fixed costs across higher units, reducing unit price and improving margins.	Successful SME3 ran production at 100 % capacity; gross margin ↑ to 34 %.
Cost Optimization (Operational Efficiency)	Waste reduction, preventive maintenance, energy management.	Successful SME2 recovered net margin to 18 %.

Source: Author's analysis based on dataset

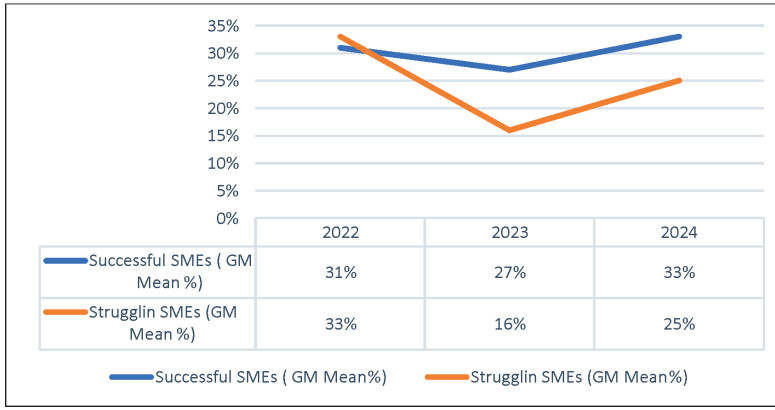

Figure 3: Performance Comparative Index: Successful vs Struggling SMEs

Source: Author's analysis based on dataset

5.3. Strategic Framework Development and Validation

The framework translates empirical insights into actionable strategies for Egyptian manufacturing SMEs to maintain working capital, liquidity, and profitability amid inflation and currency volatility. It integrates four pillars—natural hedging, limited price increases, fixed-cost reduction, and cost optimization—targeting currency exposure, cost absorption, operational efficiency, and price-demand balance. Validated through interviews and case studies, the model emphasizes adaptive strategies such as disciplined cost control, calibrated pricing, and productive scaling to preserve cash flow and competitiveness while mitigating inflation's financial impact.

Table 12: Core Pillars of the Proposed Framework

Pillar	*Strategic Mechanism*	*Underlying Logic / Intended Outcome*
1. Natural Hedge through Export Diversification	Expand participation in export markets to constitute at least 30 % of total sales (Mainly 50% of total cost and 100% of Material Cost). generating foreign-currency inflows are less sensitive to domestic inflation trends. SMEs should establish contractual relationships with international buyers, utilize export credit facilities, and align production to meet global quality standards.	**Mechanism:** By earning in stable currencies such as USD or EUR, firms naturally hedge against local currency depreciation. Export proceeds can be recycled to pay/book prices with local suppliers (for imported input materials) without the need to pay 100% in advance as they request if you will pay in local currency. **Outcome:** Stable liquidity, mitigated FX risk, and stronger supplier confidence due to reliable hard-currency resources.
2. Capacity Maximization - Fixed Cost per Unit Reduction	Maintain continuous operations at or above 90 % plant-capacity utilization. Where possible, schedule preventive maintenance during off-peak periods to avoid downtime. Apply production scheduling to sustain throughput even during local demand contractions.	**Mechanism:** Inflation raises both variable and fixed costs; the latter (rent, depreciation, salaries) can only be diluted by producing larger volumes. Higher capacity utilization spreads fixed costs across a greater number of units, reducing the fixed cost per product and stabilizing gross margins. **Outcome:** Economies of scale, lower per-unit costs, improved cost efficiency, and margin stability under inflationary pressure.
3. Cost Optimization and Operational Efficiency	Implement lean-manufacturing principles, periodic energy audits, waste-reduction initiatives, and digital monitoring systems for inventory and preventive maintenance. Establish supplier-collaboration programs that prioritize cost optimization initiatives.	**Mechanism:** By improving process efficiency, SMEs can offset inflation-driven increases in input and labor costs. Lean production removes non-value-adding activities and shortens the cash-conversion cycle. Energy-management initiatives directly reduce overheads; a major challenge in Egypt's high-energy-cost environment. **Outcome:** Improved gross margins, enhanced asset utilization, controlled working-capital outflows, and better liquidity ratios.
4. Limited Price Increase Strategy (Price-Demand Equilibrium)	Apply selective and limited price adjustments that transfer only variable-cost increases (e.g., raw materials, logistics) to customers while absorbing part of the fixed-cost surge through efficiency gains. Communicate price changes transparently, emphasize value retention, and reinforce client trust through after-sales support or loyalty discounts.	**Mechanism:** Abrupt or excessive price hikes in Egypt's price-sensitive market can trigger severe demand loss. Limiting price increases to genuine cost escalations maintains affordability perceptions, preventing a decline in sales volume. Transparency about cost challenges and maintaining product quality help preserve long-term customer loyalty. **Outcome:** Sustained market share, stable demand, and balanced revenue growth without compromising profitability; a critical equilibrium between cost transfer and customer retention.

Source: Authors' own creation

Underpinning all of these pillars are supporting Financial-Management Mechanisms; notably rolling forecasts and cash-conversion discipline, that ensure timely liquidity awareness and continuity in operations. For SME, and after using the power of the export proceeds (Pillar 1) to negotiate with suppliers for longer payment terms and form liquidity buffers to absorb shocks. After using the power gained from Price-Demand Equilibrium strategy (Pillar 2) to negotiate better payment terms from clients. They have to establish integrated cash-flow frameworks: proactive forecast models, rolling liquidity ratios, tiered pricing for different customer segments, and supplier-partner agreements that shorten the cash-conversion cycle (CCC).

The framework (Figure 4) visualizes the systemic flow between macroeconomic pressures and SME adaptation responses. It shows how each pillar sequentially and interactively contributes to maintaining working-capital balance, liquidity sufficiency, and profitability restoration.

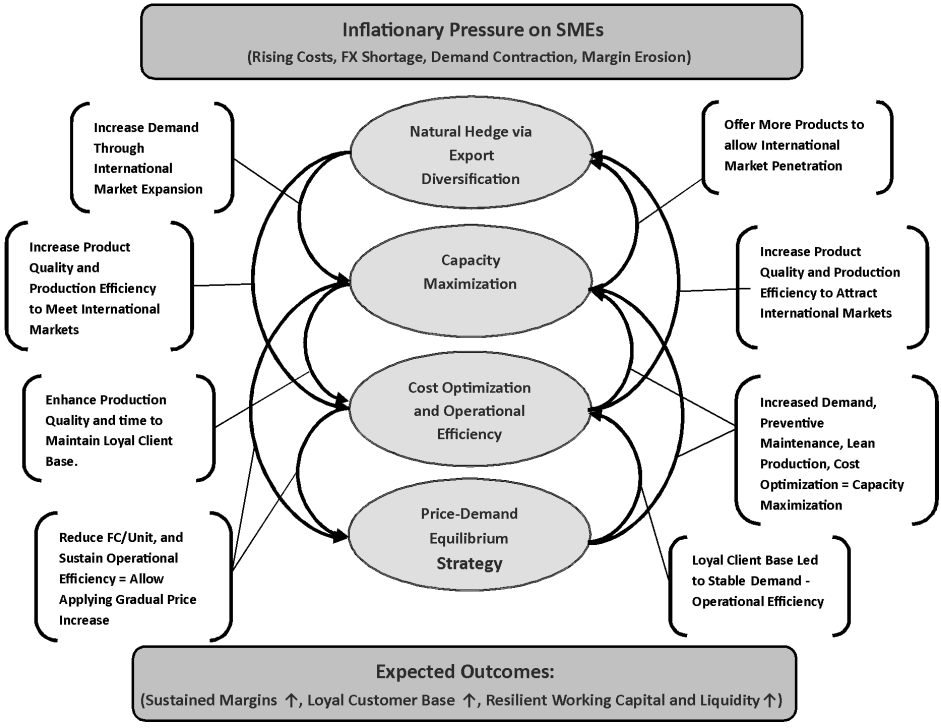

Figure 4: Integrated Inflation-Resilience Model for Egyptian Manufacturing SMEs

Source: Author

The Integrated Inflation-Resilience Model for Egyptian manufacturing SMEs relies on the interplay of four complementary pillars to stabilize finances and operations amid inflation. Natural hedging through export diversification protects liquidity and working capital by generating foreign-currency revenue and strengthening supplier relations. Capacity maximization spreads fixed costs over higher production, improves working-capital turnover, and enables economies of scale. Cost optimization enhances operational efficiency, reduces waste, and underpins sustainable scaling, competitive pricing, and export growth. The price-demand equilibrium strategy balances cost recovery with customer retention, sustaining demand, cash flow, and market share. Together, these pillars form a self-reinforcing system that preserves liquidity, competitiveness, and profitability under inflationary pressures.

The framework was validated using Lincoln and Guba's trustworthiness criteria—credibility, dependability, confirmability, and transferability. Credibility was confirmed by linking each strategic pillar to original interview data, ensuring alignment with participants' insights. Dependability was demonstrated through iterative checks against empirical data and literature, showing consistency with real SME responses to inflation. Confirmability was reinforced via external expert review, confirming data-driven conclusions. Transferability is limited due to Egypt's unique inflationary context, though the framework has conceptual relevance for similar economies.

6. CONCLUSION

The objective of this research was to develop applicable strategies tailored for Egyptian manufacturing (SMEs) to safeguard working capital and ensure business survival during severe inflationary periods. Through a mixed-methods design, the study successfully combined current theoretical strategies with real-world data from the tough economic conditions of Egypt in 2023, where inflation exceeded 40%.

Our findings reveal that the inflationary crisis generated significant and multifaceted financial strain, marked by a remarkable V-shaped downward trend in financial performance: stability in 2022, severe collapse in 2023, and only a partial recovery in 2024. The crisis was characterized by a systemic decline in liquidity, as seen by the average Cash Conversion Cycle (CCC) extending from 65 days to a crucial 93 days, and a sharp contraction of average net profit margins, which dipped into negative territory for many firms.

More importantly, the findings revealed the limitations of traditional, reactive strategies developed to mitigate the impact of inflation. Firms like Struggling SME1 and Struggling SME2, which relied on aggressive pricing adjustments (35–40% hikes) and conventional cost-cutting measures (e.g., workforce reduction), experienced severe declines in sales quantities, substantial consumer resistance, and a nearly complete collapse in profitability.

The successful SMEs showed that integrated planning and strategic agility are the most important factors to resilience. What differentiated them from the other struggling companies are three main factors: making money in foreign currency (Natural Hedging), focusing on maximizing volume to cover fixed costs (Capacity Maximization), and using controlled, customer-focused pricing strategies that kept demand high (Price-Demand Equilibrium).

All these empirical findings contributed to the creation and validation of the Integrated Inflation-Resilience Model for Egyptian Manufacturing SMEs.

The proposed strategic framework underwent a comprehensive validation process based on the four trustworthiness criteria outlined by Lincoln and Guba (1985): credibility, dependability, confirmability, and transferability. Credibility was verified by tracing each strategic element back to original interview data, ensuring alignment between participant insights and the resulting themes. Dependability was established through iterative cross-checks with both empirical findings and existing SME crisis management literature, confirming consistency between identified strategies and real company performance. Confirmability was reinforced through external expert evaluation, validating that the framework's conclusions emerged from participants' experiences rather than researcher bias.

While transferability testing was limited due to Egypt's unique 2023 inflation context, theoretical extrapolation suggests that the framework's strategic patterns may apply to similar emerging-market environments

The model provides a holistic, evidence-based roadmap, demonstrating that survival in high-inflation environments is not solely a matter of financial calculation but a process of continuous adaptation, learning, and strategic discipline. By focusing on the interactive reinforcement of these four pillars, SMEs can transform inflation from an uncontrollable external threat into a manageable operational challenge.

Ultimately, this research contributes significantly to both academic theory and managerial practice by providing a context-sensitive framework that bridges the gap between global resilience models and the harsh realities of emerging market volatility.

SMEs should focus on financial agility by generating foreign-currency revenue to hedge against local currency risks, maximize production volumes to reduce per-unit costs, and adopt gradual, targeted price increases to maintain demand. Policymakers and financial institutions should facilitate reliable foreign exchange, provide affordable financing and loan guarantees, and support operational efficiency through energy subsidies, technical assistance, and exemptions from utility cutoffs to strengthen SME resilience during inflationary periods.

The study is limited to Egyptian manufacturing SMEs in five industrial zones and excludes very small enterprises, relying on self-reported data that may be biased. Future research should track the framework's implementation over time to assess long-term performance and test its applicability in other emerging markets to identify universally effective strategies versus Egypt-specific ones.

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