Financial Sustainability Study of Manufacturing Unit at Belagavi

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Abstract

Financial sustainability is a defining condition for the long-term growth of manufacturing enterprises operating in competitive, capital-intensive environments. This study examines the financial sustainability and long-term growth trajectory of Manufacturing Unit, manufacturer based in Chakan, Pune, India, using five years (2020–21 to 2024–25) of secondary financial data drawn from the firm's audited financial statements. A descriptive, quantitative research design was adopted, employing year-wise growth-rate analysis, compound annual growth rate (CAGR), profitability and solvency ratio analysis, and correlation-regression analysis to evaluate the relationship between profitability growth and sales growth. The results indicate a positive long-term revenue CAGR of 5.6 percent alongside a marginally negative profit CAGR of −1.12 percent, reflecting recovery-driven but uneven earnings performance. The debt-equity ratio declined substantially, from 0.96 in 2020 to 0.25 in 2024, indicating a marked improvement in solvency and reduced financial risk. Gross-profit growth and sales growth were strongly correlated ($r = .933$), with gross-profit growth explaining approximately 87 percent of the variance in sales growth ($R^2 = .871$); however, given the very small number of paired observations ($n = 4$), this relationship should be treated as indicative rather than statistically conclusive. The findings suggest that Manufacturing Unit has achieved improving capital structure and revenue resilience but continues to face volatility in profitability that warrants stronger cost-control and asset-utilisation strategies. The study contributes a firm-level empirical account of financial sustainability in the Indian Manufacturing Unit , an industry under-represented in the sustainability-finance literature relative to energy, banking, and large listed manufacturing firms, and offers managerial and policy-relevant implications for small and medium manufacturing enterprises pursuing sustainable long-term growth.

Keywords
Financial sustainability; long-term growth; compound annual growth rate; financial ratio analysis; Manufacturing Unit; India

Introduction

Financial sustainability and long-term growth are widely regarded as central indicators of an organisation's competitiveness and strategic resilience (Kovalenko, 2019). For manufacturing firms operating in capital-intensive, technology-driven segments, the ability to convert revenue into consistent profitability, manage leverage prudently, and reinvest in productive capacity is essential to withstanding market volatility and sustaining growth over successive years (Ajayi & Omankhanlen, 2022). This unit serves the automotive, general engineering, aerospace, and defence sectors through CNC and VMC machining, laser cutting, press-shop, forging, and fabrication operations. As market competition

intensifies and input costs fluctuate, an evidence-based understanding of the firm's financial trajectory becomes important for management and stakeholders alike.

This study examines Manufacturing Unit's financial performance over five years (2020–21 to 2024–25) to assess whether its revenue, profit, and asset trends indicate sustainable long-term growth or emerging financial risk. The analysis draws exclusively on the firm's audited financial statements and applies descriptive and quantitative financial-analysis techniques — year-wise growth rates, compound annual growth rate (CAGR), profitability and solvency ratios, and correlation-regression analysis — to characterise the relationship between financial sustainability indicators and long-term growth.

Literature Review

Research on financial sustainability and corporate growth spans energy, manufacturing, financial-inclusion, and SME contexts, and consistently identifies profitability, capital structure, and resource-utilisation efficiency as central determinants of sustainable performance.

Studies of the energy sector illustrate how policy dependence undermines financial sustainability: Paun (2017) found that renewable-energy firms in Romania experienced financial instability once government subsidies were withdrawn, while conventional energy firms remained comparatively stable, underscoring the importance of independent financial resilience rather than reliance on external support. In a related vein, Orazalin et al. (2019) showed that sustainability reporting and responsible practice reduced financial distress among Russian oil and gas firms, while Mukhiyayeva et al. (2024) linked financial resilience in the energy sector to regulatory frameworks, market volatility, and technological disruption.

Within manufacturing specifically, firm-level financial drivers have received sustained attention. Kant (2018) found that profitability among NYSE-listed manufacturing firms was positively associated with R&D investment, growth rate, productivity, and current ratio, while firm age and size showed no significant effect. Xu and Wang (2018) demonstrated that intellectual capital — particularly relational capital — positively influenced financial performance and sustainable growth among Korean manufacturing firms. Şahin and Ergün (2018) reported that Turkish manufacturing firms experiencing over-growth exhibited lower profitability, suggesting that balanced, internally financed growth is more sustainable than rapid expansion. Zhang et al. (2021) identified a nonlinear, inverted-U relationship between financial flexibility and sustainability among Chinese manufacturers, while Ajayi and Omankhanlen (2022) found that operational efficiency — through cost management and asset utilisation — positively influenced the financial sustainability of Nigerian listed manufacturing firms.

A second stream of research connects financial sustainability to capital structure and risk management. Kovalenko (2019) characterised financial sustainability as encompassing stable cash flow, efficient capital structure, and optimal risk management, while Alhadhrami and Nobanee (2019) emphasised that CSR integration, risk disclosure, and efficient resource utilisation jointly strengthen long-term financial growth. Guillamón et al. (2021) showed that an excessive short-term financial focus can hinder R&D-driven innovation and future competitiveness, reinforcing the value of a balanced, long-term orientation.

Financial-inclusion and SME-focused studies extend the discussion to smaller and developing-economy firms. Magu and Muturi (2018) found that financial literacy — particularly budgeting, investment, and credit-management knowledge — significantly enhanced the sustainability of Kenyan SMEs, while Khan et al. (2022) found a strong long-run positive relationship between financial inclusion and sustainability across G20 economies. Asaleye et al. (2018) reported both short- and long-run relationships between financial-sector development and manufacturing output in Nigeria using a Vector Error Correction Model.

More recent contributions incorporate digitalisation, ESG, and Industry 4.0 considerations. Jamwal et al. (2021) identified supply-chain and environmental factors as the most influential enablers of sustainable manufacturing under Industry 4.0, while Zhang and Wang (2023) found that digital transformation strengthened financial management and resilience among Chinese enterprises. Giurgea and Delcea (2023) showed that European renewable-energy firms integrating innovation and balanced capital management achieved higher financial sustainability, and Mietule et al. (2025) found that Latvian manufacturing firms with stronger ESG integration outperformed peers financially, supporting a synergy view of sustainability and profitability. At the review level, Baby et al. (2024) synthesised 289 empirical studies (1987–2022) and concluded that internal firm factors — innovation, governance, and technology — exert a greater influence on manufacturing financial performance than external market or policy forces.

Collectively, this body of work establishes that financial sustainability is shaped by an interaction of profitability, capital structure, operational efficiency, and, increasingly, non-financial factors such as ESG integration and digitalisation. However, the overwhelming majority of these studies rely on multi-firm panel data drawn from listed companies, larger economies, or specific high-visibility sectors such as energy and banking. Comparatively little empirical work examines financial sustainability at the level of an individual, privately held, small-to-medium manufacturing enterprise in an emerging-market Manufacturing Unit context.

Research Gap

Existing literature on financial sustainability is concentrated in three areas namely large listed manufacturing firms subject to panel-data analysis (e.g., Kant, 2018; Xu & Wang, 2018), the energy sector (e.g., Paun, 2017; Orazalin et al., 2019; Mukhiyayeva et al., 2024), and macro-level or cross-country financial-inclusion studies (e.g., Khan et al., 2022). Privately held Manufacturing Unit in emerging economies, despite their significant contribution to automotive, aerospace, and defence supply chains remain under-represented in this literature, and firm-level, single-entity financial-sustainability studies using audited secondary data are comparatively rare in Scopus-indexed finance and management outlets. This study addresses that gap by providing a detailed, ratio- and trend-based financial-sustainability assessment of a single manufacturing enterprise, contributing an empirical case that can inform both academic understanding and managerial practice in this under-studied segment.

Problem Statement

Financial sustainability is essential for any organisation seeking long-term growth and continued competitiveness. In the case of Manufacturing Unit, year-wise fluctuations in revenue, profit, and asset levels raise questions about the consistency of the firm's financial trajectory and its capacity to sustain future expansion. Despite continued operation and investment, inconsistent year-to-year performance suggests potential risks that may affect the firm's long-term financial health; however, no systematic, ratio- and trend-based evaluation of the firm's financial sustainability existed prior to this study. The central research problem addressed here is, therefore, whether Manufacturing Unit's financial performance over the 2020–21 to 2024–25 period reflects sustainable long-term growth or whether observed fluctuations in revenue, assets, and profitability signal underlying risks that require managerial and strategic attention.

Research Objectives

1. To examine **Manufacturing Unit's** financial sustainability by analysing its financial performance and capacity to maintain long-term growth.
2. To analyse long-term trends in the firm's overall financial position, including revenue, profitability, and asset behaviour.
3. To examine the relationship between financial sustainability indicators and long-term growth outcomes.
4. To identify the challenges affecting financial sustainability and their implications for long-term growth.

Hypotheses

The following hypotheses were formulated on the basis of the study objectives and the quantitative relationships examined in the original analysis. [Author note: the source internship study did not pre-register formal hypotheses; these have been derived post hoc from its stated objectives and analytical design, consistent with a descriptive financial-analysis study, and should be reviewed and, if necessary, reframed by the author before submission.]

H01 (null): There is no significant relationship between financial-sustainability indicators (profitability and growth) and the long-term growth of Manufacturing Unit.

Ha1 (alternative): There is a significant positive relationship between financial-sustainability indicators and the long-term growth of Manufacturing Unit.

H02 (null): Manufacturing Unit's capital structure (debt–equity position) has not improved materially over the study period.

Ha2 (alternative): Manufacturing Unit's capital structure has improved materially over the study period, reflecting stronger long-term financial sustainability.

Research Methodology

Research Design

The study employs a descriptive, quantitative research design appropriate for analysing historical financial data, computing growth rates, and interpreting long-term trends. The quantitative component supports numerical analysis of revenue, profit, and asset behaviour using CAGR, year-wise growth rates, ratio analysis, and correlation-regression analysis.

Population, Sampling, and Sample Size

The population comprises the financial statements and annual reports of Manufacturing Unit. The sample frame consists of five years of audited financial data (2020–21 to 2024–25) covering revenue, net profit, and total assets. A judgmental (non-probability) sampling method was used, as the study

relies on the specific years for which complete and reliable financial data were available. The resulting sample size is five annual observations per financial parameter (revenue, profit, assets); the correlation and regression analysis of gross-profit growth against sales growth is based on four year-on-year growth observations (n = 4, derived from the five annual data points).

Data Sources

No primary data were collected. Secondary data sources included Manufacturing Unit's audited financial statements, annual reports, internal financial documents shared by the company, and published records.

Tools and Techniques of Analysis

- Year-wise growth-rate analysis (revenue, profit, assets)
- Compound annual growth rate (CAGR) analysis and short-horizon forecasting
- Financial ratio analysis: net profit ratio, return on assets, gross profit ratio, debt–equity ratio, total debt ratio
- Descriptive statistics (mean, standard deviation)
- Pearson correlation and simple linear regression, with significance testing

For presentation consistency, the available five-year financial figures have been standardised to ₹ crores and rearranged into summary income-statement and balance-sheet formats. The presentation does not infer unavailable line items from ratios.

Data Analysis and Results

Revenue Growth

Table 1 presents Manufacturing Unit's year-wise sales growth rate. Revenue declined by 5.32 percent in 2021–22 before recovering sharply (+20.50 percent) in 2022–23, followed by more moderate growth of 5.69 percent and 3.18 percent in the subsequent two years.

Particulars	2020–21	2021–22	2022–23	2023–24	2024–25
Revenue / Sales	19.23	18.21	21.94	23.18	23.92
Net Profit	0.84	0.74	0.85	0.73	0.81
Net Profit Ratio (%)	4.38	4.05	3.89	3.16	3.37

The five-year revenue CAGR was calculated as follows:

CAGR = (Final Revenue / Initial Revenue)^(1/n) − 1 = (239,199,370 / 192,287,388)^(1/4) − 1 = 0.0561, or approximately 5.6% per annum.

Applying this CAGR to project near-term revenue yields approximate forecasts of ₹25.26 crore (2025–26), ₹26.67 crore (2026–27), and ₹28.17 crore (2027–28), on the assumption that the underlying growth pattern remains stable — an assumption that should be treated cautiously given the volatility observed within the historical series.

Asset Growth

Particulars	2020–21	2021–22	2022–23	2023–24	2024–25
Total Assets	11.79	11.15	11.07	12.55	12.72
Return on Assets (%)	7.15	6.61	7.70	5.84	6.34

Note: The supplied dataset contains total assets as the available balance-sheet figure; full line-item balance-sheet components were not provided. This standardized extracted summary therefore avoids inventing unavailable accounting line items. All monetary values are presented in ₹ crores.

Total assets declined in 2021–22 and 2022–23, consistent with a period of restrained investment activity or constrained liquidity, before rising sharply in 2023–24 and stabilising in 2024–25. The corresponding asset CAGR is 1.9% per annum: CAGR = (127,160,400 / 117,899,327)^(1/4) − 1 ≈ 0.019. This modest but positive rate indicates cautious, incremental asset growth rather than aggressive capital expansion.

Profit Growth

Net profit fluctuated markedly across the period, with a long-term (five-year) profit CAGR of approximately −1.12%, indicating a slight overall decline in profitability despite intermittent recoveries in 2022–23 and 2024–25. This pattern points to inconsistency in cost management and operational efficiency rather than a structural growth trend.

8.4 Financial Ratio Analysis

Table 4 summarises key profitability and solvency ratios for 2020–24.

Ratio	2020–21	2021–22	2022–23	2023–24	2024–25
Net Profit Ratio (%)	4.38	4.05	3.89	3.16	3.37
Return on Assets (%)	7.15	6.61	7.70	5.84	6.34
Gross Profit Ratio (%)	7.02	7.99	6.43	6.66	7.29
Debt–Equity Ratio	0.96	0.83	0.81	0.27	0.25
Total Debt Ratio	0.34	0.34	0.36	0.16	0.15

The Net Profit Ratio declined from 4.38% (2020) to 3.16% (2023) before recovering slightly to 3.37% (2024), indicating pressure on the firm's ability to convert sales into net profit. Return on Assets and the Gross Profit Ratio show a similarly uneven pattern, with a dip in 2023 followed by partial recovery in 2024. In contrast, the Debt–Equity Ratio and Total Debt Ratio both show a clear, sustained decline across the five years — most notably a fall in the Debt–Equity Ratio from 0.96 to 0.25 — indicating a substantial and consistent improvement in the firm's solvency and long-term capital structure.

8.6 Correlation and Regression Analysis

8.5 Trend Analysis

The five-year trend analysis provides a visual assessment of the firm's financial trajectory. The Debt-to-Equity Ratio declined from 0.96 in 2020–21 to 0.25 in 2024–25, confirming sustained deleveraging. Revenue recovered from ₹18.21 crore in 2021–22 to ₹23.92 crore in 2024–25, while net profit remained comparatively volatile. Total assets increased from ₹11.79 crore to ₹12.72 crore, indicating modest long-term asset expansion.

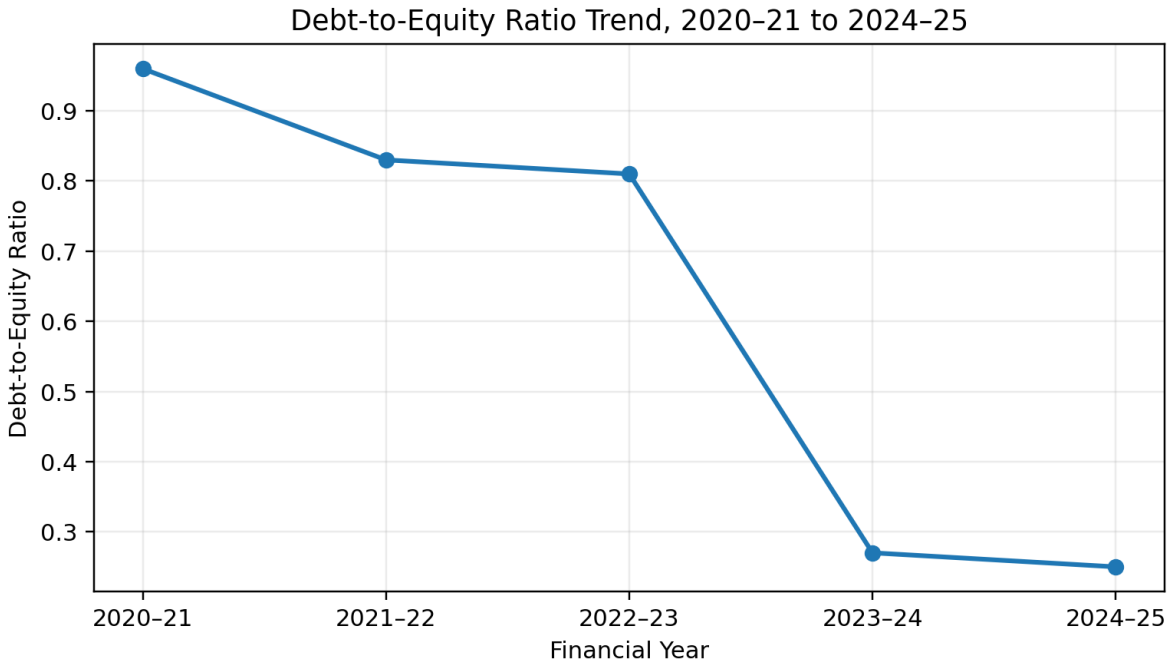


Figure 1. Five-year Debt-to-Equity Ratio trend

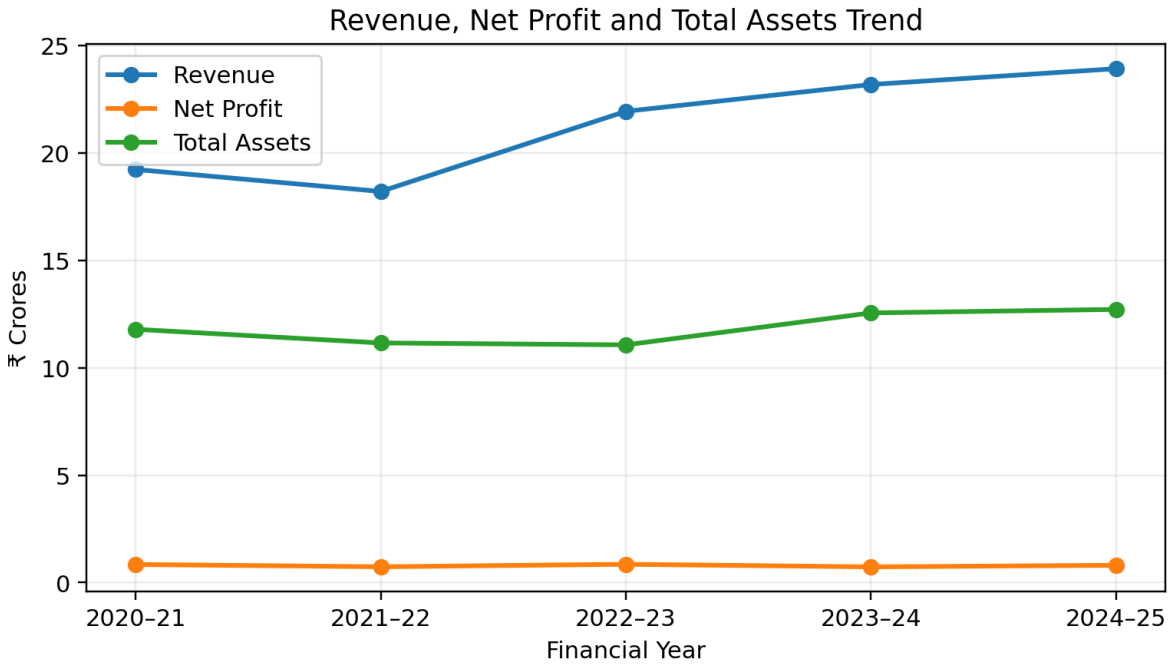


Figure 2. Revenue, Net Profit and Total Assets trend (₹ Crores)

Interpretation: Solvency improved consistently, whereas revenue growth was accompanied by uneven profitability. The divergence between the upward revenue trajectory and fluctuating net profit highlights the need for margin protection, working-capital discipline and productivity rather than relying on sales growth alone.

To examine the relationship between profitability growth and revenue growth, gross-profit growth rate (X) and sales growth rate (Y) were compared across the four year-on-year growth observations available in the dataset (Mean X = 14.72, SD = 8.79; Mean Y = 8.67, SD = 6.90).

Statistic	Value
Pearson correlation (r)	0.933
R^2	0.871
Adjusted R^2	0.806
Regression intercept	−2.11
Regression slope (β1)	0.732
n (paired observations)	4

The correlation between gross-profit growth and sales growth is strong and positive (r = .933), with the regression model indicating that gross-profit growth explains approximately 87.1% of the variance in sales growth (R^2 = .871). The slope coefficient (β1 = 0.732) suggests that, on average, sales growth increases by 0.732 percentage points for each one-percentage-point increase in gross-profit growth.

A formal significance test was conducted on this correlation, which was not reported in the original analysis. With n = 4 (df = 2), the t-statistic is $t = r\sqrt{(df)} / \sqrt{(1 - r^2)} \approx 3.67$, which corresponds to a two-tailed p-value of approximately .067. This falls short of the conventional 5% significance threshold (critical t = 4.303 at df = 2), although it is significant at the 10% level. Given the very small number of observations, this result should be interpreted as a suggestive association rather than a statistically confirmed causal relationship, and the regression model's practical use for prediction is correspondingly limited. This constitutes the principal statistical caveat of the study and directly qualifies the strength of the conclusions drawn regarding Hypothesis 1.

Discussion

The findings present a mixed but broadly constructive picture of Manufacturing Unit's financial sustainability. Revenue demonstrates a clear recovery-and-growth pattern following an initial decline, consistent with a firm rebuilding market position after a period of disruption, and the resulting 5.6% revenue CAGR is a reasonably healthy outcome for a young manufacturing enterprise. Asset growth, while modest (1.9% CAGR), reflects a cautious investment posture rather than aggressive capacity expansion, which may be appropriate given the firm's recent incorporation (2024) and evolving operational scale.

Profitability, however, tells a more concerning story: a marginally negative long-term profit CAGR (−1.12%) alongside a declining Net Profit Ratio suggests that revenue growth has not been matched by proportionate improvements in cost control or operating leverage. This is broadly consistent with Şahin and Ergün's (2018) finding that firms experiencing rapid revenue growth can simultaneously see profitability pressured if growth outpaces internal efficiency gains, and with Ajayi and Omankhanlen's (2022) emphasis on operational efficiency as a determinant of financial sustainability.

The most unambiguous positive finding is the marked improvement in capital structure: the Debt–Equity Ratio fell from 0.96 to 0.25 over five years, a trend that aligns with Kovalenko's (2019) view of financial sustainability as resting on efficient capital structure and reduced risk exposure. This deleveraging trend materially strengthens the firm's resilience to external shocks and its capacity to finance future growth without excessive reliance on debt. On this basis, the null hypothesis H02 is rejected in favour of Ha2: Manufacturing Unit's capital structure improved materially over the study period. The strong association between gross-profit growth and sales growth ($r = .933$) offers preliminary support for Hypothesis 1, though, as noted above, the small sample means this should be treated as directional evidence pending validation on a longer time series. Given the marginal statistical significance ($p \approx .067$ at the 5% threshold) and the very small sample, H01 cannot be confidently rejected on the present evidence; Ha1 is therefore tentatively, rather than conclusively, supported.

Managerial Implications

1. Working-capital optimisation.

Although working-capital ratios were not available in the supplied dataset, profitability volatility and modest asset growth indicate a need for tighter cash-conversion discipline. Management should establish monthly receivables ageing reviews, customer-wise collection targets, risk-based credit terms and slow-moving inventory monitoring. Supplier payment terms should be aligned with operating cash inflows without weakening supplier relationships. A rolling 13-week cash-flow forecast should be used to identify liquidity gaps early.

2. Protect operating margins.

Revenue increased at a 5.6% CAGR while profit CAGR was approximately −1.12%. Management should introduce product/customer-level contribution-margin reviews, variance analysis for material and labour costs, and periodic pricing reviews. Persistently weak-margin orders should be renegotiated or redesigned rather than pursued solely for volume.

3. Disciplined CapEx planning.

The 1.9% asset CAGR indicates cautious asset expansion. Future capital expenditure should be prioritised through formal appraisal covering expected capacity utilisation, payback period, return on invested capital, maintenance savings and customer-demand visibility. Capacity-creating projects should be sequenced so that cash generation and utilisation of existing assets improve before major expansion.

4. Preserve the deleveraging advantage.

The Debt-to-Equity Ratio declined from 0.96 to 0.25 and the Total Debt Ratio from 0.34 to 0.15. Management should preserve this stronger capital structure by matching new borrowing to clearly identified cash-generating projects, maintaining debt-service buffers and avoiding debt-funded expansion without demonstrable returns.

5. Strengthen asset utilisation.

Return on Assets fell to 5.84% in 2023 before recovering to 6.34% in 2024. Management should track machine utilisation, production downtime, rejection/rework rates and revenue generated per major asset. Under-utilised equipment should be reassigned, scheduled more efficiently or considered for disposal/lease decisions where economically justified.

6. Integrate risk monitoring into financial planning.

A quarterly financial-risk dashboard should monitor revenue concentration, customer receivables, inventory ageing, gross margin, cash conversion, debt service, CapEx commitments and utilisation.

Scenario analysis should be conducted for adverse movements in input costs, demand and collection periods, creating an early-warning system rather than a retrospective assessment.

1) **Monitor receivables and collection risk:** Review receivables ageing regularly and identify delayed or high-risk customer accounts to reduce the possibility of cash-flow pressure.
2) **Monitor cost and margin risk:** Track changes in raw-material, labour and operating costs and compare them with revenue and gross-profit trends to identify early margin deterioration.
3) **Monitor debt and liquidity risk:** Periodically review debt obligations, interest burden, cash availability and debt-service capacity, particularly before undertaking additional borrowing or major expenditure.
4) **Use scenario-based risk assessment:** Assess the likely financial impact of changes in demand, input costs, collection periods and other major business conditions, and prepare corrective measures in advance.

Practical Implications

For Manufacturing Unit and comparable small and medium Manufacturing Unit manufacturers, the findings suggest that pursuing revenue growth alone is insufficient for long-term financial sustainability; complementary attention to cost structure, working-capital management, and capital-structure discipline is required. The improvement in solvency indicators demonstrates that such firms can meaningfully de-risk their balance sheets even while still expanding revenue, offering a practical model for other early-stage manufacturing enterprises balancing growth ambitions against financial prudence. For industry stakeholders such as OEM customers and lenders, the analysis illustrates how ratio-based and trend-based financial diagnostics can be applied to assess supplier financial health in the absence of extended public financial histories.

Limitations of the Study

1. Single-firm case design: findings are specific to Manufacturing Unit and are not generalisable to the wider manufacturing sector without further comparative research.
2. Short time horizon: The analysis is based on five years of financial data, which may not fully capture longer economic or industry cycles.
3. Very small sample for inferential statistics: correlation and regression analysis relied on only four paired growth observations, substantially limiting statistical power and the generalisability of the regression model; the association reported ($r = .933$) achieved only marginal statistical significance ($p \approx .067$).
4. Reliance on secondary data: the study depends entirely on Manufacturing Unit's financial statements, with no independent verification or triangulation against external audited benchmarks.
5. Absence of industry benchmarking: without peer or industry-average comparison, it is not possible to assess whether Manufacturing Unit's financial sustainability is strong or weak relative to sector norms.
6. Exclusion of macroeconomic and qualitative variables: external factors (inflation, input-cost cycles, policy change) and qualitative determinants (management quality, customer concentration, employee performance) were outside the scope of this analysis.
7. Assumption-based forecasting: CAGR-based revenue projections assume a stable growth pattern that may not hold under real market conditions.

Scope for Future Research

Future research could extend this analysis using a longer financial time series (ten years or more) to validate the growth and profitability trends identified here with greater statistical confidence. Comparative, multi-firm studies across several Manufacturing Unit or certified manufacturers would allow benchmarking of financial sustainability within the sector and enable panel-data regression with adequate statistical power. Incorporating qualitative and non-financial determinants of sustainability, such as customer concentration, workforce productivity, and ESG-related practices — alongside financial ratios would also provide a more holistic account of long-term growth capacity, consistent with recent literature on ESG-integrated financial sustainability (Mietule et al., 2025).

Conclusion

This study assessed the financial sustainability and long-term growth of Manufacturing Unit over the period 2020–21 to 2024–25. The firm demonstrated a positive revenue CAGR of 5.6% and a markedly improved capital structure, with the debt–equity ratio falling from 0.96 to 0.25, indicating strengthening solvency and reduced financial risk. However, profitability remained volatile, with a slightly negative long-term profit CAGR (−1.12%) and a declining Net Profit Ratio, pointing to unresolved cost-management and efficiency challenges. The strong positive association between profitability growth and revenue growth (r = .933) offers preliminary, though not statistically conclusive, support for the view that financial sustainability underpins long-term growth. Overall, Manufacturing Unit exhibits the financial characteristics of a recovering, deleveraging, and cautiously expanding enterprise; sustaining this trajectory will require deliberate attention to profitability consistency, asset utilisation, and structured financial planning alongside its evident progress in capital-structure management. Going forward, the strongest financial-sustainability priority is to convert the firm's improved solvency position into consistent earnings and cash generation through tighter working-capital controls, evidence-based CapEx selection and structured risk monitoring.

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