

Profitability Analysis of Indian Readymade Garment Industry

Nirbhay Mahor* & Amit Banerji

Department of Management Studies, Maulana Azad National Institute of Technology, Bhopal, Madhya Pradesh 462 003, India

Received 05 October 2023; revised 15 February 2024; accepted 08 July 2024

India is among the world's largest producers and exporters of textiles and Ready-Made Garments (RMG). This research aims to establish a causal association between Return on Assets (ROA) and key operational metrics such as the cash conversion cycle, fixed asset turnover, and physical capital intensity, to investigate their influence on the profitability of the Indian RMG industry. The Auto Regressive Distributed Lag (ARDL) cointegration is applied to study impact on profitability. This study identifies a long-term relationship between profitability metrics, such as ROA, and operational factors including sales, fixed asset investments, and Working Capital Management (WCM) strategies, utilizing data from CMIE Prowess spanning from 1988–89 to 2018–19. The results suggest that (i) decreasing physical capital utilization in generating sales, leading to reduced profitability, and (ii) lengthening of the trade cycle increasing profitability, albeit with diminishing returns. Porter's Diamond model for national competitive advantage in RMG is proposed. The empirical results highlight, the importance of enhancing technology in fixed assets, optimal management of the cash conversion cycle, and debt management.

Keywords: ARDL cointegration, Cash conversion cycle, Fixed assets turnover, Physical capital intensity, Profitability

Introduction

The global apparel market is expected to reach \$2 trillion by 2025, with India contributing \$135 billion, less than half of China's contribution. Apparel and Readymade Garments (RMG) account for approximately 73% of the Indian textile industry. The RMG industry benefits from being financially viable even on a small scale. Cotton apparel exports constituted more than half of the total Textile and Apparel (T&A) exports in the financial year 2019–20. The US and the European Union (EU) combined accounted for about 60% of India's total exports. The RMG sector in the domestic market has experienced substantial growth in recent decades. This growth can be attributed to an increase in per capita income, changing fashion trends, consumer growth, urbanization, expansion of organized retail, and a higher share of designer/branded apparel.^{1,2}

Indian Ready-Made Garment Industry

Sales, exports, and Net Fixed Assets (NFA) grew at a Compound Annual Growth Rate (CAGR) of 20% or higher between 1989 and 2019 in Table 1, depicting steady growth in the industry.

Before 2000, growth was moderate. However, the industry experienced a structural shift starting in the financial year 2011–12, as illustrated in Table 2.

A structural break refers to a sudden change in an economic time series, which can result from various factors, including changes in policy direction, regime, or external shocks. Structural breaks may affect the intercept, trend, or both.³

For a significant period, the industry has been challenged by issues related to profitability and technological degradation.

After the Multi-Fiber Arrangement (MFA) quota was abolished, there was a technological decline in the sector, resulting in a decline in profitability in 2007–2008. The latter period exhibited greater vulnerability to profitability due to increased competition from Vietnam, China, Bangladesh, and other low-cost exporting countries.⁴ The steady decline in exports and Return on Assets (ROA) is a cause for concern. The unequal impact of trade openness has resulted in the loss of competitiveness in exports. Structural issues in the RMG sector related to exports of natural fibre rather than man-made ones have also hindered competition.⁵

Knowledge Gap

The role of physical capital and its utilization efficiency along with Working Capital Management

Table 1 — CAGR of Sales, Exports, and Net Fixed Assets

Period	Sales	Export	NFA
1989–2019	22.35%	19.40%	23.89%

Source: Author's calculation

*Author for Correspondence
E-mail: nirbhaymahor@gmail.com

Table 2 — Structural Break in Parameters

Variables	Financial year	Type of structural break	Reason(s)
Sales profitability (ROA)	2011–12 1994–95 & 2012–13	72% growth in industry sales Fluctuation and recovery	Increased exports and the elimination of excise duties. ⁶ The industry faced losses in 1996 due to increased debt servicing and growth financed by debt. From FY 2014, the industry maintained an ROA above a single-digit percentage, attributed to increased sales and reduced CCC.
Net fixed assets (NFA)	2004–05	Accelerated accretion of fixed assets	NFA grew by almost 50%. Firms increased their investments (CMIE Prowess). Apart from infrastructure and mines & metals, banks provided significant credit to the textile sector. ⁷
Cash conversion cycle	2012–13	Reduced time in inventory turnover	Authors' calculation

Source: Authors' compilation

(WCM) have not been depicted in any of the studies. WCM has become a variable of interest, especially during the post-Great Financial Crisis (GFC) of 2007–09. This study investigates the impact of operational and performance variables on profitability in the Ready-Made Garment (RMG) industry. The role of fixed asset in profitability assessment needs to be investigated, primarily the way it has been funded, through its mediating role as asset turnover ratio. No prior work exists in Indian RMG incorporating the role of FAT and Net Fixed Asset turnover. So far, no study of the Indian RMG industry's profitability analysis remains unexamined, presenting a notable gap in the literature. Recent studies focus on the Pakistani and Bangladesh RMG industries, which are now more competitive than the Indian. This study will use dynamic modeling to avoid issues related to endogeneity.

Literature Review and Theoretical Framework

In the RMG industry, the consumer-driven supply chains, rely heavily on global sourcing, with garment production generally diverted to developing countries. The low-cost trend in the apparel industry has targeted suppliers who are uncompetitive, rigid, and unable to meet demand. Barriers to entry into the RMG industry are low as physical capital requirements are low.⁸ RMG industry is labor-intensive, less dependent on technology with low entry barriers. Rising labor costs result in buyers searching for alternatives.⁹

A ten-day reduction in Cash Conversion Cycle (CCC) in listed Chinese textile firms increased ROA by approximately 6.7%. The retarding effect of physical capital intensity on ROA resulted in Chinese textile exporters initiating the process of switching to the labor-intensive RMG category.¹⁰ Leverage and size both showed a significant negative relationship with ROA, revealed a study on the Pakistani textile sector.¹¹

Small and medium-sized businesses (SMEs) have a lower fixed asset base and thus rely heavily on the turnover of current assets to generate profits. Spanish SMEs showed a significantly negative relationship between CCC and ROA in the period 1996–2002.¹² SMEs account for a substantial portion of India's RMG exports, and the previous findings may be applicable here as well.¹³

ROA is likely to be positively impacted if firms pursue aggressive investment in Working Capital (WC) or aggressive financing decisions. The same was proved in the profitability analysis of listed Bangladesh firms. A 1% increase in Total Assets (TA) along with a decrease in Current Assets (CA) was shown to increase ROA by 0.50%, after controlling for age, size, and leverage.¹⁴ The impact of net fixed assets on profitability can be mitigated by provisioning adequate net working capital. Increasing ROA by effectively managing and optimizing working capital requires maximizing the utilization of fixed assets through effective operations.¹⁵

Larger firms in the manufacturing sector in the United States were found to take on more credit and grant more trade credit in the mid-1980s. Account Receivables (AR) were observed to grow with sales and accounted for up to 70% of net sales. Net income was negatively correlated with AR. A fall in sales was not seen to reduce AR; on the contrary, the same increased slightly.¹⁶

In SMEs, exports can reduce ROA due to foreign exchange risk exposure, accompanied by a lack of competitiveness in home markets. In such a situation,¹⁷ automation can reverse the trends.

A study of 90 listed Pakistani textile firms for the period 2008–17 showed a negative relationship between Return on Equity (ROE) and leverage but a positive relationship with exports.¹⁸ Pakistani textile exporters experienced a decrease in export competitiveness between 2003 and 2019, due to slow economic growth,

reduced investments, changing foreign demand, depreciating currency, and low Research & Development (R&D) investments.¹⁹ This is consistent with the findings,²⁰ which used Porter's Diamond model of international trade to observe, the reaction to change in technological efficiency in the case of Ethiopian RMG exporters. The concessionary tariff structure of the importing nations was the Chance Factor(s) in the growth of Ethiopian RMG exports.

A study of 230 Brazilian firms for the period 2001–10 found that Export Intensity (EI) was negatively correlated to ROA. Foreign sales contributed positively to ROA, only when they were an outcome of foreign direct investment.²¹

Between 2001 and 2008, Tunisian textile SME exporters showed a significant relationship between EI and profitability. A 10% increase in EI resulted in an 11.82% increase in ROA.²²

Pre-GFC (before 2007) increase in physical capital intensity among EU firms, showed no longer-term impact on profitability. A ten-day reduction in CCC caused a 0.02% increase in profitability.²³ The increase in capacity was quite likely in anticipation of increased demand.

The apparel business largely relies on international sourcing, with most production being moved to developing nations where contractors and subcontractors specialize in producing components. Due to their worldwide distributed supply network and capacity to customize products to suit specific needs, consumer-driven chains have a competitive edge. Instead of relying on scale economies to make a profit, customer-driven chains do so by offering variety quickly. The RMG sector has shown a statistically significantly higher asset turnover ratio than the remainder of the textile sector. In a Korean study, the textile industry including RMG exhibited lower inventory turnover ratios within the manufacturing sector, contrary to the results.²⁴ The divergence in findings can be attributed to the fashion consumption cycle in cotton fabrics cloth, which is two to three years, long enough to turn around the inventory.

Post the GFC, the Indian textile industry faced liquidity issues because of accumulated debt resulting from the supply of cheap credit (2003–08). Subsequently, the industry focused on managing WC by shortening the CCC resulting in higher profitability and asset utilization.²⁵

Hypotheses Development

Based on the literature reviewed and the theoretical framework, this study proposes that ROA, a profitability

metric, is influenced by sales, fixed asset investments, and working capital management strategies. It aims to examine the extent to which these operational factors affect the Indian RMG industry's profitability. Proficient WC management increases profitability. Increasing sales while balancing investments in fixed assets and WC is a sign of effective managerial practice. Therefore, a long-run co-integration relationship can be hypothesized to exist between these variables and ROA. Conceptually it can be stated as follows -

ROA has a long-term relationship with sales, fixed assets and working capital management.

Data and Methodology

Data has been taken from the Centre for Monitoring Indian Economy (CMIE) Prowess for the Financial Years (FYs) from 1988–89 to 2018–19. Data for latter FYs are missing/incomplete and hence not considered (pandemic issues). The variables were scaled by the median, enabling control for unobserved heterogeneity at industry levels.²⁶ Scaled variables are depicted as FAT, CCC, NFAT and ROA (Table 3). The objective of this study is to investigate the impact of these operational variables on the profitability (ROA) of the Indian RMG industry. Most financial and economic data are non-stationary, i.e., I (1), they possess unit root. Ordinary Least Square regression may generate spurious results. In such instances, the variables (series) may exhibit long-run relationships and may be cointegrated. Cointegrating techniques-Vector Error Correction Method (VECM) and Auto Regressive Distributed Lag (ARDL) are used to understand these long-run relationships. The choice of either of these techniques is subject to the presence or absence of unit root in the variables (series). To establish causation and direction of causation, Granger Causation (GC) is used. Lag length have been selected using VAR Lag Order Selection Criteria.²⁷ Only successful and relevant iterations will be mentioned and discussed. EVIEWS 10 and SPSS 26 have been used for analyses.

Results and Discussion

Unit Root Tests

In time series analysis, it is necessary to check the presence of unit root. Augmented Dickey-Fuller (ADF) test, developed by Dickey & Fuller.²⁸ Variables were tested for stationarity at levels and at the first difference, at 5% significance level. ROA, FAT and NFAT exhibit a unit root but become

Table 3 — Variables description

Variable	Acronym	Formula	Measure
Return on Assets	ROA	Net Profit/ Total Assets	Profitability
Cash Conversion Cycle	CCC	Account Receivable Period + Inventory Turnover Ratio – Account Payable Period	Efficiency of WCM
Fixed Assets turnover ratio	FAT	Sales /Fixed Assets	Efficiency measure of usage of fixed assets
Net Fixed Assets ratio	NFAT	Net Fixed Assets/Total Assets	Physical Capital Intensity
Assets Turnover ratio	ATR	Sales/ Total Assets	Efficiency measure of usage of total assets
Accounts Receivable ratio	AR	Sales / average receivable	Efficiency measure of usage of accounts receivable
Accounts Payable ratio	AP	Purchase / average payable	Efficiency measure of usage of accounts payable.
Inventory Turnover Ratio	INV	Cost of goods sold/average inventory	Efficiency measure of usage of inventory turnaround.
Accounts Receivable scaled to sales	ARS	Account Receivable Period / Sales	Efficiency in maintaining the accounts receivable period with changes in sales.
Accounts Payable scaled to sales	APS	Account Payable Period / Sales	Efficiency in maintaining account payable period with change in sales.
Inventory Turnover scaled to sales	INVS	Inventory Turnover Average /Sales	Efficiency in maintaining inventory turnover period with change in sales.

Source: Authors' compilation

Table 4 — Unit root test

Variable	Augmented Dickey-Fuller Test	
	Levels	First Difference
ROA	-1.210	-6.646***
CCC	-6.254***	
FAT	-0.816	-3.165***
NFAT	-0.706	-5.617***
LEV	-4.063***	
ATR	-2.689***	
APS	-5.645***	
ARS	-1.978***	
INVS	-6.170***	

Source: Authors' compilation

Note: - 1% significance level indicated by ***

stationary after the first difference (Table 4). The remaining variables are stationary at their levels.

Pairwise Granger Causality Tests

GC was done at levels (stationary variables) at lags depicted.

FAT showing GC to ROA aligns with the RMG sector's typical characteristics, due to the lower requirement of fixed assets (r value = 0.716). Unidirectional GC from Debt to NFA with a strong correlation (r = 0.909) suggests fixed asset creation was debt financed. The drawback with this approach is that increasing debt servicing reduces profitability (ROA).

A significant and strong GC is observed from ARS to ROA and from INVS to ARS (Table 5). This suggests that an increase in INV leads to an increase in AR as the firm always maintains a minimum level

Table 5 — Granger Causation

Null Hypothesis:	Obs	F-Statistic	Prob.
NFAT _{t-1} ROA _{t-1}	30	8.775	0.00
FAT _{t-1} ROA _{t-1}	30	7.898	0.00
INVS _{t-1} ARS _{t-1}	30	5.172	0.03
DEBT _{t-1} NFA _{t-1}	30	6.114	0.00
ARS _{t-1} ROA _{t-1}	30	8.329	0.00
NFA _{t-1} ROA _{t-1}	30	4.237	0.04
ARS _{t-1} FAT _{t-1}	30	4.505	0.02
APS _{t-1} ARS _{t-1}	30	4.438	0.02

Source: Authors' compilation

of inventory in stock so that the firm can easily supply the RMG product to the market. The industry supplies 10% to 30% of its RMG consignments on a credit basis (authors' calculation).

The textile industry was characterized by high capital costs and post-1992, the RMG manufacturers subcontracted a larger portion of their output to small manufacturers. Over the years, the industry started falling behind in production technology due to capital hindrances. Low entry barriers and rising wage rates have led to decreasing profitability over time (Fig. 1). In general, the textile industry is facing problems with sluggish disbursements under the Technology Upgradation Fund Scheme (TUFS). The payment of interest compensation has compounded the industry's present working capital challenges. Thus, the delay in TUFS support payment has been a disincentive.²⁹

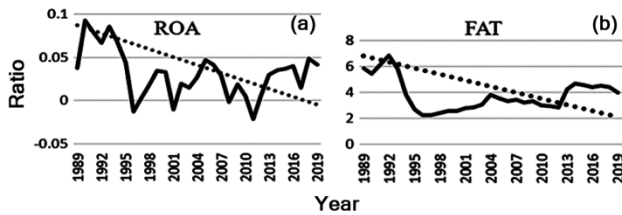


Fig. 1 — Fall in ROA & FAT of Indian RMG sector

Table 6 — Bound Test

K	N	F-statistic	Upper (1%)	Lower (1%)	Decision
3	30	11.42	5.33	7.06	Cointegration

Source: Authors' compilation.

Distributed Lag Approach to Cointegration (ARDL)

ARDL technique for cointegration can be used when variables in the model are I (0) and I (1) and mutually cointegrated.^{30,31} There are two steps to the ARDL cointegration technique. The first stage is to determine whether the variables in the model have a long-term relationship, i.e., if co integration exists (Table 6). The second stage estimates the long-run and short-run coefficients using ARDL cointegration. In this cointegration analysis, the variables (series) taken are ROA, NFAT, FAT, and CCC. CCC is I (0), rest are I (1).

For this study, Bound's test results indicated cointegration with ROA as the dependent variable.

The null hypothesis of no cointegration stands rejected, indicating that ROA and its determinants have a long-term relationship. Before establishing an Error Correction Model (ECM), the appropriate lag length needs to be specified. The lag selected is 1. VAR Granger Causality/Block Exogeneity Wald test revealed causation from NFAT, FAT, and CCC to ROA at 1 lag.

The ARDL with lags (1,0,1,0) given in Table 7, model is as per Eq. 2, ($R^2 = 74.79\%$, no autocorrelation) with the cointegrating equation as Eq. 2-ROA = $0.029 \times ROA (-1) + 1.533 \times NFAT + 0.544 \times FAT + 1.993 \times FAT (-1) + 0.004 \times CCC - 3.506$... (1)

Cointegrating Equation:

$$D(ROA) = -3.506 - 0.970 \times ROA (-1) + 1.533 \times NFAT^{**} + 2.538 \times FAT (-1) + 0.004 \times (ROA - (1.579 \times NFAT (-1) + 2.615 \times FAT (-1) + 0.004 \times CCC(-1)) + 0.544 \times D(FAT))$$
 ... (2)

The short-run model (Table 7) suggests that lagged (by one year) 1% fall (rise) in FAT decreases (increases) current ROA by 1.99%. The results obtained are in line with extant studies, except that of

Table 7 — Short-Run ARDL Lags (1,0,1,0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ROA _{t-1}	0.029	0.152	0.192	0.848
NFAT	1.533	1.080	1.418	0.168
FAT	0.544	0.610	0.892	0.381
FAT _{t-1}	1.993	0.618	3.224	0.003
CCC	0.004	0.002	2.210	0.036
C	-3.506	1.681	-2.085	0.047
R ²	0.747			
Adj. R ²	0.694			
F-statistic	16.550			
Prob(F-statistic)	0.000			
Durbin-Watson stat	1.671			
Residual diagnostics				
LM	0.717			
(Prob.)	(0.499)			
Heteroskedasticity	1.009			
Test	(0.433)			
(Prob.)				
Jarque-Bera	2.015			
(Prob.)	(0.364)			

Source: Authors' compilation

Table 8 — Long-Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NFAT	1.579	1.102	1.433	0.164
FAT	2.615	0.544	4.798	0.000
CCC	0.004	0.002	2.159	0.041

$$EC = ROA - (1.579 \times NFAT + 2.615 \times FAT + 0.004 \times CCC) \dots (3)$$

CCC. A ten-day increase in CCC increases the ROA by 0.04% in the short run.

In the long run, approximately 97% of the deviation in ROA is corrected in one year (Eq. 3), i.e., it returns to its long-run equilibrium.

In the long run (Table 8), a 1% fall (rise) in FAT decreases (increases) ROA by 2.61%, *ceteris paribus*. On the other hand, a ten-day increase in CCC increases ROA by approximately 0.046%, *ceteris paribus*. The model passed all residual tests – no autocorrelation, normal distribution of residuals, and absence of heteroskedasticity. Wald coefficient diagnostic test confirms that the set of independent variables is collectively significant for the model. Due to parsimony, results are not reproduced here. Model stability tests (CUSUM of squares), within the 5% (+/-) range, do not show any instability of the model and its coefficients in the sample period (Fig. 2).

The significant elasticity of ROA to FAT (2.61), along with GC from FAT to ROA gives credence to the argument about the drop in productivity capacity in the RMG sector.³² The structure of the industry restricts the

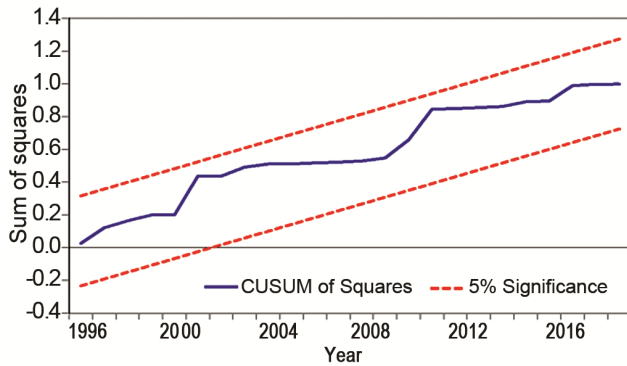


Fig. 2 — Plot of the cumulative sum of squares of residuals

increase of automation. Labor Productivity (LP) is also low, due to low technology levels and insufficient worker training.³³ Export competitiveness is adversely affected by low LP.³⁴ The decrease in FAT post-1992, along with other factors, led to the stagnation of physical capital intensity. Evidence of GC from FAT to ROA (with $r = 0.716$) suggests that investments in Net Fixed Assets (NFA) are likely to yield lower returns after one year. In general, total factor productivity (TFP) in the Indian manufacturing sector dropped in the 1990s due to capacity underutilization.³⁵ Furthermore, this justification is consistent with the conventional Hecksher-Ohlin concept, which claims that better factor endowments and manufacturing technologies influence the competitiveness of specific trade of a product.

Impact of CCC on ROA

The coefficient of CCC is positive and significant in both short and long-run ARDL models. Contrary to theory, a longer cash cycle increasing the ROA is counterintuitive. Financially constrained firms can enhance profitability by making an optimal investment in the trade cycle. Consistent with this, a study of Pakistani textile firms showed a mild positive association between CCC and profitability for the period 2010–2016.³⁶ As a source of investment, trade credit is preferred over equity and debt. Trade credit can have a smoothing effect on demand variability. Firms characterized by unstable demand can achieve comparatively higher profitability through receivables.³⁷ As a marketing tool, extended trade credit can serve as a substitute for, complement to, or aid in marketing strategies to increase sales.³⁸ SMEs operating in markets with high demand variability have been observed to achieve higher profitability by investing more in receivables than firms in markets with stable demand.³⁹ More than 95% of domestic demand in the RMG sector is satisfied by SMEs.⁴⁰

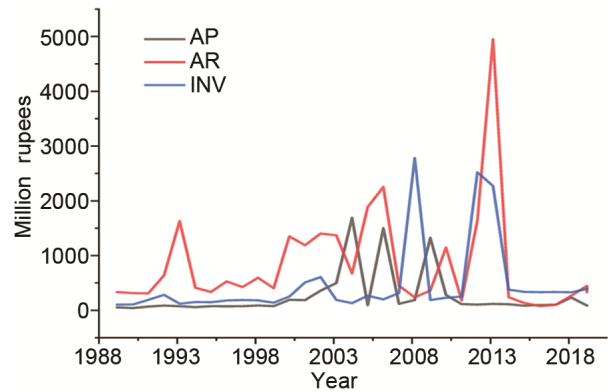


Fig. 3 — Plot of AP, AR and INV

Table 9 — OLS Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
C	-0.028	0.0059	-4.8286	0.000
ATR	0.021	0.0036	5.9915	0.000
INVS	0.085	0.0221	3.8437	0.000
R-squared	0.626	F-statistic	23.476	
Adjusted R-squared	0.599	Prob (F-statistic)	0.0000	
Durbin-Watson stat	1.856			

a. Dependent Variable: ARS
 $ARS = 0.021676(ATR) + 0.085273(INVS) - 0.028659$

In this sub-section, the causal relationship between the components of CCC, specifically AR and INV are investigated (Fig. 3). Consistent with Pecking Order Theory⁴¹, it is hypothesized that the industry can increase AR by offsetting INV, subject to diminishing returns. To mitigate any endogeneity issues, the variables are scaled by sales (resulting in INVS and ARS). The transformed variables are I (0).

GC is observed at levels from INVS to ARS. Taking Asset turnover (ATR), as a control variable, the regression equation is-

The model is robust with a strong association, $r = 0.791$, no auto correlation (DW = 1.85), and an R-squared value of 62.64%, with an F-statistic of 23.47 indicating 0.01% significance (Table 9).

A 1% rise in INVS increases ARS by 0.085%, with asset turnover as control variable. Since the marginal rate of substitution of ARS with INVS is less than one, hence the industry can offset inventory with extended receivables, albeit with diminishing returns (Fig. 4).

India is a country with the historical legacy in textile, including RMG, both manufacturing and readymade garments. The supporting or ancillary industry exist and are competitive.^{42,43} In spite of the drawbacks deduced, India has a advantage over its competitors since all the

determinants of national competitive advantage (Porter's Diamond Model) are present. This along with serious efforts by the government in the form of policies and trade associations can put RMG industry on a stronger footing. A proposed national competitive advantage model in the form of Porter's Diamond Model is given in Fig. 5.

Suggestions

Despite growing revenue and assets (fixed and total), the industry's asset turnover ratios have declined. Technology inefficiency leading to decline in capital productivity resulted in gradual decline in asset turnover

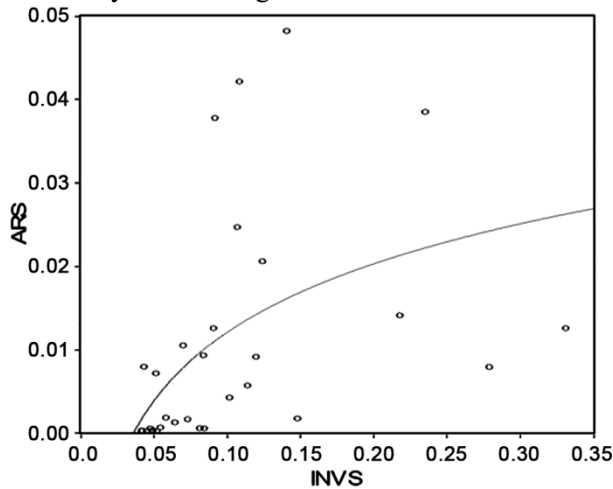


Fig. 4 — Diminishing Returns of INV

parameters. This, along with high debt servicing made matters worse. Lengthier CCC improving the ROA, confirms the bias towards trade credit rather than bank credit. Lengthening the AR to improve ROA is contingent on an extension in AP. However, this association has its limitations and may, at some point, lead to diminishing returns. The role of fixed assets (FAT) seems to be predominant in developing domestic sales rather than exports. Rising wages present a challenge to the sector, which is already grappling with delayed incentive reimbursement, withdrawal of GSP, and competition from lower wage sources like Pakistan and Bangladesh. If the present trend persists, the Indian RMG sector can face serious issues in the export market, and may even face competitive imports from Bangladesh, Pakistan, and China. Disbursements pending under TUFS can help in the upgradation of technology and provide margin money for WC Low labor productivity has been postulated to be due lack of skilled workers, which in turn cause low capital productivity. Rising wages have abetted the slide in competitiveness. With low product differentiation in RMG, sales become a factor primarily of cost competitiveness. Relaxation in labor rules can reduce the pressure of rising wages. But that will be addressing only partially the issues and challenges. Going forward, to be competitive, the industry may seriously examine the cost-competitive strategy.

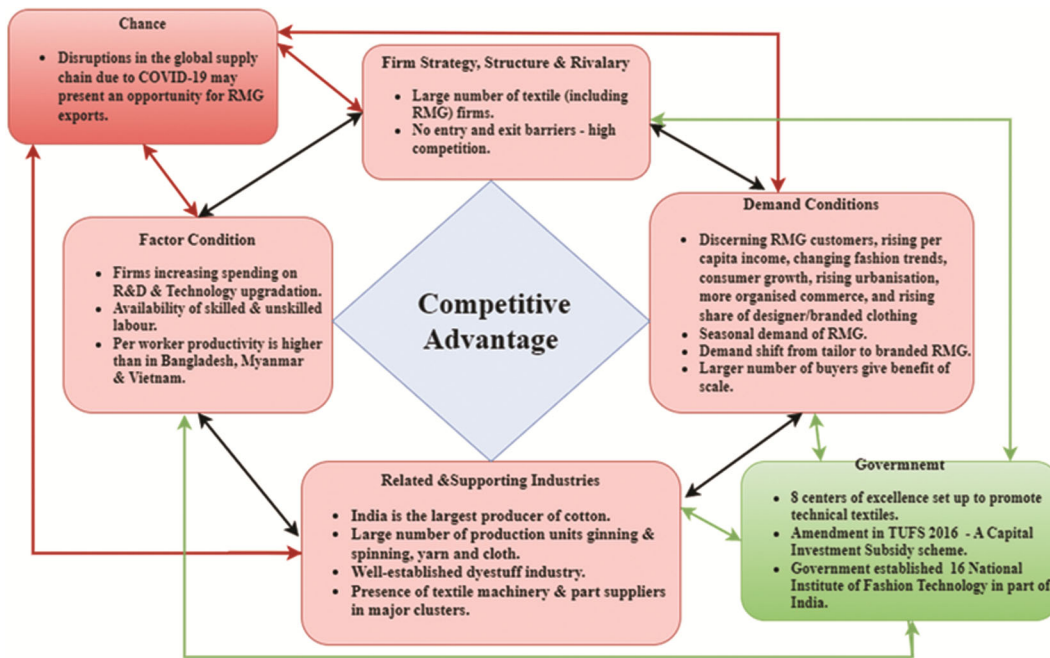


Fig. 5 — Represents proposed Porter's Diamond competitive advantage model for Indian ready-made garment industry⁴²⁻⁴⁴

Conclusions

The RMG industry faces a declining ROA due to a decline in FAT, technology inefficiency, and a decline in capital productivity. The industry has had to encourage sales through extended credit sales, which has yielded diminishing returns. This practice is exacerbated by low labor and physical productivity, increasing wages, and delayed TUFs disbursements. The industry has responded to easy entry barriers and declining FAT by encouraging sales through extended credit sales, as indicated by the GC from INVS to APS to ROA. However, this practice yields diminishing returns, further compounding the problem of declining profitability. Consequently, the RMG industry faces a declining ROA, exacerbated by low labor and physical productivity.

The RMG industry research is limited in generalizability to other textile sectors due to technological inefficiency and insufficient analysis of competition from countries like Vietnam, China, and Bangladesh. Future research should include comparative analyses, technological upgrades, competitive strategies, government policies, trade agreements, and regulatory frameworks, as well as exploring sustainable practices and digital transformation.

References

- 1 Advisors W, Annual Report on Indian Textile and Apparel Industry, (2021), <http://Efaidnbmnnnibpcajpegclefindmkaj/https://Aepcindia.Com/System/Files/Annual%20r%20and%20a%20industry%20report-2021.Pdf>, (14 April 2022).
- 2 Care ratings, Indian Readymade Garments (Apparel) Industry Overview, (2019), [http://Efaidnbmnnnibpcajpegclefindmkaj/https://www.Careratings.Com/Upload/Newsfiles/Studies/Indian%20ready%20made%20garments%20\(Apparel\)%20industry.Pdf](http://Efaidnbmnnnibpcajpegclefindmkaj/https://www.Careratings.Com/Upload/Newsfiles/Studies/Indian%20ready%20made%20garments%20(Apparel)%20industry.Pdf), (16 April 2022).
- 3 Bai J & Perron P, Computation and analysis of multiple structural change models, *J Appl Econ*, 18 (2003) 1–22, <https://doi.org/10.1002/Jae.659>.
- 4 Bhandari A K, Withdrawal of the multifibre agreement and Indian textile industry: concerns, efforts, and achievements, *Rev Dev Econ*, 25(3) (2021) 1397–1436, <https://doi.org/10.1111/rode.12760>.
- 5 Maity S & Sinha A, India's readymade garments export in the scenario of trade openness: an analysis of trend and structural break, in *Productivity Growth in the Manufacturing Sector-Mitigating Global Recession* (Emerald Publishing Limited) (2021) 219–229, doi: 10.1108/978-1-80071-094-820211016.
- 6 Union Budget 2013–14, Home: Department of Financial Services, *Ministry of Finance; Government of India*, <http://Efaidnbmnnnibpcajpegclefindmkaj/https://Financialservices.Gov.In/Sites/Default/Files/Annualreport2013-14%20dfs.Pdf>.
- 7 Planning Commission, Government of India, Eleventh five-year plan, 2007–2012: Agriculture, rural development, industry, services, and physical infrastructure (Oxford University Press) 2018, 139–236.
- 8 Singh A & Nijhar K, Recent developments in the garment supply chain, *Automation in Garment Manufacturing*, (2018) 377–396, doi:10.1016/B978-0-08-101211-6.00015-X.
- 9 Hyunju J & Choonsup H, Financial ratio analysis of the textile and apparel industries, *J Fash Bus*, 15 (2011) 125–141, doi:10.12940/JFB.2011.15.3.125.
- 10 Ju J & Yu X, Productivity, profitability, production and export structures along the value chain in China, *J Comp Econ* 43 (2015) 33–54, doi: 10.1016/j.jce.2014.11.008.
- 11 Akbar A, Working capital management and corporate performance of textile sector in Pakistan, *Eur Acad Res*, 9 (2014) 100–114.
- 12 Garcia-Teruel P J & Martínez-Solano P, Effects of working capital management on SME profitability, *Int J Manag Financ*, 3 (2007) 164–177, doi: 10.1108/17439130710738718.
- 13 Sahoo P & Ashwani, Covid-19 and Indian economy: impact on growth, manufacturing, trade and MSME sector, *Glob Bus Rev*, 21 (2020) 1159–1183, <https://doi.org/10.1177/0972150920945687>.
- 14 Meah M R, Sen K K & Sahabuddin M, Do working capital decision and efficiency of working capital management contribute to the profitability? evidence from Bangladesh, *Asia-Pacific J Manag Res Innov*, 17 (2021) 7–16, doi: 10.1177/2319510X211047368.
- 15 Mahor N & Banerji A, Profitability study of Indian pharmaceutical industry: A co integration approach, *J Sci Ind Res*, 82 (2023) 973–982, <https://doi.org/10.56042/jsir.v82i9.2180>.
- 16 Petersen M A & Rajan R G, Trade credit: theories and evidence, *Rev Financ Stud*, 10(3) (1997) 661–691, doi: 10.1093/rfs/10.3.661.
- 17 Lu J W & Beamish P W, The internationalization and performance of SMEs, *Strateg Manag J*, 22 (2001) 565–586, <https://doi.org/10.1002/smj.184>.
- 18 Ullah A, Pinglu C, Ullah S, Zaman M & Hashmi S H, The nexus between capital structure, firm-specific factors, macroeconomic factors and financial performance in the textile sector of Pakistan, *Heliyon*, 6(8) (2020) E04741, <https://doi.org/10.1016/j.heliyon.2020.e04741>.
- 19 Akhuan A & Abbas S, Modeling determinants of competitiveness: a case of textile sector of Pakistan, *J Text Inst*, 114(1) (2021) 22–31, <https://doi.org/10.1080/00405000.2021.2020415>.
- 20 Hagos F, Singh A P & Singh R, Determinants of competitiveness of garment industry in Ethiopia—an empirical study, *Vision*, 22(2) (2018) 121–134, <https://doi.org/10.1177/0972262918767042>.
- 21 Boehe D M & Jiménez A, How does the geographic export diversification–performance relationship vary at different levels of export intensity?, *Int Bus Rev*, 25(6) (2016) 1262–1272, <https://doi.org/10.1016/j.ibusrev.2016.03.011>.
- 22 Bellouma M, The impact of working capital management on profitability: the case of small and medium-sized export companies in Tunisia, *Manag Int*, 15(3) (2011) 71–88, doi: 10.7202/1005434ar.
- 23 Hazak A & Kotšina S, Does investment intensity impact company profitability? A cross-country empirical study, *Int Conf Econ Trade Dev*, 36 (2012) 157–161.

- 24 Gupta M C & Huefner R J, A cluster analysis study of financial ratios and industry characteristics, *J Account Res*, 10(1) (1972) 77, <https://doi.org/10.2307/2490219>.
- 25 Seth H, Chadha S & Sharma S, Benchmarking the efficiency model for working capital management: data envelopment analysis approach, *Int J Product Perform Manag*, 70(7) (2020) 1528–1560, doi: 10.1108/Ijppm-10-2019-0484.
- 26 Chauhan G S, Working Capital Dynamics, *Aust J Manag*, 46 (2021) 51–75, doi.org/10.1177/0312896220911440.
- 27 Stock J H & Watson M W, Introduction to Econometrics (Pearson Education Limited, India) 2018.
- 28 Dickey D A and Fuller W A, Distribution of the estimators for the autoregressive time series with a unit root, *J Am Stat Assoc*, 74 (1979) 427–431, <https://doi.org/10.2307/2286348>.
- 29 Aziz M A, RMG trading scenario in India and other major countries-comparative performance & issues, *Int J Bus Manag*, 6 (2011) 267–275, doi: 10.5539/ijbm.v6n6p267.
- 30 Myers S C, The capital structure puzzle, *J Finance*, 39 (3) (1984) 574–592, <https://doi.org/10.1111/j.1540-6261.1984.tb03646.x>.
- 31 Pesaran M H, Shin Y & Smith R J, Bounds testing approaches to the analysis of level relationships, *J Appl Econom*, 16(3) (2001) 289–326, <https://doi.org/10.1002/jae.616>.
- 32 Manoj G and Muraleesharan S, Productivity of Indian textile industry in the post multi fibre agreement (MFA) regime, *Asian Rev Soc Sci*, 8(1) (2019) 123–131, <https://doi.org/10.51983/arss-2019.8.1.1507>.
- 33 Seth H, Chadha S & Sharma S, Benchmarking the efficiency model for working capital management: Data envelopment analysis approach, *Int J Prod Perform Manag*, 70(7) (2020) 1528–1560, doi: 10.1108/Ijppm-10-2019-0484.
- 34 Dhiman R & Sharma M, Relation between labour productivity and export competitiveness of Indian textile industry: co-integration and causality approach, *Vision*, 23(1) (2019) 22–30, <https://doi.org/10.1177/0972262918821230>.
- 35 Goldar B, R&D intensity and exports: a study of Indian pharmaceutical firms, *Innov Dev*, 3(2) (2013) 151–167, doi: 10.1080/2157930X.2013.828878.
- 36 Bashi Z, An empirical analysis of working capital management attributes and firm's profitability evidence from the textile sector of Pakistan, *SSRN Electron J*, 1 (2021) 1–22, doi: 10.2139/ssrn.3936363.
- 37 Bussoli C & Conte D, Trade credit and firm profitability: Moderation analysis of intercompany financing in Italy, *J Small Bus Enterp Dev*, 27(6) (2020) 965–985, doi: 10.1108/JSBED-04-2020-0133.
- 38 Cheng N S & Pike R, The trade credit decision: Evidence of UK firms, *Manag Decis Econ*, 24 (2003) 419–438, <https://doi.org/10.1002/mde.1049>.
- 39 Abuhomous A A A, The Impact of offering trade credit on firms' profitability, *J Corp Account Financ*, 28(6) (2017) 29–40, <https://doi.org/10.1002/jcaf.22298>.
- 40 Roongta & Arun, Textile exports, domestic demand robust: HGH India's, (2023), The Economic Times, <https://economictimes.indiatimes.com/small-biz/sme-sector/textile-exports-should-pick-up-in-h2-2023-domestic-demand-robust-hgh-indias-arun-roongta/articleshow/98112174.cms?from=mdr>, Accessed (11 June 2023).
- 41 Myers S C, The capital structure puzzle, *J Finance*, 39(3) (1984) 574–592, <https://doi.org/10.1111/j.1540-6261.1984.tb03646.x>.
- 42 Kanupriya, Covid-19 and the Indian textiles sector: issues, challenges and prospects, *Vision*, 25 (2021) 7–11, <https://doi.org/10.1177/0972262920984589>.
- 43 Pravin & Wararkar, An increased of productivity by the expansion of plant capacity of spindles at textile industry in india in accordance with Indian textile machinery market, *Int J Text Eng Process*, 2 (2016) 32–37, .
- 44 Bagaria N, Analysing opportunities for india in global value chains in post covid-19 era, *Foreign Trade Rev*, 57 (2022) 261–282, <https://doi.org/10.1177/0015732520981470>.