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IMPACT OF WORKING CAPITAL MANAGEMENT PRACTICES ON THE FINANCIAL PERFORMANCE OF INDIAN HIGHER MID-CAP PHARMACEUTICAL COMPANIES

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Abstract
This study examines the working capital management (WCM) practices of higher mid-cap pharmaceutical companies in India and assesses their impact on financial performance, specifically Return on Assets (ROA). Using secondary data sourced from the CMIE Prowess IQ database, the research analyzes a panel of 26 Higher mid-cap pharmaceutical firms listed on the Bombay Stock Exchange (BSE) over a ten-year period from 2013–14 to 2022–23. Key components of WCM—such as raw material turnover, WIP turnover, finished goods turnover, debtors' turnover, creditors' turnover, and the current ratio—were considered as independent variables. Control variables including sales, sales growth, and debt-to-equity ratio were incorporated to account for firm-level financial characteristics. The study employs multiple regression analysis to evaluate the extent to which these variables influence ROA.
Descriptive and inferential statistical results reveal significant variability in WCM practices among the firms, with high dispersion in receivables, inventory turnover, and growth indicators. Although the regression model is statistically significant ($p < 0.001$), it explains only 15.1% of the variation in ROA, indicating that WCM practices alone do not fully determine financial performance. The findings suggest that while efficient working capital management contributes to operational efficiency, other strategic and external factors also play a vital role. The study underscores the need for customized WCM strategies and calls for future research incorporating qualitative variables and advanced econometric models to enhance understanding of profitability drivers in the pharmaceutical sector.

Keywords: Firm Performance, Pharmaceutical sector, Working Capital Management, Current Ratio, return on assets, Profitability of the firm.

Introduction

Working capital management (WCM) is a cornerstone of sound financial management and plays a pivotal role in ensuring the uninterrupted flow of a company's daily operations. It involves more than just overseeing the volume of current assets; the emphasis is placed on managing *net working capital*—the difference between current assets and current liabilities—which provides a more accurate picture of a firm's short-term financial health. An effective WCM strategy requires maintaining an optimal balance between liquidity and profitability by efficiently handling cash, marketable securities, accounts receivable, inventories, and short-term obligations.
A firm's ability to fund its day-to-day activities hinges on how well it manages this balance. Excessive investment in current assets may provide liquidity but often results in lower returns, as idle funds could be better deployed in higher-yielding ventures. Conversely, insufficient investment may impair the firm's operational continuity, leading to missed opportunities and financial strain. Therefore, WCM is not only about maintaining enough resources to meet current obligations but also about deploying those resources in a way that maximizes value and supports long-term strategic objectives. This necessitates prudent decisions in structuring short-term and long-term financing, determining optimal inventory levels, managing credit extended to customers, and ensuring timely payments to suppliers.
India's pharmaceutical industry stands as a significant contributor to both domestic economic development and global healthcare. Ranking fifth in the world by volume and fourteenth by value, the sector is a critical component of India's export economy and a key player in the global supply chain for generic medicines. However, the nature of this industry—characterized by intensive research and development, stringent regulatory compliance, long product development cycles, and high inventory and receivables—poses unique challenges for working capital management.

In such a dynamic and competitive environment, the efficient management of working capital is not merely a matter of financial prudence but a strategic imperative. Inefficiencies in managing receivables, inventories, and payables can significantly affect profitability, disrupt production cycles, and hinder the firm's ability to innovate and expand. On the other hand, a well-executed WCM strategy can improve liquidity, reduce operational costs, and enhance the firm's capacity to respond to market demands and regulatory shifts.

Given these considerations, this research seeks to explore the critical importance of working capital management in the Indian pharmaceutical industry. It aims to identify the specific financial and operational challenges firms face and examine how effective WCM practices can serve as a lever for sustainable growth, operational efficiency, and global competitiveness. In doing so, it highlights the strategic role that working capital decisions play in determining whether firms thrive or stagnate in a rapidly evolving industrial landscape.

Literature Review

A substantial body of research underscores the crucial role that effective working capital management (WCM) plays in enhancing a firm's profitability. Numerous empirical studies have demonstrated a positive correlation between prudent management of current assets and liabilities and the financial performance of firms across various sectors and countries.

Abednego Osei et al. (2023) highlight the significance of efficiently managing core components of working capital—such as inventories, cash, accounts receivable (debtors), and accounts payable (creditors)—to achieve optimal financial outcomes. Their study suggests that disciplined control over these variables is instrumental in driving profitability. In a similar vein, Fekadu Agmas Wassie (2021) investigates the influence of WCM practices on the performance of Ethiopian export firms. His findings reveal that key indicators of WCM, including the receivables period, cash conversion cycle, and payables period, are positively associated with profitability measures like return on assets (ROA) and return on investment (ROI). This reinforces the idea that WCM efficiency directly contributes to superior financial returns. Supporting this view, Pham et al. (2020) provide evidence from the Vietnamese steel industry, where effective WCM is shown to have a strong, positive effect on firm profitability. Their research highlights the operational benefits of minimizing delays in cash flows and optimizing the cycle of receivables, inventory, and payables.

In the pharmaceutical sector, Ahm Yeaseen Chowdhury (2018) examines firms in Bangladesh and concludes that efficient WCM is essential for maintaining profitability. His findings suggest that timely cash flow management and lean inventory practices significantly bolster financial performance in this highly competitive and regulation-intensive industry. However, the relationship between WCM and profitability is not always linear. A more nuanced perspective is offered by Anton and Nucu (2021) and Minhas Akbar et al. (2021), who propose an *inverted U-shaped relationship*. According to their analyses, profitability improves with enhanced working capital management up to an optimal point. Beyond this threshold, further tightening or expansion of working capital can diminish returns, indicating that over- or under-investment in working capital can be detrimental. Industry-specific characteristics also play a pivotal role in shaping the WCM-profitability linkage. For example, Rey Ares et al. (2021), in their study on Spanish fish canning companies, reveal that strategic choices in WCM—particularly regarding collection periods and inventory conversion cycles—significantly impact economic profitability. Their work illustrates how sector-specific operational dynamics influence the effectiveness of WCM strategies.

In the Indian context, Farhan et al. (2021) delve into the differences in WCM practices among small, medium, and large pharmaceutical firms. Their research shows that firm size affects the structure and implementation of working capital policies, with larger firms often enjoying greater efficiency due to economies of scale and better access to credit markets. Macroeconomic conditions further add complexity to the WCM-profitability relationship. Iman and Mehdi (2019) find that broader economic indicators such as inflation and gross domestic product (GDP) influence firm performance. Specifically, while both inflation and GDP show a positive relationship with return on assets (ROA), only inflation has a significant effect on refined economic value added (REVA). This suggests that external economic factors can mediate the impact of internal working capital decisions on profitability metrics. It is also important to acknowledge divergent findings in the literature. Yousaf and Bris (2021), for example, present a contrasting perspective in their study of Czech firms. They report a negative relationship between working capital and firm performance, suggesting that excessive investment in current assets may lead to inefficiencies and drag down profitability.

Research Gap

While extensive research has established a general relationship between working capital management (WCM) and financial performance across various sectors and geographies, there remains a noticeable gap in sector-specific and size-specific analysis—particularly within the context of India's pharmaceutical industry. Most prior studies have focused on either large-cap or small firms, or have examined WCM in broader industrial contexts without disaggregating findings based on firm size categories such as mid-cap companies.

Furthermore, although the Indian pharmaceutical industry is globally recognized for its volume and reach, few empirical studies have specifically addressed how WCM practices influence the financial performance of higher mid-cap pharmaceutical firms, which represent a crucial and rapidly expanding segment of the industry. These firms typically face unique operational and financial challenges: they are large enough to experience complexities in inventory, receivables, and payables management, yet may lack the resource buffer and market leverage enjoyed by large-cap firms.

Additionally, much of the existing literature has focused on generalized profitability metrics such as return on assets (ROA) or return on equity (ROE), without delving deeply into how specific WCM components—like the cash conversion cycle, receivables turnover, or payables period—individually and collectively affect firm-level performance in mid-cap pharmaceutical settings. Moreover, the potential moderating role of macroeconomic and regulatory factors in this segment has been largely unexplored.

Therefore, there is a clear need for focused empirical investigation into the impact of WCM practices on the financial performance of Indian higher mid-cap pharmaceutical companies. This study aims to fill this gap.

Objectives

1. To examine the working capital management practices adopted by higher mid-cap pharmaceutical companies in India.
2. To assess the impact of key components of working capital—such as inventory turnover, receivables period, payables period, and cash conversion cycle—on financial performance indicators like return on assets (ROA)

Research Methodology

This study aims to evaluate the impact of working capital management (WCM) practices on the financial performance of Indian pharmaceutical companies, specifically those listed on the Bombay Stock Exchange (BSE). The analysis is grounded in secondary data sourced from the Centre for Monitoring Indian Economy (CMIE) Prowess IQ database—an established and reliable source of financial and corporate performance information in India.

From a total of 129 listed pharmaceutical companies available in the BSE dataset, 26 companies were selected for the study. The selection was based on data availability and completeness, ensuring the inclusion of firms with consistent financial records over the analysis period. These selected firms were categorized as higher mid-cap pharmaceutical companies, based on their market capitalization between 100 crores to 1000 crores, aligning with the study's focus on this specific firm size segment.

The study encompasses a 10-year period from financial year 2013–14 to 2022–23, providing a longitudinal perspective on WCM practices and their effects across different business cycles and regulatory environments. This extended time frame enhances the robustness of the analysis and allows for capturing trends and patterns over time.

To empirically investigate the relationship between WCM and financial performance, the study employs multiple regression analysis as the primary analytical technique. This method facilitates the examination of how various components of working capital management influence the firm's profitability, measured through Return on Assets (ROA)—a widely accepted indicator of operational efficiency and financial health.

The independent variables representing WCM practices include:

- Raw Material Turnover Ratio
- Work-in-Progress (WIP) Turnover Ratio
- Finished Goods Turnover Ratio
- Debtors Turnover Ratio
- Creditors Turnover Ratio
- Current Ratio

These variables collectively provide a comprehensive view of how efficiently firms manage different stages of their working capital cycle—from procurement to production to sales and collections.

In addition to WCM variables, the model incorporates several control variables to account for firm-specific and structural differences that could affect financial performance. These include:

- Company Size (measured by total assets or sales revenue)
- Sales Growth Rate
- Debt-to-Equity Ratio

By including these control variables, the study ensures a more accurate estimation of the isolated impact of WCM on ROA, controlling for other financial and operational dynamics.

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Data Analysis and Findings

To study the impact of working capital management practices on the performance of Indian higher mid-cap pharmaceutical companies, multiple regression has been used. As a part of multiple regression analysis is conducted with the help of model summary, Anova results and coefficient results. The statistical results of multiple regression are as follows.

Table 1: Descriptive Statistics of higher Mid-Cap Pharmaceutical Companies

	Min	Max	Mean	Std. Deviation	Skewness	Kurtosis
Raw material turnover	0	39	6.58	5.292	3.333	14.383
WIP turnover	1	735	32.45	57.966	8.269	88.854
Finished goods turnover	3	501	24.1	45.66	6.904	58.937
Debtors turnover	1	15424	67.88	956.574	16.097	259.395
Creditors turnover	0	30	4.07	2.978	5.511	41.983
Current ratio	0	33	1.98	2.549	8.542	93.842
Debt-to-equity ratio	0	19	0.58	1.516	7.987	87.116
Sales	22	51491	8866.85	8596.82	2.257	6.908
Growth	-100	533	13.88	56.101	4.754	36.637
Return on Assets	-13	116	8.24	11.097	3.814	33.875

Source: Compiled from CMIE Prowess IQ

The descriptive statistics of higher mid-cap pharmaceutical companies, compiled from CMIE Prowess IQ, reveal significant variability and skewness across key operational and financial indicators. The raw material turnover ratio has a relatively low mean of 6.58 and a standard deviation of 5.29, but shows positive skewness (3.333) and high kurtosis (14.383), indicating a concentration of lower values with a few high outliers. Work-in-progress (WIP) turnover and finished goods turnover exhibit even more pronounced skewness (8.269 and 6.904, respectively) and kurtosis (88.854 and 58.937), with large standard deviations, highlighting extreme outliers and wide variation among firms in inventory management practices.

Debtors' turnover presents the most extreme values, with a mean of 67.88 and a staggering standard deviation of 956.57, alongside very high skewness (16.097) and kurtosis (259.395). This indicates that while most companies maintain reasonable debtor turnover levels, a few firms exhibit extremely high values, possibly due to large credit sales or delayed collections. Similarly, the current ratio (mean = 1.98, skewness = 8.542) and debt-to-equity ratio (mean = 0.58, skewness = 7.987) suggest that although average liquidity and leverage appear manageable, the distribution is heavily skewed, pointing to the presence of firms with either excessively high liquidity buffers or minimal debt levels.

In terms of sales, the mean value stands at ₹8,866.85 crore with considerable dispersion (standard deviation = ₹8,596.82 crore) and moderate skewness (2.257), suggesting variation in market size and operational scale. Growth in revenue shows a wide range from -100% to 533%, with a mean of 13.88% and high variability (standard deviation = 56.10), reflecting the dynamic and competitive nature of the pharmaceutical industry. Return on Assets (ROA), though averaging a reasonable 8.24%, also shows substantial skewness (3.814) and kurtosis (33.875), signifying the presence of firms with exceptionally high or negative returns. Overall, the data depict a sector characterized by high heterogeneity in operational efficiency, financial structure, and performance, with notable outliers influencing the aggregate measures.

Table 2: Coefficient of Variation of higher Mid-Cap Pharmaceutical Companies

	Mean	Std. Deviation	Coefficient of Variation
Return on Assets	8.15	11.019	1.353
Raw material turnover	6.61	5.286	0.800
WIP turnover	32.45	57.966	1.786
Finished goods turnover	24.17	45.731	1.892
Debtors turnover	68.03	958.423	14.087

Creditors turnover	4.06	2.979	0.733
Current ratio	1.98	2.553	1.292
Debt-to-equity ratio	.59	1.518	2.587
Sales	8879.55	8611.021	0.970
Growth	13.91	56.206	4.040

Source: Compiled from CMIE Prowess IQ

The coefficient of variation (CV) analysis of higher mid-cap pharmaceutical companies, based on data from CMIE Prowess IQ, provides insights into the relative dispersion of key financial and operational variables. A lower CV indicates greater stability and consistency, while a higher CV reflects higher variability in relation to the mean. Among the indicators, creditors turnover (CV = 0.733) and raw material turnover (CV = 0.800) exhibit the lowest variation, suggesting that most companies maintain relatively stable procurement and payment practices. Sales also show moderate consistency (CV = 0.970), indicating that revenue figures, although high in absolute terms, are relatively less dispersed across firms. Similarly, return on assets (CV = 1.353) and current ratio (CV = 1.292) exhibit moderate variability, implying a fair degree of uniformity in profitability and liquidity management among the firms.

In contrast, WIP turnover (CV = 1.786) and finished goods turnover (CV = 1.892) display high variability, indicating significant differences in inventory management efficiency. The debt-to-equity ratio (CV = 2.587) also shows considerable dispersion, suggesting varying capital structures, with some firms being highly leveraged and others operating with minimal debt. More concerning are the high coefficients of variation for growth (CV = 4.040) and debtors turnover (CV = 14.087). The extreme variability in debtors' turnover implies inconsistent credit policies and collection efficiency across companies, while the high CV for growth reflects a volatile business environment where some firms achieve rapid expansion and others experience negative growth. Overall, the data reveal a mix of consistency in core operations and liquidity, but also wide disparities in growth, credit management, and capital structure among mid-cap pharmaceutical companies.

Table 3: Model Summary results of Higher Mid-cap pharmaceutical companies

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.388[a]	0.151	0.12	10.336
a. Predictors: (Constant), Growth, Sales, Debtors turnover, Debt-to-equity ratio, Raw material turnover, Current ratio, Finished goods turnover, Creditors turnover, WIP turnover				

Source: Compiled from CMIE Prowess IQ

The model summary results for higher mid-cap pharmaceutical companies, based on multiple regression analysis, reveal a modest relationship between the selected predictor variables and the dependent variable (likely Return on Assets or another performance metric). The multiple correlation coefficient (R = 0.388) suggests a weak positive linear relationship between the predictors—growth, sales, debtors turnover, debt-to-equity ratio, raw material turnover, current ratio, finished goods turnover, creditors turnover, and WIP turnover—and the dependent variable.

The R Square value of 0.151 indicates that only 15.1% of the variance in the dependent variable is explained by the model. While this demonstrates that the model captures some of the influencing factors, a large proportion of the variation remains unexplained, suggesting the presence of other critical variables outside the model. The adjusted R Square, which adjusts for the number of predictors and sample size, is slightly lower at 0.12, reinforcing the limited explanatory power of the model. The standard error of the estimate is 10.336, which reflects the average distance that the observed values fall from the regression line.

Table 4: ANOVA results of Higher Mid-cap pharmaceutical companies

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	4723.979	9	524.887	4.913	.000[b]
	Residual	26602.445	249	106.837		
	Total	31326.425	258			
a. Dependent Variable: Return on Assets						

b. Predictors: (Constant), Growth, Sales, Debtors turnover, Debt-to-equity ratio, Raw material turnover, Current ratio, Finished goods turnover, Creditors turnover, WIP turnover

Source: Compiled from CMIE Prowess IQ

The ANOVA results for higher mid-cap pharmaceutical companies provide statistical evidence regarding the overall significance of the multiple regression model used to predict Return on Assets (ROA). The regression model, which includes predictors such as growth, sales, debtors turnover, debt-to-equity ratio, raw material turnover, current ratio, finished goods turnover, creditors turnover, and WIP turnover, shows a regression sum of squares of 4,723.979 with 9 degrees of freedom, while the residual sum of squares is 26,602.445 with 249 degrees of freedom, resulting in a total sum of squares of 31,326.425. The mean square for the regression is 524.887, and the mean square for the residual is 106.837, yielding an F-statistic of 4.913. This F-value is associated with a significance level (p-value) of .000, which is well below the conventional threshold of 0.05. This indicates that the regression model as a whole is statistically significant and that the included independent variables, taken together, significantly predict the dependent variable (ROA). Despite the overall model significance, as highlighted in Table 3, the low R Square (0.151) suggests that while the model is statistically valid, its practical explanatory power is limited.

Table 5: Coefficients results of Higher Mid-cap pharmaceutical companies

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	4.510	1.654		2.728	.007
	Raw material turnover	.413	.125	.198	3.313	.001
	WIP turnover	-.011	.015	-.060	-.742	.459
	Finished goods turnover	.015	.015	.064	1.041	.299
	Debtors turnover	.001	.001	.055	.935	.351
	Creditors turnover	.056	.280	.015	.199	.843
	Current ratio	-.115	.270	-.027	-.425	.671
	Debt-to-equity ratio	-1.590	.430	-.219	-3.699	.000
	Sales	.000	.000	.106	1.771	.078
	Growth	.042	.013	.216	3.153	.002

a. Dependent Variable: Return on Assets

Source: Compiled from CMIE Prowess IQ

The coefficient results from the regression analysis (Table 5) reveal the impact of various working capital components and control variables on the financial performance of higher mid-cap pharmaceutical companies, measured by Return on Assets (ROA). Among the independent variables, raw material turnover has a positive and statistically significant influence on ROA ($B = 0.413$, $t = 3.313$, $p = 0.001$), indicating that better utilization of raw materials is associated with improved profitability.

Growth also shows a significant positive effect on ROA ($B = 0.042$, $t = 3.153$, $p = 0.002$), suggesting that companies experiencing higher revenue growth tend to generate higher returns. Conversely, the debt-to-equity ratio has a significant negative impact on ROA ($B = –1.590$, $t = –3.699$, $p = 0.000$), implying that firms with higher leverage are likely to experience reduced profitability, possibly due to higher financial risk or interest burden.

Other variables, such as WIP turnover, finished goods turnover, debtors turnover, creditors turnover, current ratio, and sales, do not show statistically significant relationships with ROA, as their p-values exceed the 0.05 threshold. This indicates that, within this dataset, these components of working capital management and firm size (as measured by sales) do not have a strong direct influence on financial performance.

In summary, the regression model identifies raw material efficiency, growth rate, and capital structure (debt-equity ratio) as the key significant predictors of ROA in higher mid-cap pharmaceutical firms, while other working capital elements appear to have a limited direct impact.

Conclusion:

The statistical analysis of higher mid-cap pharmaceutical companies reveals significant variability and complexity in their financial and operational performance. The descriptive statistics and coefficient of variation indicate high dispersion in key variables such as debtors' turnover, WIP turnover, finished goods turnover, growth, and debt-to-equity ratio, suggesting heterogeneity in inventory management, credit practices, growth trajectories, and capital structure across firms. While some indicators like raw material turnover, creditors turnover, and sales display relative consistency, others reflect extreme values and outliers, pointing to differing business strategies and operational efficiencies within the sector.

The regression model, although statistically significant ($p < 0.001$), demonstrates limited explanatory power, with an R Square of only 15.1%, indicating that the selected predictors—growth, sales, various turnover ratios, current ratio, and debt-to-equity ratio—explain only a small portion of the variability in Return on Assets. The ANOVA results confirm the model's significance, yet the high standard error of estimate (10.336) and the weak R value (0.388) reinforce the conclusion that other critical factors influencing profitability are not captured by the current model.

Implications

1. **Managerial Insights on Working Capital Management (WCM):** The study highlights that while certain working capital components—such as inventory and receivables turnover—vary significantly across firms, their collective impact on financial performance (ROA) is statistically significant, though relatively limited. This suggests that WCM practices do matter, but their influence may be moderated by firm-specific strategies, industry conditions, or external factors.
2. **Need for Tailored Financial Strategies:** The high variability and weak explanatory power of the model indicate that a one-size-fits-all approach to WCM may not be effective. Managers in mid-cap pharmaceutical firms must design customized strategies that align working capital policies with firm size, market dynamics, and operational models.
3. **Risk and Liquidity Management:** The extreme skewness and high coefficients of variation in variables such as debtors' turnover and current ratio suggest inconsistent liquidity management across firms. Companies should benchmark against industry leaders to improve credit control and inventory efficiency, reducing risk and enhancing return on assets.
4. **Policy and Regulatory Relevance:** Given the industry's importance to public health and the economy, regulators and policymakers may use such empirical insights to promote best practices in financial management, especially for mid-sized firms that are critical to domestic supply chains.

Limitations

1. **Limited Explanatory Power:** The regression model explains only 15.1% of the variance in ROA, indicating that other important factors influencing profitability are not included—such as R&D intensity, product pipeline, export orientation, and regulatory compliance costs.
2. **Sample Constraints:** The study focuses on 23 higher mid-cap companies out of 129 listed pharmaceutical firms, which, although carefully selected for data completeness, may not be fully representative of the broader industry.
3. **Reliance on Secondary Data:** While CMIE Prowess IQ is a reliable source, the accuracy and completeness of secondary data can be a constraint. Non-financial indicators (e.g., management quality, innovation strategy, operational bottlenecks) are not captured.
4. **Static WCM Indicators:** The study uses traditional working capital ratios, which may not reflect real-time cash flow challenges or dynamic shifts in working capital requirements due to seasonal or market disruptions (like COVID-19 or global supply chain shocks).

Scope for Further Research

1. **Inclusion of Qualitative Factors:** Future studies could integrate qualitative variables such as supply chain integration, ERP systems, managerial efficiency, or governance practices, which may better explain differences in financial performance.
2. **Comparative Analysis across Market Segments:** Expanding the study to include small-cap and large-cap pharmaceutical companies could offer a broader perspective and enable comparative benchmarking of WCM effectiveness across different firm sizes.
3. **Cash Conversion Cycle (CCC) Analysis:** Introducing the Cash Conversion Cycle as a synthesized measure of WCM efficiency may yield deeper insights into how firms optimize the timing of cash inflows and outflows.

4. **Event- or Crisis-Based Analysis:** Examining WCM behavior during external shocks**,** such as the pandemic or economic downturns, could reveal how firms adapt their strategies under stress, contributing to crisis management literature.
5. **Panel Data or Time Series Econometric Models:** Using advanced econometric techniques such as fixed-effects models or dynamic panel regressions can better capture firm-level heterogeneity and the longitudinal impact of WCM on performance.

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