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A Study on Designing and Managing the Supply Chain Process and its Impact on Business Performance to Gain a Long-Term Competitive Advantage

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Abstract: ***This study aims to understand factors that improve business performance and gain a competitive advantage. It compares the operations and supply chain procedures of automakers like General Motors, Toyota, and Ford to assess their management efficiency ratios. The research examines the cash conversion cycle, cash conversion cycle, receivables turnover, inventory turnover, and total asset turnover. General Motors leads in quickly turning sales into profits, with shorter collection periods and lower inventory holdings. The study also highlights the complex interplay between financial success, competitive advantage, and operational excellence in the automobile sector. By utilizing this information, companies can improve their supply chain operations and long-term competitiveness.***

Keywords: Management efficiency ratio, automotive sector, Ford, Toyota, GM, SCM Operations, long-term competitiveness, total asset turnover, inventory turnover, cash conversion cycle, receivable turnover.

I. INTRODUCTION

A common set of financial indicators that Wall Street tracks to benchmark companies are called management efficiency ratios. A company studies other companies to identify good practices. In this study we will study some data of four companies and study the significant impact of operations and supply chain processes. In this, we will learn that the first four measures show how quickly the cash received from the sale is converted into profit. A company buys raw materials on credit, or converts them into manufactured products, sells products to customers on credit, or receives payment in cash from customers, then buys raw materials, this cycle continues continuously in business and the quicker the cycle, the better for the company. Inventory is a crucial asset in many businesses, often being the largest asset on the balance sheet, despite its often not being very liquid. Inventory is a crucial financial asset, and excess can result in a company with insufficient funds to operate effectively. Effective inventory management is crucial for a company's growth as it saves money and provides a competitive advantage.

Here it appears that General Motors carries the least inventory. The receivables turnover ratio measures a company's efficiency in collecting sales on credit, with a higher ratio indicating cash operations or efficient credit collection methods. Factors affecting this ratio include product delivery speed, order accuracy, and customer interaction, especially in online catalogues.

Inventory turnover ratio measures a company's efficiency in converting inventory into sales, indicating liquidity and speed of usage. Low ratios indicate inefficiency, while high ratios suggest strong sales or ineffective buying. Factors like lead times, purchasing practices, and production impact this ratio. Total asset turnover measures a firm's efficiency in using assets for sales revenue generation, indicating pricing strategy. It varies by industry and can be influenced by investments in technology and outsourcing.

II. NEED AND SIGNIFICANCE OF THE STUDY

The need for or significance of this study is taken through the data obtained, implement best practices in your organization and design or manage the supply chain. Can gain a competitive advantage and thus reduce the impact on business. Factor can be summarized as follows:

1) *Efficiency Improvement:*-Management efficiency ratios measure a company's operations and supply chain processes. Improving these requires strategic supply chain management, including inventory management, supplier negotiation, and order processing.

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2) *Competitive Advantage:* - Companies can gain competitive advantage by using Management Efficiency Ratio. Efficient supply chain management offers a competitive advantage, as demonstrated by companies like General Motors. This optimizes operations, reduces costs, improves cash flow, and enhances customer satisfaction, thereby gaining a market edge.
3) *Long-Term Performance:* - Supply chain management is crucial for long-term business performance, ensuring agility, responsiveness, and cost-effectiveness. Companies continuously monitor and optimize efficiency ratios to adapt to market conditions, customer demands, and competitive pressures.
4) *Significant of the Study:* -

- *Strategic Insights:* - The study explores supply chain management strategies for companies to gain a competitive advantage, identifying best practices and areas for improvement.
- *Performance Enhancement:* -Understanding the impact of supply chain design and management on business performance enables companies to enhance operations, leading to cost savings, improved efficiency, and enhanced customer service.
- *Risk Mitigation:* - Supply chain management mitigates risks like inventory stock outs, supply disruptions, and cash flow issues by implementing best practices and enhancing company resilience in uncertain situations.
- *Strategic Investment:* - The study emphasizes the significance of strategic investments in technology, infrastructure, and talent for enhancing supply chain excellence, driving long-term growth and profitability.

III. LITERATURE REVIEW

1) Barbara B. Flynn, Baofeng Huo, Xiande Zhao (2009), the study explores the relationship between supply chain integration (SCI) and performance, focusing on internal, customer, and supplier integration. It finds that SCI significantly impacts operational and business performance, with internal and customer integration enhancing performance more than supplier integration. The study emphasizes the importance of a holistic approach for superior performance outcomes.
2) David M. Gligor (2016), the research explores the relationship between a firm's environmental characteristics and supply chain fit (SCF). It reveals a negative correlation between environmental uncertainty and SCF, suggesting challenges in aligning design with product characteristics. The study highlights the financial benefits of resource deployment in enhancing SCF and agility, offering strategic implications for firms in uncertain environments.
3) Mei Cao, Qingyu Zhang (2010), the study explores the impact of supply chain collaboration on firm performance, focusing on collaborative advantage. Results show that collaboration enhances this advantage, leading to improved performance. Firm size moderates this relationship, with collaborative advantage mediating the link for small firms and partially for medium and large firms.
4) Kaur Arshinder, Arun Kanda & S. G. Deshmukh (2011), This paper reviews the importance of supply chain coordination in today's interconnected world, focusing on various perspectives, mechanisms for managing uncertainty, and research gaps. It highlights the need for unified systems and collaborative efforts among SC members to effectively address uncertainties, providing valuable insights for enhancing supply chain management and navigating contemporary challenges.
5) Rudolf Leuschner, Dale S. Rogers, François F. Charvet (2013), This meta-analytic review confirms a positive correlation between supply chain integration (SCI) and firm performance, based on 86 peer-reviewed articles and 17,467 observations. The study highlights the importance of collaboration between customers and suppliers in SCI, emphasizing the need for optimized integration for enhanced firm performance.
6) Steven A. Melnyk, Ram Narasimhan, Hugo A. DeCampos (2013), this literature highlights the importance of strategic alignment and deliberate management in optimizing supply chain performance. It proposes a framework that includes influencers, design decisions, and building blocks, encompassing business environment, model, outcomes, life cycle, inventory, transportation, capacity, and technology. The framework highlights research opportunities and covered areas for further understanding.
7) Piyush Singhal, G. Agarwal, M.L. Mittal, (2011), The study explores the impact of efficiency strategies like outsourcing and lean on firms, highlighting the need for supply chain risk management (SCRM) to mitigate market uncertainties and disruptions. It classifies SCRM literature and proposes future research dimensions, focusing on coordination, decision-making and sector-specific implementation issues.
8) Yao Zhao, (2002) this thesis examines the impact of information technology on supply chain management, focusing on the value of information sharing and demand-related insights.

It develops two models, one addressing inventory cost reduction in a two-stage supply chain and another improving forecast accuracy in a multi-stage supply chain. The study also explores optimal production-inventory policies, cyclic order-up-to policies, and information sharing frequency and timing.

IV. OBJECTIVES OF THE RESEARCH

1) Analyze and compare management efficiency ratios, including the cash conversion cycle, receivables turnover, inventory turnover, and total asset turnover, among automakers such as General Motors, Toyota, and Ford.
2) Investigate the impact of operations and supply chain processes on these management efficiency ratios, emphasizing factors such as inventory management, receivables turnover, and asset utilization.
3) Identify best practices and areas for improvement in operations and supply chain procedures based on the analysis of management efficiency ratios.
4) Understand the relationship between efficient supply chain operations, financial performance, and competitive advantage in the automotive industry.
5) Provide insights and recommendations for companies to enhance their supply chain operations, optimize management efficiency ratios, and achieve long-term competitiveness.

V. HYPOTHESIS

1) H0: There is no significant difference in management efficiency ratios, including the cash conversion cycle, receivables turnover, inventory turnover, and total asset turnover, among General Motors, Toyota, and Ford.
   H1: There is a significant difference in management efficiency ratios among General Motors, Toyota, and Ford.
2) H0: Operations and supply chain processes do not significantly impact management efficiency ratios, including inventory management, receivables turnover, and asset utilization.
   H1: Operations and supply chain processes significantly impact management efficiency ratios, including inventory management, receivables turnover, and asset utilization.
3) H0: There are no discernible best practices or areas for improvement in operations and supply chain procedures based on the analysis of management efficiency ratios. H1: There are identifiable best practices and areas for improvement in operations and supply chain procedures based on the analysis of management efficiency ratios.
4) H0: There is no significant relationship between efficient supply chain operations, financial performance, and competitive advantage in the automotive industry.
   H1: There is a significant relationship between efficient supply chain operations, financial performance, and competitive advantage in the automotive industry.
5) H0: Recommendations for enhancing supply chain operations and optimizing management efficiency ratios do not lead to long-term competitiveness for companies in the automotive industry.
   H1: Recommendations for enhancing supply chain operations and optimizing management efficiency ratios lead to long-term competitiveness for companies in the automotive industry.

VI. SCOPE OF THE STUDY

1) *Automotive Industry Focus:* The study concentrates on the automotive industry, specifically comparing management efficiency ratios among key players such as General Motors, Toyota, and Ford.
2) *Management Efficiency Ratios:* The study examines and compares various management efficiency ratios, including the cash conversion cycle, receivables turnover, inventory turnover, and total asset turnover.
3) *Operations and Supply Chain Processes:* The impact of operations and supply chain processes on management efficiency ratios is investigated, with a focus on factors such as inventory management, receivables turnover, and asset utilization.
4) *Best Practices Identification:* The study identifies best practices and areas for improvement in operations and supply chain procedures based on the analysis of management efficiency ratios.
5) Relationship Analysis: The relationship between efficient supply chain operations, financial performance, and competitive advantage in the automotive industry is explored.
6) *Insights and Recommendations:* Insights and recommendations are provided for companies to enhance their supply chain operations, optimize management efficiency ratios, and achieve long-term competitiveness in the automotive industry.

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VII. RESEARCH METHODOLOGY

The research design used in this study is likely a combination of descriptive and comparative research designs, focusing on quantitative analysis. This study uses a combination of descriptive and comparative research designs, focusing on quantitative analysis. It describes and analyses management efficiency ratios of General Motors, Toyota, and Ford using descriptive statistics. The study compares these ratios to identify significant differences, using statistical tests. Quantitative analysis examines relationships between efficiency ratios, operations, supply chain processes, financial performance, and competitive advantage. A cross-sectional design allows for a snapshot comparison. Longitudinal analysis may be incorporated for assessing changes over time.

VIII. DATA COLLECTION

Secondary data: Secondary data is collected from previous research and literature to fill in the respective project. The secondary data was collected through:

- Articles
- Websites

Sample size: 3 Company and 7 factors.

Analysis Technique: This Operating Performance data has been collected from the website. After this a comparison of different management efficiency factors has been done.

IX. DATA ANALYSIS & INTERPRETATION

A comparison of Automobile Companies

Efficiency Measure	Ford(F)	General Motors(GM)	Toyota(TM)
Days sales outstanding	128.91	98.13	119.15
Days inventory	34.81	38.84	43.4
Days payables	67.81	67.43	43.93
Cash conversion cycle	95.91	69.54	118.62
Receivables turnover	2.83	3.72	3.06
Inventory turnover	10.48	9.4	8.41
Total asset turnover	0.52	0.53	0.47

Operating Performance 2021 report

1) Days sales outstanding:-

Efficiency Measure	Ford(F)	General Motors(GM)	Toyota(TM)
Days sales outstanding	128.91	98.13	119.15

Best at this Factor

Analysis

General Motors is the best at this, taking about 98.13 days to be paid for cars that have been shipped to dealers.

Interpretation

Days a sale outstanding refers to the time it takes for a company to collect cash from customers. For automobile companies this is known as floor plan financing.

2) Days inventory:-

Efficiency Measure	Ford(F)	General Motors(GM)	Toyota(TM)
Days inventory	34.81	38.84	43.4

Analysis

Here it appears that Ford Motors carries the least inventory. It holds the lowest inventory of 34.81 days, which is the lowest among all these.

Interpretation

Day's inventory refers to the total amount of inventory a company holds in operation and supply chain processes, including raw material, work-in-process, and finished goods.

3) Days payables

Efficiency Measure	Ford(F)	General Motors(GM)	Toyota(TM)
Days payables	67.81	67.43	43.93

Analysis

General Motors takes an average of 67.43 days to pay its suppliers, while Toyota takes only 43.93 days. General Motors is the slowest at paying its suppliers, Toyota is the quickest.

Interpretation

The payables measure indicates the speed at which a company pays its suppliers.

4) Cash conversion cycle:-

Efficiency Measure	Ford(F)	General Motors(GM)	Toyota(TM)
Days sales outstanding	128.91	98.13	119.15
Days inventory	34.81	38.84	43.4
Days payables	67.81	67.43	43.93
Cash conversion cycle	95.91	69.54	118.62

Analysis

The comprehensive measure suggests that General Motors is the most suitable company, followed by Toyota and then Ford. Because General Motors takes the least among these at 69.54 days.

Interpretation

The cash conversion cycle time refers to the time it takes a company to turn the money spent on raw materials into the profit it receives from the products that use those raw materials.

A comprehensive measure is the cash conversion cycle that is calculated as follows:

Formula

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Cash conversion cycle = Days sales outstanding + Days inventory - Days payables
Find out General Motors Cash conversion cycle-
Day's sales outstanding- 98.13
Day's inventory- 38.84
Day's payables- 67.43
Put the all value in formula:-
Cash conversion cycle = 98.13 + 38.84 - 67.43
Cash conversion cycle **= 69.54**

5) Receivables turnover:-

Efficiency Measure	Ford(F)	General Motors(GM)	Toyota(TM)
Receivables turnover	2.83	3.72	3.06

Analysis
The comprehensive measure suggests that General Motors is the most suitable company, followed by Toyota and then Ford. General Motors takes the highest among these at 3.72 days.
Interpretation
A higher receivables ratio indicates a company's cash operation or efficient credit extension and collection methods. A high ratio indicates a short time between sales and cash collection, while a low ratio indicates longer collection. A lower ratio indicates longer receivables holding and higher risk of non-collection.
The ratio is calculated as follows:
Receivables turnover = Annual credit sales / Average accounts receivable

- Annual credit sales- total value of sales made to customers on credit terms within a fiscal year.
- Average accounts receivable- the mean value of the amounts owed to a company by its customers over a specific period.

6) Inventory turnover:-

Efficiency Measure	Ford(F)	General Motors(GM)	Toyota(TM)
Inventory turnover	10.48	9.4	8.41

Analysis
This comprehensive measurement shows that Ford Motors has an Inventory efficiency ratio of 10.48, which is better than General Motors and Toyota.
Interpretation
The inventory turnover ratio is a measure of a company's efficiency in converting inventory into sales, indicating liquidity and speed of usage. It is often compared against similar companies in the same industry. A low ratio suggests inefficiency, while a high ratio suggests strong sales or ineffective buying. Low ratios may indicate poor sales, excess inventory, or planned inventory build-up.
The inventory turnover ratio formula is:
Inventory turnover = Cost of goods sold / Average inventory value

7) Total asset turnover

Efficiency Measure	Ford(F)	General Motors(GM)	Toyota(TM)
Total asset turnover	0.52	0.53	0.47

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Analysis

This comprehensive measurement shows that General Motor has a total asset turnover ratio of 0.53, which is better than Ford Motors and Toyota.

Interpretation

Total asset turnover is a measure of a firm's efficiency in using its assets for sales revenue generation. It indicates pricing strategy and varies by industry. It is similar to receivables and inventory turnover, but includes plants, warehouses, equipment, and other assets owned by the firm. Comparing it with unrelated businesses is not useful.

The formula for the ratio is:

Total asset turnover = Revenue (or sales) / Total assets

X. FINDINGS

1) *Days Sales Outstanding (DSO):* General Motors performs the best, taking around 98.13 days to collect cash from customers.
2) *Days Inventory:* Ford Motors maintains the lowest inventory level, with a holding period of 34.81 days, which is the lowest among the companies examined.
3) *Days Payables:* General Motors has the slowest supplier payment period, averaging 67.43 days, while Toyota demonstrates the quickest payment cycle at 43.93 days.
4) *Cash Conversion Cycle:* General Motors as the most suitable, with a cash conversion cycle of 69.54 days, followed by Toyota and Ford.
5) *Receivables Turnover:* General Motors as the most suitable company, with a cash conversion cycle of 3.72 days, followed by Toyota and Ford.
6) *Inventory Turnover:* Ford Motors demonstrates superior inventory efficiency with a ratio of 10.48, outperforming both General Motors and Toyota.
7) *Total Asset Turnover:* That General Motors has a total asset turnover ratio of 0.53, surpassing both Ford Motors and Toyota in efficiency.

XI. LIMITATIONS OF RESEARCH

The study was carried out within the stated parameters. Nevertheless, the research was limited.

1) Data of only one year 2021 has been taken.
2) This study is based on the information provided by the respondents.
3) This ratio is generally compared against companies in the same industry.

XII. SUGGESTION & RECOMMENDATION

1) Companies can enhance their cash flow and financial health by streamlining their cash conversion cycle, reducing customer collection time, efficiently managing inventory, and optimizing payment terms with suppliers.
2) Implementing effective inventory management practices like just-in-time systems or demand forecasting can reduce excess inventory levels, improve turnover ratios, free up capital for other investments, and decrease obsolescence risk.
3) Maintaining healthy relationships with suppliers is crucial for short-term financing benefits, as timely payments can lead to better terms, improved reliability, and access to innovative solutions, despite extending payment terms.
4) Companies should optimize asset utilization, invest in technology upgrades, and consider outsourcing non-core activities to generate efficient sales revenue, thereby reducing capital expenditures.
5) Utilizing data analytics and advanced forecasting techniques aids companies in making informed decisions about inventory management, pricing strategies, and customer demand, by analysing historical sales data and market trends.
6) Continuous improvement initiatives should focus on operational efficiency across the supply chain, from production to order fulfilment and delivery, involving automation, lean manufacturing principles, and optimizing logistics operations to reduce lead times and costs.
7) Companies should enhance collection methods, implement stricter credit policies, and use technology for faster invoicing and payment processing to reduce the sales outstanding ratio.

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XIII. CONCLUSION

The study of management efficiency ratios among General Motors, Toyota, and Ford reveals distinct strengths and areas for improvement in their supply chain operations. General Motors excels in converting sales into profits, maintaining low inventory levels and a robust cash conversion cycle.

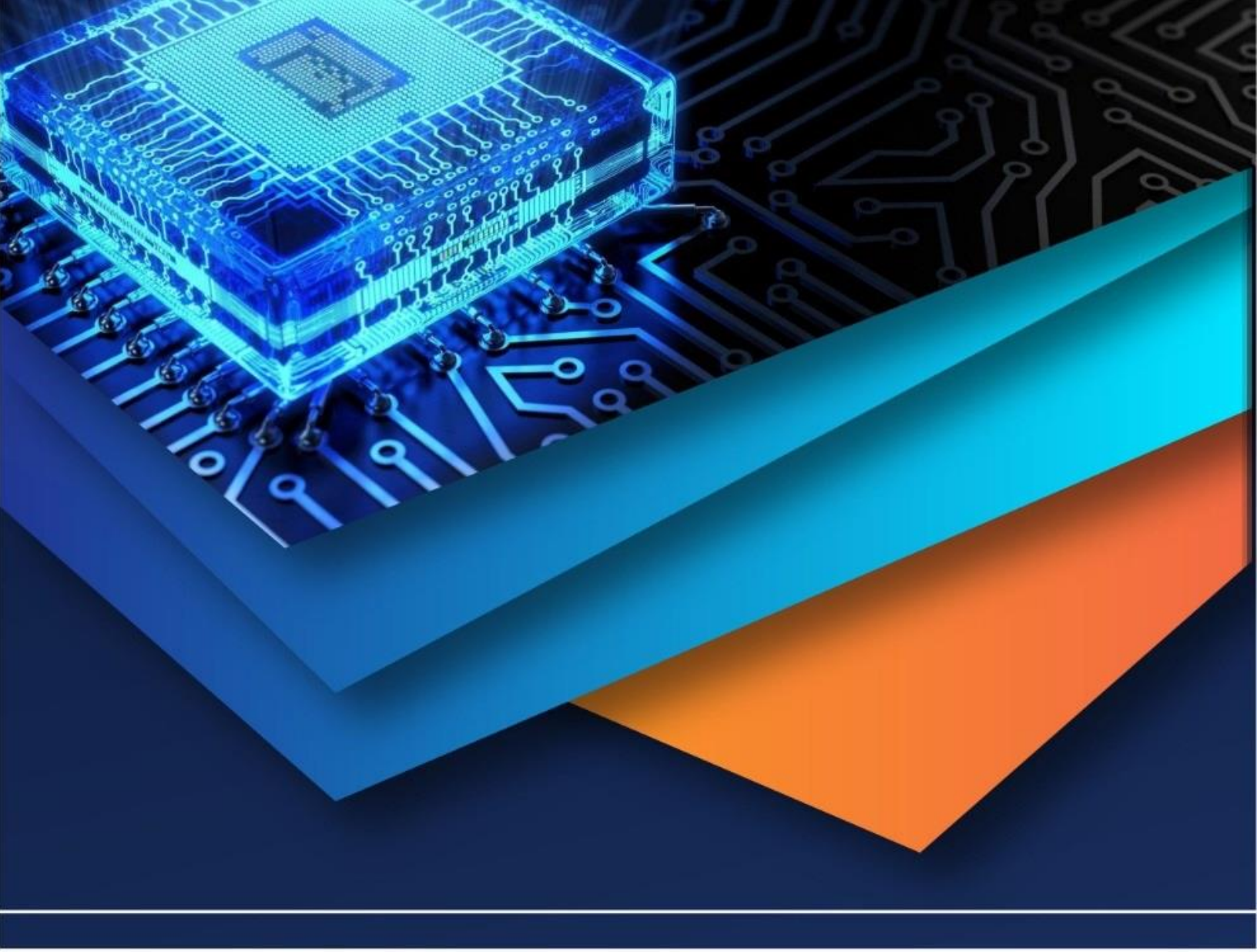
However, its slower supplier payment period may pose long-term challenges. Ford maintains the lowest inventory levels and demonstrates efficient turnover ratios. Toyota's quick supplier payment cycle demonstrates strong supplier relationships.

These findings highlight the complexity of achieving comprehensive efficiency across supply chain processes and emphasize the importance of optimizing management efficiency ratios for operational efficiency, cost reduction, and customer satisfaction.

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