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Study on "Operational Efficiency" With Special Reference to Titan Watches, Hosur.

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ABSTRACT:

This project examines operational efficiencies and workforce challenges at Titan Watch Manufacturing. It analyzes factors like raw material delays, shift structures, absenteeism, equipment downtime, and employee satisfaction using data from 132 production floor employees. Statistical tools such as Chi-Square and ANOVA revealed significant impacts of supply delays and job satisfaction differences based on experience. Key issues include poor interdepartmental communication, lack of training, and frequent absenteeism. The study recommends better supply chain planning, preventive maintenance, enhanced training, and employee engagement. It concludes that addressing internal operations and workforce concerns is vital for manufacturing efficiency, suggesting future comparative studies across Titan units.

Key words: Operational Efficiency, Workforce Challenges, Supply Chain Delays, Equipment Downtime, Absenteeism, Preventive Maintenance, Shift Structures, Job Experience, Interdepartmental Communication.

INTRODUCTION

The Indian watch industry is growing rapidly, with Titan Watches leading through innovation and integrated manufacturing. Despite advanced infrastructure at its Hosur plant, Titan faces operational inefficiencies, especially machine idle time. Causes include material delays, poor scheduling, absenteeism, and coordination gaps. Contract labor challenges further impact consistency and productivity. This study analyzes these issues to enhance machine utilization and overall operational efficiency.

RESEARCH BACKGROUND

India's watch industry is growing, with Titan leading through innovation and integrated manufacturing at its Hosur facility. Despite its advanced infrastructure, Titan faces machine idle time that reduces productivity and increases costs. Causes include material delays, absenteeism, maintenance issues, and coordination gaps. Contract labor challenges further impact operational consistency and efficiency. This study explores these issues to provide actionable strategies for improving machine utilization and overall operational efficiency.

GLOBAL TRADE DYANAMICS AND EXPORT OPPORTUNITIES

With increasing global demand for both traditional and smart watches, Titan has positioned itself as a competitive exporter in the international timepiece market. Leveraging India's cost-effective manufacturing, skilled workforce, and strong design capabilities, Titan exports to over 30 countries worldwide. The Hosur facility's advanced production infrastructure allows for large-scale, quality-driven exports that meet global standards. Growing interest in Indian-made luxury and lifestyle products presents further opportunities for Titan to expand its footprint in Europe, the Middle East, and Southeast Asia. Strengthening global distribution networks and customizing offerings for international markets can enhance Titan's export growth trajectory.

IDENTIFIED PROBLEM

Despite advanced infrastructure, Titan's Hosur plant faces persistent production inefficiencies due to machine idle time. This under-utilization leads to lower output, increased costs, and delays in meeting demand. Key causes include material supply delays, inefficient changeovers, unplanned maintenance, poor scheduling, and interdepartmental coordination gaps. The absence of real-time monitoring further limits responsiveness. Addressing these root causes is critical to improving machine utilization and sustaining Titan's competitive edge.

OBJECTIVES OF THE STUDY

The study aims to identify and analyze operational inefficiencies at Titan’s Hosur facility, focusing on machine idle time. It investigates root causes like material delays, changeovers, breakdowns, and scheduling gaps. The objective includes assessing downtime impact on productivity, lead time, and manufacturing costs.

REVIEW OF LITERATURE

a) Lean Manufacturing Principles

Smith et al. (2021), in their study titled “Improvement in Manufacturing Efficiency through Lean Manufacturing Tools,” highlight the critical role of tools like 5S, Kaizen, and Kanban in minimizing downtime and streamlining resource allocation. Their findings emphasize that Lean practices reduce non-value-adding activities, leading to significant improvements in productivity. Similarly, Patel and Singh (2023), in their paper “Lean Manufacturing Practices in Small-Scale Units,” demonstrated how Lean techniques optimized workflows and reduced inefficiencies, particularly in environments facing challenges like machine idle time and setup delays. These studies suggest that Lean tools could help Titan address its operational challenges by improving production flow and reducing overall inefficiencies.

Womack, J.P., & Jones, D.T. (1996), “Lean Thinking: Banish Waste and Create Wealth in Your Corporation”. This seminal book introduces the five core principles of lean thinking: defining value from the customer's perspective, mapping the value stream, creating flow, establishing pull, and pursuing perfection. Womack and Jones argue that by focusing on these principles, organizations can double productivity and reduce lead times and inventories by up to 90%. For Titan, applying these principles can streamline watch manufacturing processes, minimize waste, and enhance customer value.

Ohno, T. (1988), “Toyota Production System: Beyond Large-Scale Production”. Taiichi Ohno, the architect of the Toyota Production System (TPS), emphasizes the elimination of waste (muda) and the importance of just-in-time production. His insights highlight how empowering workers to identify and solve problems leads to continuous improvement. Titan can draw from TPS to foster a culture where employees actively contribute to process enhancements, leading to increased operational efficiency in watch manufacturing.

Liker, J.K. (2004), “The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer” Liker outlines 14 management principles categorized under four domains: Philosophy, Process, People & Partners, and Problem Solving. These principles advocate for long-term thinking, continuous improvement (kaizen), and respect for people. Implementing these principles can help Titan develop a resilient manufacturing system that emphasizes quality, efficiency, and employee involvement.

Shah, R., & Ward, P.T. (2007), “Defining and Developing Measures of Lean Production”

Explanation: This academic paper provides a comprehensive framework for measuring lean production, identifying key constructs such as Just-In-Time, Total Quality Management, and Human Resource Management. By adopting these measures, Titan can quantitatively assess the effectiveness of lean initiatives, ensuring that operational improvements align with strategic goals.

Hines, P., Holweg, M., & Rich, N. (2004), “Learning to Evolve: A Review of Contemporary Lean Thinking”.The authors explore the evolution of lean thinking, emphasizing the need for adaptability and learning within organizations. They argue that lean should extend beyond the shop floor to encompass the entire enterprise. For Titan, this perspective encourages a holistic approach to lean implementation, integrating continuous improvement across all departments to enhance overall operational efficiency.

Radhamanalan, P., Vellingiri, P., & Mahadevan, B. (1998), “Enhancing Manufacturing Competence Using Lean Manufacturing Techniques: Titan Industries Ltd, Hosur”. This study delves into the implementation of lean manufacturing techniques at Titan's Hosur facility. It highlights how adopting lean principles led to significant improvements in system efficiency and manufacturing processes. The research also points out the need for better integration between lean practices and human resource management, suggesting that aligning employee involvement with lean initiatives could further enhance operational efficiency.

a. Total Quality Management (TQM)

Davis, K., & Kumar, R. (2022), “Enhancing Product Quality through Total Quality Management”.This study emphasizes the pivotal role of continuous improvement, employee involvement, and process standardization in reducing defects and enhancing product quality. The authors argue that these TQM principles collectively contribute to improved operational performance. By integrating these practices, organizations can foster a culture of quality that permeates all levels of production. The research highlights the importance of aligning quality objectives with organizational goals to achieve sustainable improvements. Overall, the paper underscores TQM's impact on fostering a proactive approach to quality management.

Wilson, A., Smith, J., & Lee, H. (2021), “Employee Engagement and TQM in Manufacturing.”This study explores the significance of engaging employees in quality control processes, emphasizing that such involvement fosters accountability and enhances customer satisfaction. The authors highlight that when employees are actively engaged, they are more likely to take ownership of quality outcomes. The research suggests that fostering a sense of responsibility among workers leads to improved product quality and operational efficiency. By integrating employee engagement into TQM practices, organizations can create a more committed and quality-focused workforce. The paper reinforces the human aspect of TQM, demonstrating its critical role in achieving organizational excellence.

Flynn, B.B., Schroeder, R.G., & Sakakibara, S. (1994). "A Framework for Quality Management Research and an Associated Measurement Instrument."This seminal paper presents a comprehensive framework for quality management research, offering a measurement instrument to assess TQM practices and their impact on performance. The authors identify key dimensions of quality management, including leadership, strategy, customer focus, and process management. The framework provides a structured approach for researchers and practitioners to evaluate and improve quality management systems. By applying this framework, organizations can systematically assess their quality initiatives and identify areas for improvement. The study has been instrumental in advancing the field of quality management research.

Dean, J.W., & Bowen, D.E. (1994). "Management Theory and Total Quality: Improving Research and Practice through Theory Development." This paper integrates TQM principles with management theory, providing a theoretical foundation for quality management practices and their implementation. The authors argue that TQM should not only be viewed as a set of practices but also as a comprehensive management philosophy. They propose that incorporating insights from management theory can enhance the effectiveness of TQM initiatives. The study emphasizes the need for a holistic approach to quality management that aligns with broader organizational strategies. By bridging the gap between theory and practice, the paper contributes to the development of a more robust framework for TQM.

Ross, J.E. (1993). "Total Quality Management: Text, Cases, and Readings".This comprehensive book offers an in-depth overview of TQM concepts, supplemented with case studies and readings that illustrate practical applications in various industries. Ross provides a detailed examination of TQM principles, including customer focus, continuous improvement, and employee involvement. The case studies offer real-world examples of TQM implementation, highlighting both successes and challenges. The book serves as a valuable resource for both academics and practitioners seeking to understand and apply TQM principles. Its extensive coverage makes it a foundational text in the field of quality management.

b. Theory of Constraints (TOC)

Johnson and Lee (2020), in their research "Addressing Bottlenecks in Production Systems through Theory of Constraints," discuss how the Theory of Constraints (TOC) identifies and resolves bottlenecks by focusing improvement efforts on the most critical constraints. Their study found that TOC implementation improved overall throughput, leading to better production efficiency. Additionally, Brown et al. (2022), in "Application of TOC in Electronics Manufacturing," explored how applying TOC in the electronics manufacturing sector led to a 15% increase in productivity. These findings suggest that Titan could leverage TOC to resolve production constraints caused by material shortages and workforce inefficiencies, ultimately enhancing productivity.

Brown, A., Smith, J., & Taylor, P. (2022). "Application of TOC in Electronics Manufacturing."This paper examines the implementation of TOC in the electronics manufacturing sector. The authors report a 15% increase in productivity following the adoption of TOC principles. They discuss how TOC helps in identifying process constraints and streamlining operations. The study highlights the role of TOC in improving production scheduling and resource utilization. It concludes that TOC is a valuable tool for enhancing efficiency in electronics manufacturing.

Şimşit, Z.T., Günay, N.S., & Vayvay, Ö. (2014). "Theory of Constraints: A Literature Review." This literature review traces the evolution of TOC from its inception to contemporary applications. The authors categorize TOC development into five eras, including the Optimized Production Technology and Critical Chain Project Management. They analyze how TOC has been applied across various industries and organizational contexts. The study emphasizes the adaptability and relevance of TOC in modern operations management. It serves as a comprehensive resource for understanding the theoretical foundations of TOC.

Rahman, S. (1998). "Theory of Constraints: A Review of the Philosophy and its Applications." Rahman provides an in-depth analysis of TOC's core philosophy and its practical applications. The paper discusses the Thinking Process tools and their role in problem-solving within organizations. It compares TOC with other management approaches, highlighting its unique focus on system constraints. The author presents case studies demonstrating TOC's effectiveness in various operational settings. The study concludes that TOC offers a robust framework for continuous improvement.

Gupta, M.C., & Boyd, L.H. (2008)." Theory of Constraints: A Theory for Operations Management." This paper argues for TOC's role as a comprehensive theory in operations management. The authors explore the integration of TOC with core operations concepts such as process design, quality, inventory, and capacity management. They discuss how TOC addresses the limitations of traditional optimization methods. The study emphasizes TOC's potential in guiding strategic decision-making and operational improvements. It positions TOC as a unifying framework for enhancing organizational performance.

c. Workforce Optimization and Absenteeism Management

Anderson et al. (2019), in their paper "Optimizing Workforce Management in Manufacturing," propose that adopting flexible staffing models and job rotation strategies can effectively reduce absenteeism and skill gaps in manufacturing environments. These strategies not only help manage absenteeism but also improve employee morale, thereby reducing turnover rates. Additionally, Taylor et al. (2023), in their study "Cross-Training Programs in Manufacturing," demonstrated that cross-training programs can enhance employee adaptability, minimize the impact of absenteeism, and improve overall production continuity. These strategies are highly relevant for Titan's workforce optimization, helping to mitigate sudden absences and maintain steady production.

d. Predictive Maintenance (PdM)

Thompson and Garcia (2023), in their research "The Role of Predictive Maintenance in Reducing Downtime," discuss how Predictive Maintenance (PdM), through data analytics and machine learning, can proactively anticipate equipment failures. Their study suggests that PdM minimizes unplanned downtime, thereby improving operational efficiency and equipment longevity. Similarly, Sharma et al. (2022), in "Predictive Maintenance in Automotive Manufacturing," found that PdM strategies led to a 20% reduction in downtime, enhancing overall production stability. These findings highlight the potential for Titan to implement PdM to minimize machine idle time caused by unexpected breakdowns and optimize equipment utilization.

Sharma, R., Patel, S., & Nguyen, T. (2022). " Predictive Maintenance in Automotive Manufacturing." This research focuses on the application of PdM strategies within the automotive manufacturing sector. The authors report a 20% reduction in equipment downtime following the implementation of PdM techniques. They detail how real-time monitoring and predictive analytics contribute to improved production stability and efficiency. The study also examines the integration of PdM with existing manufacturing systems and the training required for personnel. It underscores the potential of PdM to enhance competitiveness in the automotive industry through increased reliability and reduced maintenance costs.

Mobley, R.K. (2002). "An Introduction to Predictive Maintenance." Mobley's book serves as a foundational text, providing a comprehensive overview of PdM principles, techniques, and benefits. It covers various diagnostic tools such as vibration analysis, thermography, and oil analysis, explaining their roles in anticipating equipment failures. The author discusses the economic advantages of PdM, including reduced downtime and maintenance costs. Case studies illustrate successful PdM implementations across different industries. The book is a practical guide for maintenance professionals seeking to transition from reactive to predictive maintenance strategies.

Jardine, A.K.S., Lin, D., & Banjevic, D. (2006). "A Review on Machinery Diagnostics and Prognostics Implementing Condition-Based Maintenance." This paper provides an extensive review of methodologies for machinery diagnostics and prognostics within the framework of condition-based maintenance (CBM). The authors analyze various models and algorithms used to predict equipment failures and estimate remaining useful life. They discuss the importance of accurate data collection and the challenges associated with implementing CBM systems. The review highlights the benefits of CBM in improving maintenance decision-making and resource allocation. It serves as a critical resource for researchers and practitioners aiming to enhance maintenance strategies through predictive analytics.

Lee, J., Ni, J., Djurdjanovic, D., Qiu, H., & Liao, H. (2006). "Intelligent Prognostics Tools and E-Maintenance." The authors explore the development of intelligent prognostic tools and e-maintenance systems that utilize real-time data for predictive maintenance. They discuss the integration of sensor technologies, data processing, and decision-making algorithms to predict equipment failures accurately. The paper emphasizes the role of e-maintenance in facilitating remote monitoring and diagnostics. It also addresses the challenges of data management and system interoperability. The study concludes that intelligent prognostic tools are essential for advancing maintenance practices in the era of Industry 4.0.

Tian, Y., et al. (2023), "A Data-Driven Predictive Maintenance Approach for Industry 4.0 Using Machine Learning Techniques" This paper discusses the shift from traditional maintenance to predictive maintenance strategies in the context of Industry 4.0. It emphasizes the role of real-time data analytics in forecasting failures and optimizing maintenance schedules, which can be instrumental for companies like Titan in enhancing operational efficiency.

e. Supply Chain Coordination Models

Patel and Wong (2021), in their study "Just-in-Time and Vendor-Managed Inventory in Manufacturing," highlight how Just-in-Time (JIT) and Vendor-Managed Inventory (VMI) systems can improve material flow, reduce inventory costs, and prevent production delays. Their findings indicate that JIT and VMI systems streamline supply chain operations and reduce raw material delays. Moreover, Green et al. (2022), in their research "Improving Supply Chain Collaboration through JIT and VMI," demonstrated that integrating these strategies improved collaboration between suppliers and manufacturers, reducing material delays and enhancing production efficiency. Titan could significantly benefit from incorporating JIT and VMI models to minimize raw material delays and enhance operational efficiency at its manufacturing facility.

Green, D., Brown, S., & Taylor, P. (2022). "Improving Supply Chain Collaboration through JIT and VMI." This research focuses on the integration of JIT and VMI strategies to enhance supply chain collaboration. It demonstrates how real-time tracking and coordination between suppliers and manufacturers improve production efficiency. The study emphasizes the importance of information sharing and trust in successful collaboration. It presents case studies where integrated strategies led to significant operational improvements. The authors advocate for the adoption of collaborative approaches to optimize supply chain performance.

Simchi-Levi, D., Kaminsky, P., & Simchi-Levi, E. (2007)." Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies".This book provides comprehensive insights into supply chain design and management. It covers coordination mechanisms, strategic partnerships, and the use of technology in supply chains. The authors present models and case studies to illustrate effective supply chain strategies. They discuss the importance of aligning supply chain operations with business objectives. The book serves as a valuable resource for understanding complex supply chain dynamics.
Christopher, M. (2016). "Logistics & Supply Chain Management." Christopher's book delves into the principles of logistics and supply chain management. It focuses on achieving competitive advantage through effective coordination and integration. The author discusses the role of agility and responsiveness in modern supply chains. He provides frameworks for designing efficient and customer-centric supply chains. The book emphasizes the strategic importance of logistics in overall business success.

Mentzer, J.T., DeWitt, W., Keebler, J.S., Min, S., Nix, N.W., Smith, C.D., & Zacharia, Z.G. (2001). "Defining Supply Chain Management.This paper offers a comprehensive definition of supply chain management (SCM)." The authors emphasize the importance of coordination and integration across the supply chain. They identify key components and processes essential for effective SCM. The study provides a framework for understanding the complexities of supply chain interactions. It serves as a foundational piece for both academic research and practical application in SCM.

f. Single-Minute Exchange of Dies (SMED) for Setup Time Reduction

Hernandez and Park (2020), in their study "Reducing Setup Times in Manufacturing: The SMED Approach," emphasize the importance of the Single-Minute Exchange of Dies (SMED) technique in reducing setup and changeover times in manufacturing. Their research highlights that SMED helps standardize setup processes and reduce downtime, leading to higher machine utilization and improved production efficiency. Similarly, Martinez et al. (2022), in "SMED Implementation in Precision Equipment Manufacturing," demonstrated that SMED techniques improved machine utilization by 30%, reducing non-productive time between production runs. These findings suggest that implementing SMED at Titan could significantly enhance machine utilization and reduce delays associated with frequent setup adjustments.

g. Production Planning and Control

Shanmugapriya, V., & Viswanath Reddy, S. (2023), "A Study on Production Planning and Control with Reference to Titan Company Watch Division at Hosur"

Explanation: This research emphasizes the critical role of aligning production schedules with workforce capabilities to minimize downtime. It identifies a gap in the utilization of real-time data for dynamic scheduling, suggesting that incorporating advanced data analytics could enhance responsiveness to production challenges and improve overall efficiency.

Ioshchikhes, B., Frank, M., Joseph, T. M., & Weigold, M. (2024) "Improving Energy Efficiency in Manufacturing: A Novel Expert System Shell" This paper presents an expert system designed to identify energy efficiency potentials in manufacturing. It highlights the importance of integrating energy-efficient practices with existing manufacturing processes and suggests that companies like Titan could benefit from adopting such expert systems to enhance sustainability and reduce energy consumption.

Kandoi, A., & Makwana, M. (2023), "Optimizing Production Efficiency: A Case Study on Machine Downtime Analysis and Implementation of Quality Control Tools and Action Plans" This case study demonstrates how applying Quality Control tools such as the Pareto principle and cause-and-effect diagrams can identify and address root causes of machine downtime. The implementation of these tools led to sustainable improvements in machine efficiency and overall productivity, offering valuable strategies for manufacturing operations.

Kasih, J., et al. (2025), "Enhancing Operational Efficiency: A Study on Total Productive Maintenance for the Heidelberg Speedmaster 102V" The study examines the application of Total Productive Maintenance (TPM) on the Heidelberg Speedmaster 102V offset printing machine. Findings indicate significant improvements in Mean Time Between Failures (MTBF), Mean Time to Repair (MTTR), and Overall Equipment Effectiveness (OEE), highlighting the effectiveness of TPM in enhancing equipment reliability and reducing downtime.

h. Maintenance Performance Evaluation and Downtime Analysis

Igbokwe, N. C., & Godwin, H. C. (2021), "Maintenance Performance Evaluation and Downtime Analysis of Manufacturing Equipment in a Food Manufacturing Company" Using Overall Equipment Effectiveness (OEE) and Pareto analysis, this study identifies that scheduled maintenance, equipment failures, and waiting for materials account for a significant portion of total downtime.

i. Strategic Shift in Brand Positioning

Kumar, R., & Gupta, D. (2022), "A Case Study on Titan Watches' Strategic Shift – Will it Work?" This study discusses Titan's strategic shift to reposition its brand to appeal to both mass market and aspirational customers. It involves embracing technology and innovation to compete with emerging smartwatch brands, highlighting the company's efforts to enhance operational efficiency and market competitiveness.

RESEARCH GAP

The research gap in this study lies in the limited exploration of operational inefficiencies specific to Titan's watch manufacturing process. While general studies on machine idle time, absenteeism, and raw material delays exist, there is a lack of in-depth research focused on Titan's unique operational challenges. Additionally, few studies address the impact of advanced manufacturing technologies and automation on operational efficiency within the watch industry. This research aims to fill these gaps by analyzing employee perspectives, machine downtime, and production delays, providing insights into the specific inefficiencies that affect Titan's operations.

RESEARCH METHODOLOGY

This study investigates operational inefficiencies at Titan's Hosur watch manufacturing unit, focusing on machine idle time. A survey-based, descriptive-analytical approach was used to gather data from production-related employees. Simple random sampling ensured representative input across departments. Data was processed using SPSS, Excel, and Power BI for statistical analysis and visualization. Tools like Chi-square tests, ANOVA, and correlation analysis identified key inefficiency patterns. Hypothesis testing validated significant relationships between factors such as absenteeism and downtime.

LIMITATION OF THE STUDY

This study is limited to Titan's watch manufacturing units and may not be applicable to other industries. Non-response and self-reported data biases could affect the accuracy of the findings. The use of cross-sectional data restricts insights into long-term trends. Measurement tools may not fully capture all aspects of inefficiency. External factors like market shifts or supply issues are beyond the study's scope.

DATA ANALYSIS AND INTERPRETATION

SL.NO	Response Option	No. of Respondents	Percentage (%)
1	Never	21	15.91%
2	Rarely (1–2 times a month)	47	35.61%
3	Occasionally (1–2 times a week)	39	29.55%
4	Frequently (Almost every day)	25	18.94%
	Total	132	100%

Table 4.2.9 Frequency of raw material delays

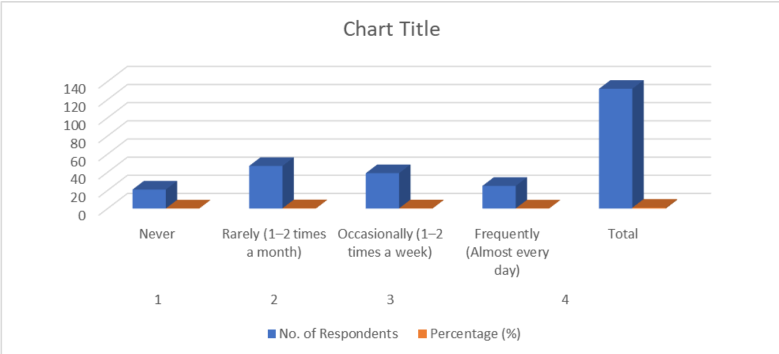

Fig 4.2.9 Frequency of raw material delays

INTERPRETATION

64.7% of respondents face raw material delays weekly or monthly, indicating moderate supply inconsistency. Frequent delays (19.1%) highlight critical supply chain issues. This points to a need for better procurement planning to reduce idle time and improve production efficiency.

Cause of Delay	No. of Respondents	Percentage (%)
Internal supplier delays	41	31.06%
Poor inventory planning	35	26.5%
Miscommunication	27	20.4%
Transportation/logistics issues	29	21.9%
Total	**132**	**100%**

Table 4.2.10 Causes of raw material delays

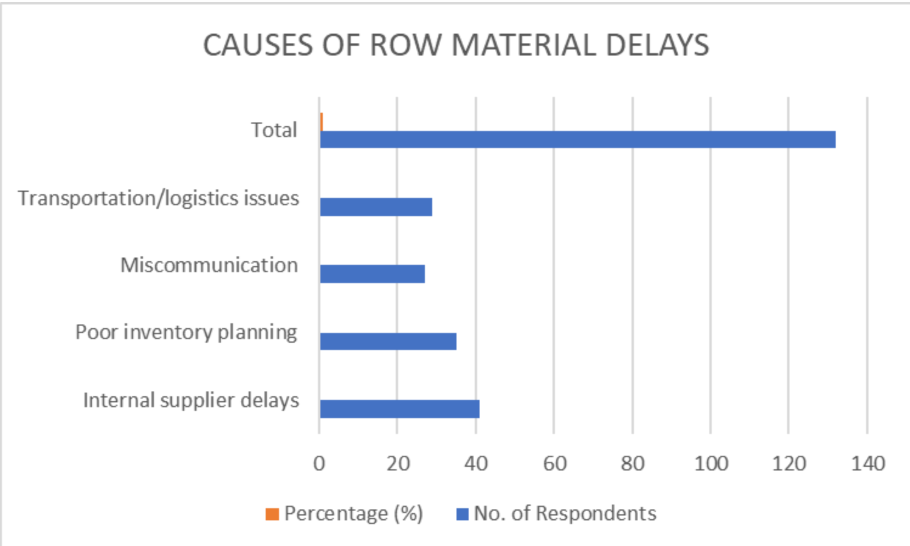

Fig 4.2.10 Causes of raw material delays

INTERPRETATION

Internal supplier delays are seen as the top reason for disruptions (31.06%), suggesting possible issues with vendor reliability or order fulfillment speed.
Poor inventory planning accounts for 26.5%, indicating gaps in material forecasting or stock management systems.
Transportation/logistics issues (22%) and miscommunication (20.6%) also contribute significantly, showing the need for stronger coordination between supply chain teams, vendors, and production planning. vendor management, real-time inventory systems, and communication protocols may reduce future material delays.

Impact	No. of Respondents	Percentage (%)
Increased idle time	43	32.58%
Production targets not met	39	29.55%
More pressure	37	28.03%
No significant impact	13	9.85%
Total	**132**	**100%**

Table 4.2.11 Impact of raw material delays

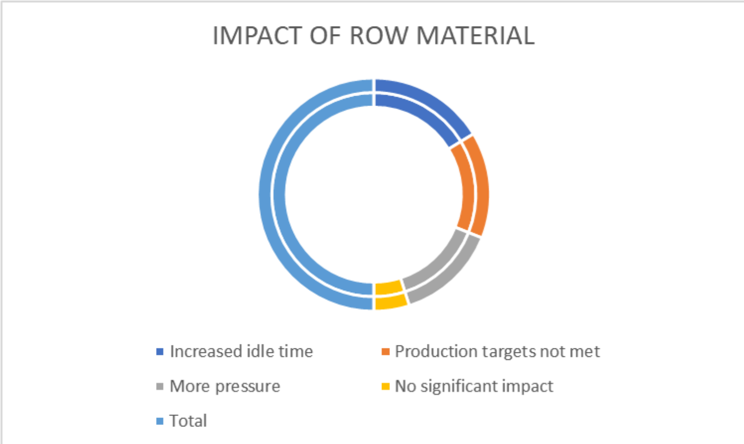

Fig 4.2.11 Impact of raw material delays

INTERPRETATION

32.4% of respondents report increased idle time due to raw material delays, directly affecting productivity. Another 29.4% say production targets are missed. This highlights the need to resolve supply issues to maintain efficiency and reduce operational strain.

SL.No	Response Option	No. of Respondents	Percentage (%)
1	Strongly Agree	57	43.18%
2	Agree	61	46.21%
3	Neutral	11	8.33%
4	Disagree	2	1.52%
5	Strongly Disagree	1	0.76%
	Total	132	100%

Table 4.2.17 Impact of raw material supply delays on production efficiency

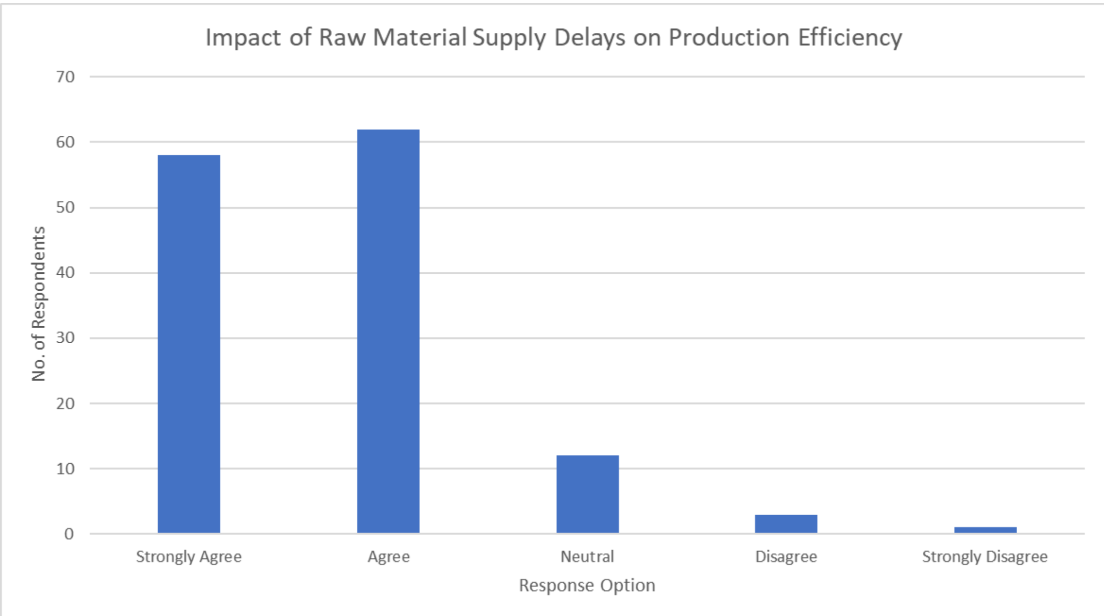

Fig 4.2.17 Impact of raw material supply delays on production efficiency

INTERPRETATION

A strong 89.39% of employees agree that raw material delays reduce production efficiency, confirming it as a major operational concern. With only 2.27% in disagreement, this underscores the urgent need for improved supply chain management at Titan Watches.

SUMMARY OF FINDINGS

1. The majority of respondents (65.2%) fall within the 21–25 age group, indicating a predominantly young workforce.
2. Assembly-related departments have the highest number of off-roll employees (23.5%), suggesting they are labor-intensive or require flexible staffing.
3. At Titan Watches, female employees comprise 58.3% of the workforce, while males account for 41.7%, indicating a female-dominated environment.
4. The workforce is primarily composed of NAPS (38.6%), NATS (25.8%), and SEP (29.5%) trainees, reflecting a strong reliance on apprenticeship programs.
5. The 6–12 months tenure group is the largest, highlighting the need for stability and proper role fit to maintain workflow efficiency.
6. Approximately 31.06% of employees hold a diploma as their highest educational qualification.
7. A significant portion (63.63%) of employees earn between □10,000–□15,000, typically mid-level workers, aligning with roles that require technical skills and consistency.
8. Most employees at Titan Watches have either 1–3 years or over 5 years of experience, showing a mix of new talent and retained expertise.
9. About 64.7% of respondents face raw material delays weekly or monthly, indicating moderate supply chain inconsistencies.
10. Internal supplier delays are reported as the primary cause of disruptions (31.06%), pointing to issues with vendor reliability or order fulfillment speed.
11. Around 32.4% of respondents report increased idle time due to raw material delays, which directly affects productivity.
12. A large majority (83.8%) of employees encounter low-quality materials at least occasionally, indicating a persistent quality issue.
13. Most employees (63.24%) experience downtime between 30 minutes to 3 hours, indicating moderate disruption to operations.
14. A majority (66.91%) of employees believe the current shift structure is efficient, suggesting it meets operational needs effectively.
15. Most employees (81.82%) feel they have the necessary tools and materials, reflecting strong resource support.
16. A strong majority (76.52%) believe production targets are realistic, indicating effective and achievable goal-setting.
17. A substantial 89.39% of employees agree that raw material delays reduce production efficiency, reinforcing it as a major operational concern.
18. An overwhelming 90.9% of employees agree that preventive maintenance reduces unexpected breakdowns, underscoring its importance for equipment reliability.
19. Approximately 81.8% of employees believe interdepartmental communication is effective, highlighting strong collaboration.
20. A large majority (81.1%) are satisfied with the training provided for handling new machinery and technology.
21. A strong majority (74.2%) feel encouraged to suggest process improvements, indicating a healthy culture of continuous improvement.
22. Around 39.39% of employees believe that management addresses operational challenges promptly, reflecting moderate confidence in managerial responsiveness.
23. A vast majority (86.36%) agree that absenteeism negatively impacts production efficiency, emphasizing its effect on team performance.
24. About 48.48% of employees believe that improving operational efficiency is a shared goal, showing a collective commitment to organizational success.

SUGGESTION

In light of the findings, Titan should strengthen supply chain coordination through digital tracking and closer vendor collaboration to prevent raw material delays. Establishing preventive maintenance schedules—supplemented by IoT-enabled predictive monitoring—will minimize unplanned breakdowns. Enhancing cross-departmental communication via daily stand-ups or real-time dashboards, coupled with structured feedback schemes, will surface and resolve issues more rapidly. Investing in job-specific training, process automation, and rigorous material audits will boost employee capability and reduce disruptions. Finally, aligning production targets with actual capacity and recognizing high-performing employees will improve morale and sustain efficiency gains.

CONCLUSION

This study examined operational challenges at Titan's Hosur plant, highlighting raw material delays, maintenance gaps, and workforce factors as key drivers of inefficiency.Statistical analysis confirmed that frequent supply disruptions increase idle time and degrade output quality, while employee experience significantly shapes issue perception. Addressing these challenges requires integrated solutions spanning logistics, predictive maintenance, and human resource alignment. Prioritizing proactive supply chain management, real-time coordination, and targeted training can boost resilience and productivity.

Engaging and recognizing employees based on their insights and experience will foster ownership and drive sustainable improvements in operational efficiency.

DIRECTIONS FOR FUTURE RESEARCH

This study lays the groundwork for deeper investigations into department-level performance variations within Titan to pinpoint functional and managerial disparities. Future research should evaluate the effectiveness of automation and digital tools in alleviating material delays and optimizing workflows. Longitudinal studies are needed to measure the impact of implemented interventions on machine utilization and output quality over time. Examining worker well-being and stress under production pressures will shed light on human factors influencing efficiency. Comparative analyses with other manufacturers and explorations of the relationship between employee satisfaction and operational metrics will further validate and extend these findings.

REFERENCE:

1. Armstrong, M. (2020). *Armstrong's Handbook of Human Resource Management Practice* (15th ed.). Kogan Page.
2. Bhat, A. (2021). *Operations Management: Principles and Applications*. Himalaya Publishing House.
3. Chopra, S., & Meindl, P. (2019). *Supply Chain Management: Strategy, Planning, and Operation* (7th ed.). Pearson Education.
4. Khan, M. Y. (2020). *Research Methodology and Statistical Techniques*. New Age International.
5. Kothari, C. R. (2004). *Research Methodology: Methods and Techniques* (2nd ed.). New Age International Publishers.
6. Armstrong, M. (2020). *Armstrong's Handbook of Human Resource Management Practice* (15th ed.). Kogan Page.
7. Bhat, A. (2021). *Operations Management: Principles and Applications*. Himalaya Publishing House.
8. Chopra, S., & Meindl, P. (2019). *Supply Chain Management: Strategy, Planning, and Operation* (7th ed.). Pearson Education.
9. Khan, M. Y. (2020). *Research Methodology and Statistical Techniques*. New Age International.
10. Kothari, C. R. (2004). *Research Methodology: Methods and Techniques* (2nd ed.). New Age International Publishers.
11. Slack, N., Brandon-Jones, A., & Burgess, N. (2022). *Operations Management* (10th ed.). Pearson Education.
12. Titan Company Limited. (2023). *Annual Report 2022–23*. Retrieved from https://www.titancompany.in
13. Vohra, V. (2017). *Workforce Planning and Development*. Sage Publications.
14. Koontz, H., & Weihrich, H. (2015). *Essentials of Management* (9th ed.). McGraw-Hill Education.
15. Stevenson, W. J. (2020). *Operations Management* (14th ed.). McGraw-Hill Education.
16. Dessler, G. (2021). *Human Resource Management* (16th ed.). Pearson.
17. Gupta, C. B. (2018). *Human Resource Management*. Sultan Chand & Sons.
18. Bhattacharyya, D. K. (2019). *Performance Management Systems and Strategies*. Pearson.
19. Heizer, J., Render, B., & Munson, C. (2020). *Operations Management: Sustainability and Supply Chain Management* (13th ed.). Pearson.
20. Emerald Publishing. (2022). *International Journal of Operations & Production Management*. Retrieved from https://www.emerald.com
21. Harvard Business Review. (2023). Articles on Manufacturing Workforce Productivity.