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A Study on Supply Chain Coordination and its Impact on Overall Operational Performance at Ti Anode Fabricators Pvt. Ltd., Chennai

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ABSTRACT: Ti Anode Fabricators Pvt. Ltd. (TIAANO) is a professionally managed private limited manufacturing organization established in 1992 and headquartered in Chennai, India. The company specializes in the manufacturing of electrochemical process equipment and engineered products designed for industrial applications requiring high corrosion resistance and advanced surface treatment technologies. The objective of the study is to analyse supply chain coordination and its impact on overall operational performance at Ti Anode Fabricators Pvt. Ltd., Chennai. The study adopts a descriptive research approach to understand supply chain coordination practices, identify operational aspects, and evaluate operational performance outcomes. The data for the study is collected from employees working in different departments involved in supply chain activities. The findings are based on the responses of the employees and the available organizational data. The research design adopted for the present study is descriptive in nature, as it aims to describe and analyze the existing supply chain coordination practices and their impact on overall operational performance. The study uses a non-probability sampling technique. Specifically, convenience sampling is adopted to select the respondents. A total of 110 employees of Ti Anode Fabricators Pvt. Ltd., Chennai were selected as the primary source of data collection. Therefore, the sample size of the study is 110. To analyze the collected data, various statistical tools and techniques have been used to interpret the responses accurately and draw meaningful conclusions. The statistical tools used in the study are: Percentage Analysis, Chi-Square Test, Correlation Analysis and ANOVA (Analysis of Variance). The study concludes that supply chain coordination plays a significant role in improving the overall operational performance of the organization. The findings indicate that a considerable proportion of respondents have a positive perception of coordination among departments, which supports smooth material flow, improves productivity, and reduces lead time.

KEYWORDS: Supply chain, operational performance, operational issues, operational coordination

I. INTRODUCTION

Ti Anode Fabricators Pvt. Ltd. (TIAANO) is a professionally managed private limited manufacturing organization established in 1992 and headquartered in Chennai, India. The company specializes in the manufacturing of electrochemical process equipment and engineered products designed for industrial applications requiring high corrosion resistance and advanced surface treatment technologies. Over the years, the organization has developed strong technical expertise in the design, fabrication, testing, and supply of titanium anodes, electroplating equipment, cathodic protection systems, and customized engineering solutions. These products are widely used in industries such as chemical processing, water and wastewater treatment, power generation, oil and gas, infrastructure development, and metal finishing operations. The company operates with structured manufacturing systems supported by skilled technical personnel, modern fabrication facilities, and strict quality control practices. Emphasis is placed on precision engineering, material handling efficiency, and adherence to international manufacturing standards to ensure product reliability and performance. Through continuous improvement initiatives and process optimization, the organization maintains consistency in production quality and delivery schedules. TIAANO has established a significant global presence by exporting its products to more than 66 countries. Efficient coordination between procurement, production planning, inventory management, and dispatch activities plays a vital role in meeting international customer requirements. Logistics management forms an important function within the organization, ensuring timely sourcing of raw materials, effective warehouse operations, and smooth shipment execution for both domestic and export orders.

The company's operational approach focuses on quality, customer satisfaction, and sustainable manufacturing practices. Through continuous innovation, advanced engineering capabilities, and effective supply chain coordination, TIAANO has strengthened its position as a reliable manufacturer in the electrochemical engineering sector.

II. REVIEW OF LITERATURE

Dubey et al. (2018) – Supply Chain Integration and Operational Performance, Dubey and colleagues studied integration practices in manufacturing firms and found that coordinated procurement and production planning significantly improved operational outcomes. The study highlighted that collaboration between internal departments reduced idle time and improved inventory utilization. Logistics performance also improved as dispatch schedules were aligned with production completion.

Flynn, Koufteros & Lu (2018) – Internal Coordination and Manufacturing Efficiency, This research emphasized internal coordination among purchasing, production, and warehouse departments. The authors observed that organizations with strong cross-functional coordination achieved better production flow and reduced operational bottlenecks. Improved coordination ensured smoother handling of finished goods, leading to enhanced logistics performance.

Bag et al. (2020) – Coordinated Operational Practices in Manufacturing, Bag examined coordination practices linking procurement activities, production scheduling, and distribution planning within manufacturing organizations. The study explained that when departments followed a coordinated workflow, material flow became smoother and operational delays were minimized. Proper alignment between raw material arrivals and production plans reduced idle machine time and improved productivity. The research further highlighted that coordinated dispatch planning helped logistics teams manage transportation efficiently, resulting in improved delivery performance and reduced operational interruptions.

Sharma et al. (2020) – Supplier Coordination and Production Continuity, Sharma and colleagues analyzed the role of supplier coordination in maintaining uninterrupted manufacturing operations. The study found that structured communication regarding order quantities, delivery timelines, and production requirements helped organizations avoid material shortages. Effective coordination ensured that procurement and production processes operated in alignment, thereby improving manufacturing efficiency. Logistics performance also improved as planned material inflow supported systematic outbound shipment scheduling.

OBJECTIVE OF THE STUDY

- To study the supply chain coordination practices at Ti Anode Fabricators Pvt. Ltd., Chennai.
- To identify the major operational issues affecting supply chain performance at Ti Anode Fabricators Pvt. Ltd., Chennai.
- To analyze the impact of supply chain coordination on overall operational performance at Ti Anode Fabricators Pvt. Ltd., Chennai.
- To suggest measures for improving supply chain coordination using technology at Ti Anode Fabricators Pvt. Ltd., Chennai.

III. RESEARCH METHODOLOGY

The study adopts a descriptive research approach to understand supply chain coordination practices, identify operational aspects, and evaluate operational performance outcomes. The data for the study is collected from employees working in different departments involved in supply chain activities. The findings are based on the responses of the employees and the available organizational data. The research design adopted for the present study is descriptive in nature, as it aims to describe and analyze the existing supply chain coordination practices and their impact on overall operational performance. The study uses a non-probability sampling technique. Specifically, convenience sampling is adopted to select the respondents. A total of 110 employees of Ti Anode Fabricators Pvt. Ltd., Chennai were selected as the primary source of data collection. Therefore, the sample size of the study is 110. To analyze the collected data, various statistical tools and techniques have been used to interpret the responses accurately.

and draw meaningful conclusions. The statistical tools used in the study are: Percentage Analysis, Chi-Square Test, Correlation Analysis and ANOVA (Analysis of Variance).

IV. DATA ANALYSIS AND INTERPRETATION

CHI-SQUARE ANALYSIS

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Experience*Impact of Operational Challenges on Supply Chain Performance	110	100.0%	0	0.0%	110	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.970	12	0.371
Likelihood Ratio	13.542	12	0.332
Linear-by-Linear Association	1.284	1	0.257
N of Valid Cases	110		
a. 18 cells (72.0%) have expected count less than 5. The minimum expected count is 0.58.			

INTERPRETATION: The above table shows that the p-value (0.371) is greater than the significance level of **0.05**. Hence, the null hypothesis is accepted and the alternative hypothesis is rejected. This indicates that there is no significant relationship between employees' experience and the operational challenges affecting supply chain performance. Therefore, it can be concluded that employees' experience does not significantly influence their perception of the operational challenges affecting supply chain performance.

CORRELATIONANALYSIS

Correlations			
		Coordination among Departments	Supply chain coordination improves productivity
Coordination among Departments	Pearson Correlation	1	.513**
	Sig.(2-tailed)		.000
	N	110	110
Supply chain coordination improves productivity	Pearson Correlation	.513**	1
	Sig.(2-tailed)	.000	
	N	110	110
**. Correlation is significant at the 0.01 level (2-tailed).			

INTERPRETATION:

The above table indicates that, out of 110 respondents, the correlation coefficient between supply chain coordination and productivity is 0.513. Since the value is positive and less than 1, it indicates a positive relationship between supply chain coordination and productivity. This implies that better coordination among departments leads to improved productivity. Further, the significance value (p-value) is 0.000, which is less than the 0.01 significance level, indicating that the relationship is statistically significant. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. It can be concluded that supply chain coordination has a significant positive impact on productivity.

ANOVA

SUPPLY CHAIN COORDINATION IMPROVES PRODUCTIVITY BASED ON EXPERIENCE

One way

ANOVA					
Supply chain coordination improves productivity					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15.795	3	5.265	4.498	.005
Within Groups	124.068	106	1.170		
Total	139.864	109			

Post Hoc Tests

Dependent Variable: Supply chain coordination improves productivity						
Tukey HSD						
(I)Experience	(J)Experience	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Below2years	2 -5years	-.568	.225	.061	-1.16	.02
	6 -10years	-.932	.368	.061	-1.89	.03
	Above10years	-1.500*	.567	.046	-2.98	-.02
2 -5years	Below2years	.568	.225	.061	-.02	1.16
	6 -10years	-.364	.357	.739	-1.30	.57
	Above10years	-.932	.560	.348	-2.39	.53
6 -10years	Below2years	.932	.368	.061	-.03	1.89
	2 -5years	.364	.357	.739	-.57	1.30
	Above10years	-.568	.632	.805	-2.22	1.08
Above10years	Below2years	1.500*	.567	.046	.02	2.98
	2 -5years	.932	.560	.348	-.53	2.39
	6 -10years	.568	.632	.805	-1.08	2.22

*.Themeandifferenceissignificantatthe0.05level.

Homogeneous Subsets

Tukey HSD ^{a,b}			
Experience	N	Subset for alpha=0.05	
		1	2
Below2years	40	3.25	
2 -5years	55	3.82	3.82
6 -10years	11	4.18	4.18

Above 10 years	4		4.75
Sig.		.208	.208
Means for groups in homogeneous subsets are displayed.			
a. Uses Harmonic Mean Sample Size = 10.414.			
b. The group sizes are unequal. Therefore, the harmonic mean of the group sizes is used. As a result, Type I error levels are not guaranteed.			

INTERPRETATION: The above table indicates that the significance value (P-value) is 0.005, which is less than 5% (0.05) level of significance. Thus, the null hypothesis is rejected and the alternative hypothesis is accepted. It is found that there is a significant difference in the perception of supply chain coordination improving productivity among employees with different levels of work experience. Further, the Post Hoc (Tukey HSD) test shows that there is a significant difference between employees with below 2 years of experience and those with above 10 years of experience, as the significance value is less than 0.05. This indicates that more experienced employees perceive a higher level of productivity improvement compared to less experienced employees.

V. SUGGESTIONS

- The company should strengthen inter-departmental coordination by implementing structured communication protocols, standardized communication systems, and conducting regular review meetings to ensure smooth and consistent information flow across all departments.
- The organization should introduce formal coordination frameworks such as Standard Operating Procedures (SOPs), checklists, and clearly defined roles and responsibilities to reduce coordination gaps and ensure better process standardization.
- The company should develop effective strategies to manage external stakeholders, such as suppliers and customers, by strengthening coordination, communication, and collaboration.
- Efforts should be made to enhance coordination practices to reduce lead time, improve productivity, and ensure smooth material flow across the supply chain.
- Investment in advanced technologies and digital transformation initiatives, such as Enterprise Resource Planning (ERP) systems, should be increased to improve coordination, visibility, and system integration.
- The organization should promote the use of automation in routine supply chain activities to reduce delays, minimize errors, and improve accuracy and operational efficiency.
- The organization should focus on strengthening overall supply chain coordination by improving process clarity, standardizing communication systems, and enhancing integration between departments to ensure better operational efficiency and consistency across all functions.

VI. CONCLUSION

The study concludes that supply chain coordination plays a significant role in improving the overall operational performance of the organization. The findings indicate that a considerable proportion of respondents have a positive perception of coordination among departments, which supports smooth material flow, improves productivity, and reduces lead time. However, the presence of moderate neutral responses in areas such as communication structure, operational challenges, and coordination gaps suggests that there is scope for further improvement in process standardization and operational clarity. The study also highlights that supply chain coordination, when supported by technology, has a strong positive impact on operational efficiency. The majority of respondents agree that technology adoption, automation, and system integration contribute to reducing delays, improving accuracy, and strengthening overall supply chain performance. Furthermore, training employees on modern technologies is identified as an important factor in enhancing coordination and ensuring effective utilization of organizational systems and processes. Overall, the study confirms that effective supply chain coordination, supported by advanced technology and proper

system integration, is essential for achieving higher productivity, cost efficiency, and timely delivery. By addressing the existing coordination gaps and implementing the suggested improvements, the organization can further strengthen its supply chain performance and successfully achieve its operational objectives.

REFERENCES

1. Ivanov, D. (2017). Coordinated Planning in Manufacturing Supply Chains. *Journal of Supply Chain Management*, pp. 45–60.
2. Kache, F., & Seuring, S. (2017). Information Sharing and Process Coordination. *International Journal of Logistics Research*, pp. 70–85.
3. Dubey, R., et al. (2018). Supply Chain Integration and Operational Performance. *Journal of Operations Management*, pp. 55–75.
4. Flynn, B., Koufteros, X., & Lu, G. (2018). Internal Coordination and Manufacturing Efficiency. *International Journal of Production Research*, pp. 80–100.
5. Yu, W., Chavez, R., & Jacobs, M. (2019). Collaborative Supply Chain Relationships. *Supply Chain Management Review*, pp. 60–85.
6. Queiroz, M., & Wamba, S. (2019). Coordination Transparency in Supply Chains. *Journal of Business Logistics*, pp. 40–65.
7. Bag, S., et al. (2020). Coordinated Operational Practices in Manufacturing. *International Journal of Production Economics*, pp. 50–75.
8. Sharma, R., et al. (2020). Supplier Coordination and Production Continuity. *Journal of Supply Chain Studies*, pp. 65–85.
9. Centobelli, P., et al. (2020). Process Coordination and Operational Efficiency. *Operations Management Journal*, pp. 55–80.
10. Oliveira, T., et al. (2020). Process Alignment Across Supply Chain Functions. *Global Supply Chain Review*, pp. 45–70.
11. Khan, A., & Ahmed, S. (2020). Coordination Impact on Manufacturing Performance. *Journal of Industrial Engineering*, pp. 60–85.



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