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THE ROLE OF ORDER MANAGEMENT SYSTEM IN SUPPORTING DIGITAL TRADE FACILITATION AND GLOBAL MARKETING STRATEGY (CASE STUDY OF PT KOMATSU UNDERCARRIAGE INDONESIA)

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Abstract: The Study examines the role of integration of an Order Management System (OMS) in supporting digital trade facilitation and strengthening global marketing strategy at PT Komatsu Undercarriage Indonesia in collaboration with Komatsu Australia. Before OMS implementation, order handling relied on manual processes in which purchase orders were sent via email or PDF and re-entered into internal systems, resulting in fragmented orders across multiple Australian destinations, requiring cross-country clarifications of up to two to three days, resulting in increased risks of errors and administrative delays. The research employed a qualitative descriptive case study approach, collecting primary data through semi-structured interviews, direct observation, and documentation review. Data were analyzed using NVivo to support systematic coding theme development and pattern visualization. The findings indicate that OMS acts as a key enabler of upstream digital trade facilitation by standardizing order formats, improving data accuracy, reducing duplication or missing orders, and enhancing near real-time visibility and coordination between KUI and Komatsu Australia. Furthermore, OMS provides an integrated single source of truth for demand and marketing strategy. The study concludes that OMS integration improves cross-border information flow and operational reliability, although organizational readiness and data governance remain critical to maximizing long-term strategic benefits.

Keywords: *Order Management System, Digital Trade Facilitation, Supply Chain Integration, Global Marketing Strategy, Manufacturing Industry*

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1. Introduction

Globalization and digital transformation have significantly reshaped international trade practices. Traditional trade processes that relied on manual document exchanges are increasingly replaced by digital trade facilitation, which emphasizes document digitalization, process automation, and integration of information systems across countries (OECD, 2019; Ferrari, Salinas, & Shingal, 2020). The World Trade Organization (2023 highlights that digital trade facilitation can reduce international transaction costs by up to 15-20 percent while improving the reliability and speed of global supply chains. In export-oriented manufacturing

industries, particularly heavy equipment manufacturing, digitalization of order management has become a strategic requirement to sustain competitiveness (Gunasekaran et al., 2018).

PT Komatsu Undercarriage Indonesia (KUI), as part of Komatsu Ltd, supplies undercarriage components and trading items to global markets, with Australia as a key destination. However, the order management process between Komatsu Australia and KUI remains largely manual, relying on email-based purchase orders (PO) with varying formats across multiple regions. Prior studies indicate that manual order processing increases the risk of fragmented data, administrative errors, duplicate or missing orders, and prolonged cross-border clarification (Chen, Zhao, & Tang, 2020; Sutanto & Prabowo, 2022). These issues negatively affect production planning accuracy, order and sales performance stability, and on-time delivery. The complexity of multi-destination markets further amplifies the challenges. Low order visibility and inconsistent demand data often lead to backlog accumulation and forecasting inaccuracy within global supply chains (Lee & Wang, 2019; Zhang, Chen & Li, 2021). Without an integrated order management system, companies face difficulties in synchronizing demand information across regions and responding effectively to market changes.

Previous literature emphasizes that an Order Management System (OMS) improves order visibility, reduces administrative errors, and strengthens supply chain integration by enabling standardized and real-time data exchange (Gunasekaran et al., 2018; Liu, Shang & Xu, 2021). OMS is also recognized as a key component of modern digital trade facilitation, as it supports upstream integration beyond export documentation processes (OECD, 2019; Ferrari et al., 2020). Moreover, reliable operational data generated from integrated systems supports data-driven global marketing decisions and enhances firms' responsiveness to international market dynamics (Kotabe & Kothari, 2016; Wedel & Kannan, 2016).

Despite extensive discussion on OMS and digital trade facilitation, empirical studies focusing on Indonesian manufacturing firms integrated into the global network, particularly within the Indonesia-Australia trade context, remain limited. Furthermore, research linking OMS-generated data to global marketing strategy formulation in heavy equipment manufacturing is still scarce (Nguyen, Ngo, & Ruel, 2020; Handayani & Permana, 2021).

Therefore, this study aims to analyze the role of OMS integration in supporting digital trade facilitation between Komatsu Australia and PT Komatsu Undercarriage Indonesia. This research also examines how OMS implementation generates data and information that supports global marketing strategy formulation, while identifying strategic challenges and opportunities to improve operational efficiency and global competitiveness.

2. Research Method

This study employs a qualitative descriptive approach using a case study method. A qualitative approach is selected to obtain an in-depth understanding of processes, experiences, and operational dynamics related to the implementation of an Order Management System (OMS) in supporting digital trade facilitation and global marketing strategy. The case study method is appropriate because the research focuses on a specific organizational context, namely the integration of OMS between Komatsu Australia and PT Komatsu Undercarriage Indonesia (KUI), which is characterized by cross-border order management, multi-destination market structure, complex purchase order (PO), and relatively long production lead times.

The object of this research is the cross-border order management process, particularly the flow of order receipt, validation, and utilization of order data before and after OMS implementation. The study was conducted at PT Komatsu Undercarriage Indonesia (KUI),

located in Cikarang, West Java, Indonesia, as part of Komatsu Ltd, Japan, which is currently implementing OMS integration with Komatsu Australia. The research period covered April to March 2025, including preparation, data collection, analysis, and reporting stages.

Research data consists of primary and secondary data. Primary data were collected through in-depth interviews, direct observation, and document analysis. Semi-structured interviews were conducted with key informants directly involved in order management and OMS implementation, including the general manager of marketing, sales operation managers, planning production control supervisor, staff responsible for Komatsu Australia accounts, sales production planning staff, order processing staff, and IT personnel. The interviews aimed to explore operational challenges, coordination issues, risk associated with manual order processing, and perceived changes following OMS implementation.

Direct observation was conducted using non-participant overt observation approaches to capture actual operational activities. Observed aspects included the receipt of purchase orders from Komatsu Australia (via email or PDF), manual data input processes, the frequency of input errors, cross-border clarification processes affected by time zone differences, and changes in workflows after OMS adoption. Observation data was used to validate interview findings and provide contextual understanding of operational practices.

Document analysis was performed to support and triangulate primary data. Internal documents analyzed included order and sales performance data for the period FY2021-FY2024, actual production lead times, and industry benchmarks, and purchase order documents from multiple Australian destinations (Sydney, Perth, Queensland, Fremantle, and New Caledonia), records of input errors and customer complaints, standard operating procedures (SOP) for manual order processing and OMS implementation, and system-related reports and process flow diagrams. External sources such as WTO trade facilitation reports, Indonesian export statistics, and relevant academic literature were also reviewed.

To ensure data credibility and trustworthiness, this study applied data and method triangulation, comparing information across different information and data collection techniques. Member checking was conducted by confirming interview interpretations with selected informants, while peer debriefing involved discussions with academic supervisors and research peers to enhance analytical rigor and reduce bias.

Data analysis was conducted interactively and continuously throughout the research process. The analysis was supported by NVivo qualitative data analysis software to enhance transparency, consistency, and traceability of the analytical process. Analytical stages included initial data familiarization, coding and data reduction, identification of patterns and thematic relationships, and interpretation of findings. The results were analyzed by linking empirical evidence with the theoretical frameworks of Supply Chain Integration, Digital Trade Facilitation, and Dynamic Capability, enabling a comprehensive explanation of how OMS integration improves cross-border order data flow, supports data-driven global marketing decisions, and reveals strategic challenges and opportunities in digital systems implementation.

3. Results and Discussion

3.1. Results

Pre-OMS Cross-Border Order Management Issues

Based on triangulated evidence from in-depth interviews, direct operational observations, and internal documentation, the study finds that before OMS integration, cross-border order management between Komatsu Australia and Komatsu Undercarriage Indonesia (KUI) was predominantly manual and document-based. Purchase orders (PO) were transmitted via email

in PDF format by PIC across multiple Australian regions (Sydney, Perth, Queensland, Fremantle, and New Caledonia). Each region applied distinct document layouts and writing conventions, including variations in part number format, quantity notation, destination description, and scheduling remarks.

The absence of a standardized order-data structure required intensive manual checking before further processing. Operationally, the pre-OMS workflow consisted of: (1) PO reception via email, (2) manual screening, (3) re-entry into the KUI internal system, (4) manual validation, and (5) cross-border clarification in cases of mismatch. This sequence prolonged administrative lead time and created high dependency on individual accuracy, thereby increasing the probability of data-entry errors and processing delays. Five major structural problems were identified in the pre-OMS phase:

1. multi-destination order fragmentation
2. Non-standard PO formats across regions
3. Manual data-entry risk
4. Cross-border clarification delays
5. Missed and correcting orders

Collectively, these issues weakened demand reliability, constrained forecasting and production planning responsiveness, and limited the organization's ability to utilize order data strategically for global marketing purposes. The dominant bottleneck was located in the upstream information flow rather than production.

Structural Process Change After OMS Integration

OMS implementation, initiated in mid FY2024 and stabilized in FY2025, fundamentally transformed order handling from a document-based process into a structured system-based workflow. Orders that were previously treated as email attachments requiring manual re-entry became standardized data records validated within a centralized system.

Figure 1 presents the structural comparison between pre-OMS and post-OMS workflows. In the pre-OMS configuration, multiple manual stages, including email reception, screening, manual input, and repeated verification, created bottlenecks and elevated exposure to missed orders and input errors. In contrast, the post-OMS workflow enables earlier mismatch detection and structured revision requests before order data are released for downstream planning (Sales Production Plan/SPP). This structural simplification reduces rework and improves the readiness of validated order data for planning functions.

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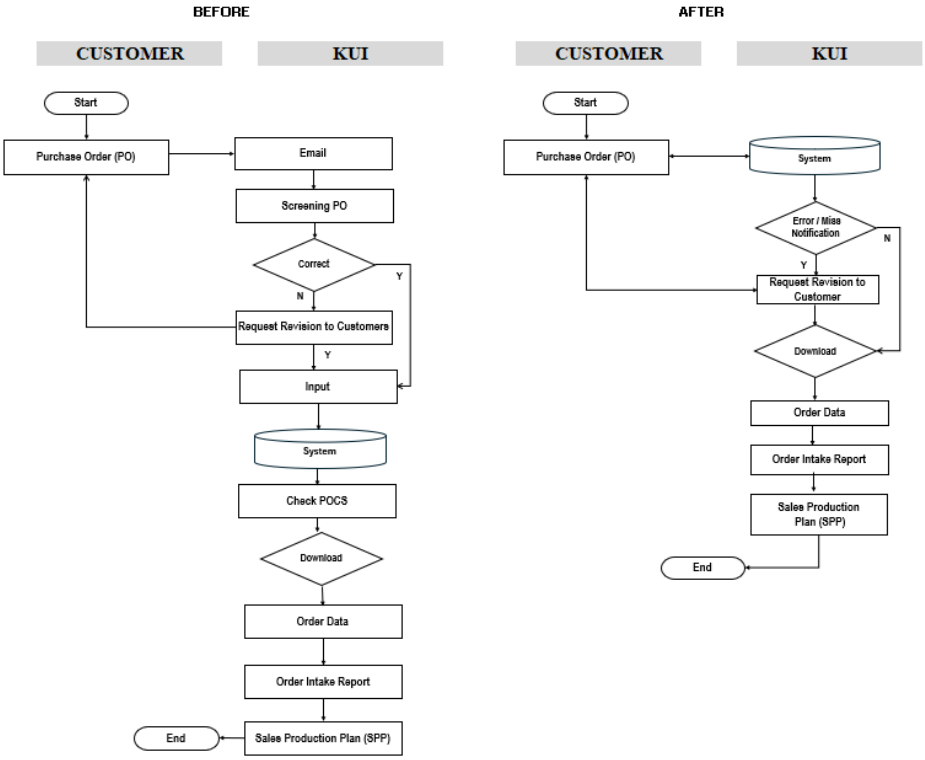

Figure 1. Comparison of Order Processing Flow Before and After OMS Integration
Source: Internal process documentation (2025)

The transformation indicates a shift from reactive manual coordination toward standardized system-mediated order governance.

Cross-Border Clarification Lead Time

Before OMS integration, clarification of mismatched PO data required approximately 2-3 working days. This delay was driven by time zone differences, asynchronous email communication, and decentralized PIC coordination across Australian regions. After OMS stabilization, clarification can generally be completed within the same day or less than one working day. Earlier mismatch detection and centralized status visibility reduce coordination latency and administrative lead time before planning activities commence.

Order Error Rate

Order error percentage across three fiscal years demonstrates a transition-stabilization pattern.

Table 1. Order Error Rate Before and After OMS Implementation

Fiscal Year	Total PO	Total Errors	Error Rate
FY2023 (Pre-OMS)	635	33	5.20%
FY2024 (Transition Phase)	698	43	6.16%
FY2025 (Stabilized OMS)	510	6	1.18%

Source: Internal process documentation (2025)

The data indicated a temporary increase in error rate during FY2024, corresponding to the transition phase when hybrid routines and user adaptation were still occurring. However, following full stabilization in FY2025, the error rate declined significantly to 1.18%, representing a substantial improvement compared to the pre-OMS baseline.

This pattern suggests that OMS's impact on order data accuracy becomes fully observable only after organizational routines and data governance mechanisms stabilize.

NVivo Findings (Pattern Confirmation)

NVivo Analysis was employed to enhance analytical transparency and confirm a dominant qualitative pattern across interviews, observations, and documentation.

The word frequency output (Figure 2) identifies "Australia", "order", "data", "system", "sales", "stock", and "forecast" as dominant terms. This confirms that informants primarily associate operational constraints with upstream order-data reliability rather than production capacity.

Cluster analysis (Figure 3) reveals a strong relationship between "order-data-time," indicating that timeliness and accuracy of order information represent the core bottleneck influencing planning responsiveness. Furthermore, the NVivo project map (Figure 4) illustrates cross-functional linkages between order processing, planning, and marketing functions, highlighting that order-data inconsistency contains both operational and strategic decision-making.

Figure 2. NVivo Word Cloud of Dominant Terms in Cross-Border Order Management and OMS Implementation
Source: NVivo analysis result (2025)

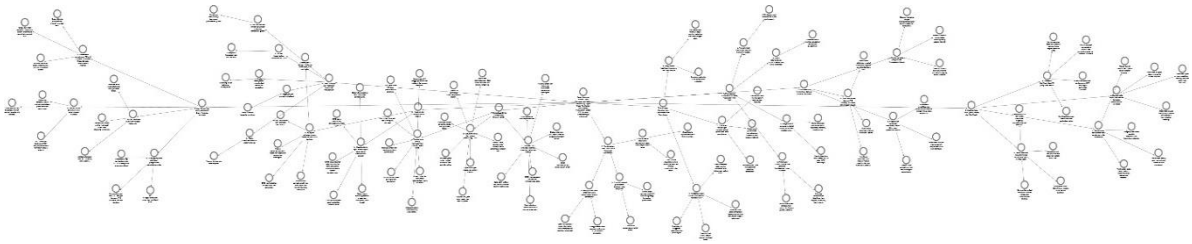

Figure 3. NVivo Cluster Analysis Showing the Relation Between "Order-Data-Time" as the Core Bottleneck
Source: NVivo analysis result (2025)

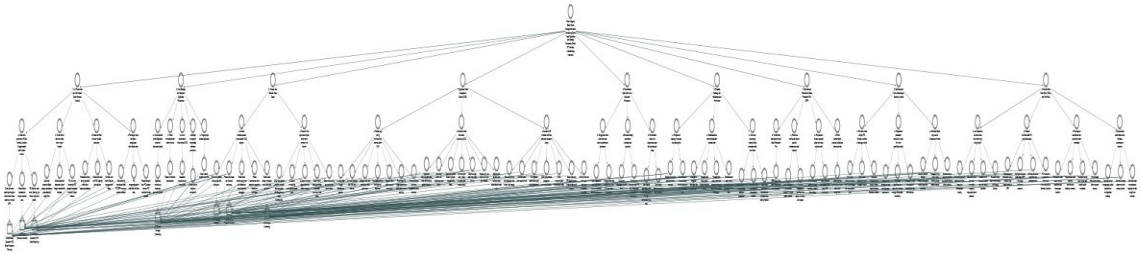

Figure 4. NVivo Project Map Illustrating Cross-Functional Linkages Between Order Processing, Planning, and Global Marketing
Source: NVivo analysis result (2025)

In the NVivo findings, the empirical conclusion is that the principal constraint before OMS was information-flow inefficiency, and that OMS contributes to improving data reliability and cross-functional coordination.

3.2. Discussion

OMS and Supply Chain Integration (SCI)

From a supply chain integration perspective, the pre-OMS condition reflects the low information integration across the cross-border supply chain. Order data was fragmented across emails and non-standardized PDF documents, limiting demand visibility and creating reactive coordination between sales, order processing, and production planning. This fragmentation constrained the firm's ability to consolidate total demand from multiple Australian regions, thereby reducing forecasting accuracy and planning responsiveness.

OMS strengthens information integration by centralizing order data within a single system and enabling early mismatch detection. Validated order information becomes available more quickly for downstream planning processes such as MRP, SPP, and inventory monitoring. This structural shift enhances cross-functional integration because data are no longer dependent on manual re-entry and individual interpretation.

The NVivo project map reinforces this interpretation by illustrating that order-data reliability is directly linked to planning responsiveness and marketing decision-making. Thus, OMS contributes to SCI not only by improving data flow but by reducing uncertainty in the demand signal transmitted across organizational functions.

OMS as Upstream Digital Trade Facilitation

This study extends the concept of digital trade facilitation beyond downstream export documentation and customs automation. In the case of KUI, digitalization was more advanced in export processing forwarding activities, while upstream cross-border order exchange remained manual.

The primary barrier was not regulatory or physical, but informational and structural, with inconsistent PO format, repeated manual re-entry, and clarification delays averaging 2-3 working days. These inefficiencies represent non-physical trade barriers that increase transaction latency and reduce responsiveness.

OMS reduces these barriers by transforming cross-border order exchange from a document- based mechanism into a structured, database system. Empirical evidence supports this transformation through the reduction of clarification lead time from 2-3 working days to same day or less than one working day, as well as the stabilization of order error rate at 1.18% in FY2025. Therefore, OMS functions as an upstream digital trade facilitation mechanism by

increasing transaction speed, data reliability, and standardization in cross-border business processes.

Dynamic Capability: Transition, Learning, and Stabilization

Dynamic capability theory explains the observed performance fluctuation during OMS implementation. First, OMS enhances sensing capability by improving real-time visibility of demand from multiple Australian regions. Earlier mismatch detection allows the firm to identify deviation before planning processes are affected. Second, OMS strengthens its seizing capability by accelerating planning decisions once order data is validated. Reduced clarification lead time allows production planning to commence earlier, improving responsiveness. Third, OMS requires reconfiguring capability because the organization must shift from email-based manual routines to a standardized digital workflow. The temporary increase in error rate during FY2024 (6.16%) reflects this adaptation phase, where hybrid processes and incomplete standardization were still present.

However, the sharp decline in error rate to 1.18% in FY2025 confirmed successful stabilization of new routines. This pattern supports the dynamic capability argument that short-term performance volatility during digital transformation may reflect organizational learning rather than system failure.

OMS for Global Marketing Strategy (Beyond Operational Efficiency)

Beyond operational efficiency, OMS provides strategic value by enabling data-driven global marketing, particularly in the key account relationship between KUI and Komatsu Australia. The centralized order database enhances the strategic use of demand data in several ways:

1) Demand Intelligence and Segmentation: OMS enables structured analysis of demand patterns across Australian regions and segments (e.g., mining, construction, retail). Instead of treating each PO as an isolated transaction, KUI can analyze recurring demand trends, part rotation patterns, and regional purchasing behavior. This supports more informed product prioritization and availability planning.
2) Service Reliability as Competitive Positioning: reduce clarification lead time and lower error rates, enhance order accuracy and shipment reliability. These improvements strengthen the KUI service reliability narrative in global B2B markets, where responsiveness and accuracy are critical competitive differentiators.
3) Proactive Key-Account Responsiveness: With improved traceability, sales and marketing functions can respond more proactively to urgent requests, demand fluctuations, and recurring part needs. This shifts the firm from reactive order fulfillment toward anticipatory coordination with a strategic customer.
4) Marketing Relevant Performance Monitoring: OMS provides a foundation for monitoring marketing relevant indicators such as order sales synchronization, demand stability trends, and delivery reliability patterns (without disclosing confidential backlog values). These indicators enable alignment between operational data and strategic marketing evaluation. However, NVivo hierarchy findings suggest that OMS is still predominantly perceived internally as an operational tool rather than a strategic marketing instrument. This indicates a managerial opportunity to integrate OMS data into dashboards, analytical routines, and collaborative planning mechanisms to fully leverage its strategic potential.

Limitation and Future Research

This study is limited by its single case study design. Which provides in-depth contextual insight but limits generalizability across industries and geographic settings. Although qualitative evidence is provided for clarification of lead time and order error rate, detailed backlog figures remain confidential and therefore cannot be fully disclosed.

Furthermore, the evaluation period includes a transition phase, FY2024, where performance indicators reflect adaptation dynamics rather than steady state impact. Future research should employ multi-case or mixed method designs to test the impact of OMS integration on measurable marketing performance outcomes such as delivery reliability, customers retention, and revenue growth.

4. Conclusion

This study demonstrates that the integration of the Order Management System (OMS) plays a structural role in transforming cross-border order management between Komatsu Australia and PT Komatsu Undercarriage Indonesia (KUI).

Prior to OMS implementation, the primary bottleneck was not production capacity, but fragmented and non-standardized upstream information flow. Manual email-based PO exchange created clarification delays, data inconsistencies, and elevated error risks, limiting both operational responsiveness and strategic demand visibility.

The implementation of OMS shifted the process from document-based routines to a standardized data-based workflow. Empirical indicators show a significant reduction in cross-border clarification lead time from 2–3 working days to the same day or less than one working day. While the transition phase in FY2024 reflected adaptation challenges, stabilization in FY2025 resulted in a sharp decline in order error rate to 1.18%, confirming improved data accuracy and process reliability.

From a theoretical standpoint, this study extends the concept of digital trade facilitation to the upstream stage of cross-border order-data exchange. It provides empirical evidence of strengthened information integration within Supply Chain Integration (SCI) and explains performance stabilization through the lens of Dynamic Capability, particularly sensing, seizing, and reconfiguring mechanisms.

Beyond operational efficiency, OMS contributes strategically by enabling structured demand intelligence, improving service reliability positioning, and supporting proactive key-account responsiveness. The system establishes a foundation for data-driven global marketing by enhancing visibility, traceability, and cross-functional coordination.

Overall, OMS integration functions not merely as an administrative improvement tool, but as a strategic enabler of digital trade facilitation, supply chain integration, and global competitiveness in manufacturing export contexts.

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