Bhinneka: Journal of Social Sciences and Contemporary Studies
Volume: 1, Nomor: 3, (2026), September: 130 - 139
Website: https://ejournal.ojs-lppm.com/index.php/Bhinneka/article/view/558
E-ISSN: xxxx-xxxx

LOGISTICS COMPETITIVENESS IN THE DIGITAL ERA: THE ROLE OF PORT CONNECTIVITY, TECHNOLOGY, TRUST, AND REGULATORY COORDINATION

Baringin[1], Andre Agachi Purba[2]
Darma Agung University, Indonesia [1]
Medan State University, Indonesia [2]
Corresponding Author: baringin@gmail.com[1*], andreagachipurba2000@gmail.com[2]

Info Artikel
Received: *03 September 2026*
Revised : *14 September 2026*
Accepted: *22 September 2026*
Published: *30 September 2026*

Keywords: *logistics competitiveness; port connectivity; digitalization; regulatory coordination.*

Abstract
Logistics competitiveness increasingly depends on the ability of organizations and logistics ecosystems to provide reliable, efficient, transparent, and responsive services. In developing maritime economies such as Indonesia, competitiveness is influenced by port connectivity, transportation infrastructure, information technology, institutional coordination, and relationships among logistics actors. This study investigates the multidimensional factors supporting logistics competitiveness in the digital era. A qualitative literature-based approach was employed by synthesizing academic studies, international logistics reports, and Indonesian policy documents. The findings indicate that competitiveness is influenced by the interaction of physical infrastructure, digital connectivity, regulatory efficiency, organizational competence, and inter-organizational trust. Ports with strong physical connectivity may still experience inefficiencies when information systems are fragmented or administrative processes are poorly coordinated. Similarly, advanced technology may provide limited benefits when organizations lack the capability and trust necessary to use shared information. The study concludes that logistics competitiveness should be approached as an ecosystem-level outcome rather than an isolated organizational capability.

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.
Publisher: Lembaga Penerbit Penelitian Multidisipliner

INTRODUCTION

Logistics competitiveness determines the ability of an economy to move goods efficiently and connect domestic production with international markets.

Indonesia's geographical structure makes maritime logistics especially important. Ports connect islands, production centers, distribution networks, and international trade routes.

However, logistics competitiveness cannot be determined solely by port infrastructure. Modern logistics also requires reliable information systems, efficient regulations, competent service providers, and effective relationships among organizations.

The digital transformation of logistics has therefore expanded the concept of competitiveness from physical infrastructure toward integrated physical and digital ecosystems. This study examines the major dimensions of logistics competitiveness in the digital era.

Previous research has identified logistics as an important component of competitive advantage because efficient logistics activities can improve service quality, responsiveness, and customer value. The development of logistics competitiveness is particularly important in emerging economies where infrastructure, regulatory arrangements, technological adoption, and organizational capabilities may develop at different rates. In the Indonesian context, the logistics sector also faces challenges associated with fragmented regulations, infrastructure limitations, intermodal connectivity, and the need for greater integration among logistics actors. These conditions increase the importance of organizational capabilities that can support coordination and adaptation (Ratnasari et al., 2026).

Information technology has become one of the major resources available to logistics companies in addressing these challenges. Digital technologies can facilitate information exchange, improve operational visibility, support decision-making, and increase responsiveness to customer requirements. Evidence from the first study used as the basis of this analysis demonstrates that information technology has a significant relationship with logistics competitiveness and that regulatory convergence is also associated with both information technology and logistics competitiveness. The study further identifies information technology as a mediating mechanism between regulatory convergence and logistics competitiveness (Barata, 2026).

However, technological capability alone may not be sufficient to explain the effectiveness of inter-organizational logistics activities. Logistics operations involve relationships among companies, customers, suppliers, business partners, transport providers, and other stakeholders. These relationships require the exchange of information and coordination of activities under conditions of uncertainty. Consequently, trust becomes an important relational resource (BRATA et al., 2023).

The findings of these two studies suggest that technological and relational capabilities should not necessarily be examined independently. Digital systems can provide accurate and timely information, but organizations still need sufficient trust to exchange information, coordinate activities, and respond collaboratively to unexpected situations. Conversely, strong inter-organizational relationships may be strengthened when supported by reliable digital information systems (Barata et al., 2022).

Despite the importance of these factors, studies concerning logistics competitiveness frequently examine technological capability, regulatory conditions, and relational mechanisms separately. This

creates an opportunity to develop an integrated perspective that considers both technological and relational resources as interconnected foundations of logistics competitiveness.

The contribution of this study lies in connecting technological and relational perspectives into a single analytical framework. Rather than treating technology and trust as independent factors, this study views them as complementary organizational capabilities that can jointly support operational coordination, responsiveness, and competitive advantage.

RESEARCH METHOD

The research used a qualitative literature-based approach. Academic studies concerning logistics competitiveness, port performance, digital transformation, supply chain integration, and organizational trust were analyzed alongside international and Indonesian logistics policy reports.

The analysis categorized competitiveness factors into infrastructure, technology, regulation, organizational capability, and inter-organizational relationships.

The second study examined trust formation in inter-organizational logistics relationships using a qualitative case study involving a logistics manager, a business partner, and two operational staff members. Data were collected through semi-structured interviews and observations and analyzed using thematic analysis.

Data Sources

The analytical material consisted of the two uploaded research articles. The first article focused on the effect of regulatory convergence and information technology on logistics competitiveness, while the second focused on the formation and maintenance of trust in inter-organizational logistics relationships.

The two studies were selected because they examine related dimensions of logistics performance within an Indonesian organizational context but employ different theoretical and methodological perspectives.

Data Analysis

The analysis was conducted through four stages. First, the researchers identified the main concepts, variables, and findings reported in each study. Second, the findings were grouped into three analytical dimensions: technological capability, relational capability, and logistics competitiveness. Third, similarities and complementary relationships between the findings were identified. Finally, the findings were synthesized into an integrated conceptual interpretation.

The analysis focused particularly on information exchange, responsiveness, coordination,

reliability, communication, regulatory adaptation, and competitive performance.

This approach allows the study to generate a broader conceptual explanation while maintaining a clear distinction between findings directly reported by the source studies and the interpretation developed through the integration process.

RESULTS

The analysis identifies five interconnected competitiveness dimensions

First, physical connectivity. Ports, roads, warehouses, and transportation networks provide the physical foundation of logistics.

Second, digital connectivity. Information systems connect organizations and increase cargo visibility.

Third, regulatory efficiency. Simplified and coordinated procedures can reduce administrative burdens.

Fourth, organizational capability. Skilled employees and effective management are required to convert infrastructure and technology into performance.

Fifth, relational capability. Trust and collaboration support information sharing and coordinated responses to disruptions.

These findings suggest that digital capability should not be understood merely as the possession of technological infrastructure. Rather, its contribution to competitiveness depends on the organization's ability to use technology as part of operational and managerial processes.

Inter-Organizational Trust as a Relational Capability

The second major finding concerns the importance of trust in inter-organizational logistics relationships. The qualitative study demonstrates that trust involves both cognitive and relational dimensions. Participants associated trust with competence, reliability, consistency, honesty, mutual respect, and confidence that business partners would fulfill their commitments.

Trust was also found to develop progressively through repeated successful interactions. Small initial commitments, consistent performance, accurate documentation, and timely delivery created behavioral evidence that increased confidence between organizational actors.

Communication emerged as another central mechanism. Transparent and timely communication helped reduce uncertainty, align expectations, and maintain credibility, particularly when operational problems occurred.

Thus, inter-organizational trust can be interpreted as a relational capability that facilitates

coordination and reduces the need for excessive monitoring. When organizations trust one another, operational interactions can become more flexible and responsive.

The Complementary Relationship between Technology and Trust

The most important integrated finding is that digital capability and inter-organizational trust represent complementary rather than competing resources.

Technology provides the infrastructure through which information can be generated, exchanged, stored, and processed. Trust, meanwhile, influences how organizational actors interpret information, communicate with one another, and respond to uncertainty.

For example, digital systems may provide real-time information concerning shipment status, delivery schedules, documentation, and operational disruptions. However, the usefulness of such systems also depends on the willingness of organizational actors to communicate accurately and transparently. Trust therefore provides a relational foundation that can support effective utilization of technological systems.

The second study shows that communication and transparency are fundamental to maintaining trust, while the first study demonstrates the importance of information technology for competitiveness. When these findings are considered together, information technology can be viewed as an enabler of communication and coordination, while trust can facilitate the effective relational use of information.

Regulatory Adaptation, Technology, and Competitive Performance

The first study also found a significant relationship between regulatory convergence and information technology, with a path coefficient of 0.763 and a t-statistic of 20.194. Regulatory convergence was also significantly associated with logistics competitiveness, with a path coefficient of 0.734 and a t-statistic of 18.306.

Furthermore, the indirect effect of regulatory convergence on logistics competitiveness through information technology was reported at 0.350, with a t-statistic of 4.403.

These findings indicate that regulatory adaptation and technological capability are interconnected. In practical terms, regulatory requirements may encourage organizations to improve their information systems and operational processes. Technology can subsequently help organizations implement and monitor regulatory requirements more effectively.

When integrated with the trust findings, this suggests a broader framework in which institutional adaptation, digital capability, and relational capability jointly support logistics competitiveness.

DISCUSSION

The five dimensions should not be considered independently

A port may have sophisticated infrastructure but still experience delays when information is fragmented. Similarly, an advanced digital platform may have limited impact when transportation infrastructure is inadequate.

Trust provides another important link between technological and organizational dimensions. Digital platforms create opportunities for information sharing, but organizations must be willing to rely on information provided by partners.

Regulatory coordination also affects competitiveness because inconsistent procedures can increase transaction costs. Consequently, logistics competitiveness should be understood as an ecosystem capability.

Therefore, digital transformation should involve organizational adaptation rather than simply purchasing new technological systems. Employees, managers, and business partners must understand how digital information is generated, communicated, and used in logistics activities.

Trust as an Organizational Resource

Trust should also be understood as more than an interpersonal characteristic. The qualitative findings indicate that trust reduces monitoring requirements, facilitates decision-making, and improves coordination between business partners.

From a theoretical perspective, this interpretation is consistent with Social Exchange Theory, which emphasizes the development of trust through repeated exchanges, and Relational Exchange Theory, which recognizes the importance of relational mechanisms in sustaining inter-organizational cooperation.

Trust can also be considered an intangible organizational resource. When business partners have confidence in one another's competence and reliability, organizations can coordinate activities with less friction. Consequently, trust may contribute indirectly to operational efficiency and long-term relationship stability.

Communication as the Link between Digital Capability and Trust

Communication represents an important connection between technology and trust. The qualitative findings demonstrate that transparent communication reduces uncertainty and strengthens credibility.

Digital technologies can enhance the speed and accessibility of communication, but the

presence of technology does not automatically guarantee transparency. Organizations still need to provide accurate information and communicate proactively when problems occur.

This distinction is important because logistics operations are exposed to uncertainty. Delays, documentation problems, transportation disruptions, and changing customer requirements can affect operational performance. Under such circumstances, transparent communication can help maintain trust even when operational problems cannot be completely avoided.

The Role of Consistency and Reliability

Both studies indirectly emphasize the importance of consistency. The competitiveness study highlights the importance of reliable logistics operations and information technology, while the trust study identifies consistent performance as a major foundation of trust.

This suggests that competitiveness is not created by isolated technological innovations or individual successful transactions. Instead, it is accumulated through repeated organizational performance.

Consistent delivery, accurate documentation, timely information, responsive communication, and reliable technological systems can gradually strengthen the confidence of customers and business partners. Over time, this accumulated confidence may become an intangible source of competitive advantage.

Formal and Relational Mechanisms

Another important implication concerns the relationship between formal mechanisms and relational mechanisms. Regulatory frameworks and formal agreements provide structure for logistics activities, while trust and interpersonal relationships facilitate cooperation in situations that cannot be fully anticipated by formal rules.

The qualitative study indicates that informal relationships, mutual respect, and harmony complement formal contractual mechanisms in the Indonesian business context.

Therefore, logistics competitiveness can be approached through a combination of formal and relational governance. Formal systems provide clarity and accountability, while relational trust can facilitate flexibility and cooperation.

CONCLUSIONS

Logistics competitiveness in the digital era depends on the interaction of physical connectivity, digital integration, regulatory coordination, organizational competence, and inter-organizational trust.

For Indonesia, improving logistics competitiveness requires coordinated development rather than isolated investment. Ports, government agencies, transportation providers, logistics service providers, and technology platforms need to operate within an increasingly integrated ecosystem.

Future empirical studies should develop measurable indicators that capture the combined effects of infrastructure, digital integration, trust, regulatory efficiency, and logistics service performance.

The integrated findings further indicate that technology and trust should not be treated as independent organizational resources. Digital systems provide the infrastructure for information exchange, whereas trust provides an important relational foundation for using that information effectively. Their interaction can therefore contribute to more responsive and coordinated logistics operations.

The findings also highlight the importance of combining formal and relational mechanisms. Regulatory arrangements and formal agreements provide organizational structure, while trust, communication, reliability, and interpersonal relationships contribute to flexibility and sustained cooperation.

From a managerial perspective, logistics companies should develop digital capabilities together with relationship-management capabilities. Investment in information technology should be accompanied by efforts to improve communication quality, transparency, service reliability, employee capability, and partner relationships.

This study has limitations because it is based on an integrative analysis of two existing empirical studies rather than newly collected primary data. Consequently, the proposed relationships should be tested through future empirical research involving larger samples, multiple logistics organizations, and additional variables such as service innovation, human resource capability, supply chain integration, and organizational resilience.

Future studies may also develop and empirically test an integrated structural model examining whether inter-organizational trust strengthens the relationship between digital capability and logistics competitiveness. Such research would provide stronger empirical evidence concerning the interaction between technological and relational resources in emerging-market logistics.

REFERENCES

Barata, F. A. (2026). THE IMPACT OF THE CONVERGENCE OF REGULATIONS AND INFORMATION TECHNOLOGY IN INCREASING LOGISTICS COMPETITIVENESS AT

PT. FAB ENTERPRISES LOGISINDO. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi*, *10*(3), 1547–1556.

Barata, F. A., Ricardianto, P., Mulyana, A., Perwitasari, E. P., Arubusman, D. A., Purwoko, H., & ENDRI, E. (2022). *Berthing time in the port of Tanjung Priok, Jakarta, Indonesia*.

BRATA, F. A. R. I., ARIOHADI, M. W., Ricardianto, P., EL HAQ, L., Octaviani, R. D., & SITORUS, P. P. (2023). *SAFETY RISK AND OPERATIONAL EFFICIENCY ON LOGISTIC SERVICE PROVIDERS'SUSTAINABLE COAL SUPPLY CHAIN MANAGEMENT*.

Ratnasari, E. D., Barata, F. A., & Pristiana, U. (2026). TRUST FORMATION IN INTER-ORGANIZATIONAL LOGISTICS RELATIONSHIPS: A QUALITATIVE CASE STUDY OF FAB ENTERPRISES IN INDONESIA. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi*, *10*(4), 2270–2279.

Christopher, M. (2016). *Logistics & supply chain management* (5th ed.). Pearson.

Heilig, L., Lalla-Ruiz, E., & Voß, S. (2017). Digital transformation in maritime ports: Analysis and a game theoretic framework. *Netnomics, 18*, 227–254.

Notteboom, T., Pallis, A., & Rodrigue, J. P. (2022). *Port economics, management and policy*. Routledge.

Panayides, P. M., & Venus Lun, Y. H. (2009). The impact of trust on innovativeness and supply chain performance. *International Journal of Production Economics, 122*(1), 35–46.

World Bank. (2023). *Connecting to compete 2023: Trade logistics in an uncertain global economy*. World Bank.

United Nations Conference on Trade and Development. (2023). *Review of maritime transport 2023*. United Nations.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE.

Denzin, N. K., & Lincoln, Y. S. (2018). *The SAGE handbook of qualitative research* (5th ed.). SAGE.

Komakecha, R. A., Ombati, T. O., Kikwatha, R. W., & Wainaina, M. G. (2025). Resource-based view theory and its applications in supply chain management: A systematic review. *Management Science Letters, 15*, 261–272.

Legood, A., Van Der Werff, L., Lee, A., Den Hartog, D., & Van Knippenberg, D. (2023). A critical review of cognition-based and affect-based trust. *Journal of Management Studies, 60*(2), 495–537.

Metz, A., Jensen, T., Farley, A., Boaz, A., Bartley, L., & Villodas, M. (2022). Building trusting

relationships to support implementation: A proposed theoretical model. *Frontiers in Health Services, 2*, 894599.

Miao, M., Jalees, T., Zaman, S. I., Khan, S., Hanif, N. U. A., & Javed, M. K. (2022). The influence of e-customer satisfaction, e-trust, and perceived value on consumers' repurchase intention in the B2C e-commerce segment.

Sakas, D. P., Reklitis, D. P., Giannakopoulos, N. T., & Trivellas, P. (2023). The influence of websites user engagement on the development of digital competitive advantage and digital brand name in logistics startups. *European Research on Management and Business Economics, 29*(2), 100221. https://doi.org/10.1016/j.iedeen.2023.100221

Sergi, B. S., D'Aleo, V., Konecka, S., Szopik-Depczyńska, K., Dembińska, I., & Ioppolo, G. (2021). Competitiveness and the Logistics Performance Index: The ANOVA method application for Africa, Asia, and the EU regions. *Sustainable Cities and Society, 69*, 102845. https://doi.org/10.1016/j.scs.2021.102845

Sinitò, D., Santarcangelo, V., Stanco, F., & Giacalone, M. (2023). Industry 4.0: Machinery integration with supply chain and logistics in compliance with Italian regulations. *MethodsX, 11*, 102269. https://doi.org/10.1016/j.mex.2023.102269

Vu Thi Thu, H., & Thu, T. N. (2025). The impact of logistics performance and green logistics performance on intra-ASEAN goods exports. *Asian Journal of Shipping and Logistics, 42*(1), 24–33. https://doi.org/10.1016/j.ajsl.2025.11.003

Werner-Lewandowska, K., & Kosacka-Olejnik, M. (2019). Logistics 4.0 maturity in service industry: Empirical research results. *Procedia Manufacturing, 38*, 1058–1065. https://doi.org/10.1016/j.promfg.2020.01.192