UGC Approved Indexed Peer Reviewed Journal

ISSN: 2320-6586 (Online)

IILM UNIVERSITY

Technologies for Sustainable Development Goals 2025 (TECH4SDG-2025)

School of Computer Science & Engineering

IILM University Greater Noida

Presents

1st National Conference

on

Technologies for Sustainable Development Goals 2025 (TECH4SDG-2025)

3rd March 2025

Technically Co-Sponsored by IEEE UP SECTION (INDIA)

Venue:

IILM University, Greater Noida

Plot No.18,16, Knowledge Park II, Greater Noida, Uttar Pradesh 201306

Procedings Published at

International Journal of Research in Modern Engineering and Emerging Technology

Vol. 13, Sp. Issue 1, April 2025

Doi: https://doi.org/10.63345/ijrmeet.org.v13.si1.1301

Editor-in-Chief

Dr. Mylavarapu Seetharama Prasad

www.ijrmeet.org

ISSN: (Online) 2320-6586

INTERNATIONAL JOURNAL OF RESEARCH IN MODERN ENGINEERING & EMERGING TECHNOLOGY

(IJRMEET)

I.F. (wef. 2023: 6.004)

Vol. 13, Sp. Issue 1, April: 2025

No part of this Journal may be reproduced in any form, by Photostat, Microfilm, Xerography, or any other means, or incorporated into any information retrieval System, electronic or mechanical, without the written permission of the Author, Editor-in-Chief and the Publisher of this Journal.

Copyright © 2025
Inc. All Rights Reserved

Published By
Resagate Global
KDP Grand Savanna, R. N. Ext.,
Ghaziabad- 201017, Uttar Pradesh, India

Powered By
Editor-in-Chief
IJRMEET
www.ijrmeet.org

INTERNATIONAL JOURNAL OF RESEARCH IN MODERN ENGINEERING & EMERGING TECHNOLOGY (IJRMEET)

Dear Author / Researcher,

On behalf of the *International Journal of Research in Modern Engineering & Emerging Technology (IJRMEET)*, I extend my heartfelt gratitude to all the authors and research scholars for choosing our platform to publish their valuable research contributions.

IJRMEET, a Refereed, Peer Reviewed, Indexed, and Monthly Journal in Electronic format, has been consistently dedicated since April 2013 to advancing scholarly work in the domains of Modern Engineering and Emerging Technologies. Your innovative and quality research is at the core of our mission to promote academic excellence and practical solutions in the ever-evolving field of engineering and technology.

We believe that publication should be based purely on the merit, originality, and relevance of the research, not on financial considerations. We ensure that every manuscript undergoes a thorough review process to maintain the integrity, reliability, and scholarly value of each published work.

Our journal aims not only to disseminate high-quality research globally but also to highlight critical engineering problems and their practical resolutions. I encourage researchers, academicians, faculty members, and industry professionals to continue contributing to IJRMEET and to inspire their peers and students to join us in this academic pursuit.

We sincerely thank our respected Editors, Reviewers, Technical Advisors, Authors, Web Developers, Subscribers, Supporters, and the extended academic community whose efforts and encouragement make each issue of IJRMEET a successful endeavor.

With warm regards,

Dr. Mylavarapu Seetharama Prasad

Editor-in-Chief, IJRMEET
Email: editor@ijrmeet.org
Website: www.ijrmeet.org

IILM UNIVERSITY

Technologies for Sustainable Development Goals 2025 (TECH4SDG-2025)

School of Computer Science & Engineering

IILM University Greater Noida

Presents

1st National Conference

on

Technologies for Sustainable Development Goals 2025 (TECH4SDG-2025)

3rd March 2025

Technically Co-Sponsored by IEEE UP SECTION (INDIA)

Venue:

IILM University, Greater Noida

Plot No.18,16, Knowledge Park II, Greater Noida, Uttar Pradesh 201306

ORGANIZING COMMITTEE

CHIEF PATRON

Prof. (Dr.) Taruna Gautam, Vice Chancellor, IILM University, Greater Noida

PATRON

Prof.(Dr.) Rajeev Tiwari, Dean - School of Computer Science & Engineering, IILM University, Greater Noida

GENERAL CHAIRS

Prof. (Dr.) Harshal Patil, Professor & Head-Computing & Security,
School of Computer Science & Engineering, IILM University, Greater Noida

Dr. Jasminder Kaur Sandhu, Associate Professor & Head-Machine Learning & Data Science,
School of Computer Science & Engineering, IILM University, Greater Noida

PROGRAM AND ORGANIZING CHAIRS

Dr. Lalit Kumar, Associate Professor & Head-Computing Applications,
School of Computer Science & Engineering, IILM University, Greater Noida

CONVENERS

Dr. Lalit Kumar, Associate Professor& Head- Head-Computing Applications,
School of Computer Science & Engineering, IILM University, Greater Noida

Dr. Deependra Rastogi, Assistant Professor & Head-Labs,
School of Computer Science & Engineering, IILM University, Greater Noida

ORGANIZING SECRETARY

Dr. Sumit Singh Dhanda, Associate Professor, School of Computer Science & Engineering, IILM University, Greater Noida

Ms. Suman Avdhesh Yadav, Assistant Professor, School of Computer Science & Engineering, IILM University, Greater Noida

Mr. Shantanu Bindewari, Assistant Professor, School of Computer Science & Engineering, IILM University, Greater Noida

TECHNICAL PROGRAM COMMITTEE CHAIRS

Prof. Pardeep Singh, Galgotias University, Uttar Pradesh

Dr. Sunil Nain, UIET, Kurukshetra University, Kurukshetra

Dr. Sandeep Punia, CHRIST (Deemed to be University), Bengaluru

Prof. (Dr.) Rajiv Agarwal, LIET Greater Noida, India

Dr. Sandeep Verma, NIT Jalandhar, India

Dr. Sourabh Jain, IIIT Sonepat, India

Dr. Vandana Sharma, Christ University Delhi NCR, India

Prof. (Dr.) Brijmohan Singh, Quantum University, India

Prof. Balamurugan Balusamy, Shiv Nadar University, India
Dr. Shashikant Patil, Atlas SkillTech University Mumbai, India
Dr. Abhimanyu Nain, Guru Jambheshwar University, Hisar, Haryana
Dr. Ajay Punia, Guru Jambheshwar University, Hisar, Haryana
Prof. Sanjay Jain, Amity University Rajasthan, Jaipur
Prof. Ashwani Yadav, Amity University Rajasthan
Dr. Amit Kumar, Galgotias University, Greater Noida
Dr. Jitendra Rajpurohit, Symbiosis University, Pune
Dr. Pankaj Agarwal, Jindal Steels Ltd.
Prof. Sanjay Yadav, Alliance University, Bengaluru

INDUSTRIAL AND ENTREPRENEUR CHAIRS

Mr. Vaibhav Sharma, IILM University, Greater Noida, India

FINANCE COMMITTEE

Mr. Abhinav Raghav, IILM University, Greater Noida, India
Mr. Vikas Tiwari, IILM University, Greater Noida, India

REGISTRATION COMMITTEE

Dr. Anand Singh, IILM University, Greater Noida, India
Ms. Apoorva Jain, IILM University, Greater Noida, India

WEB ADMINISTRATORS

Mr. Shantanu Bindewari, IILM University, Greater Noida
Mr. Shiva Nath, IILM University, Greater Noida

WOMEN@TECH4SDG

Dr. Gunjan Mittal Roy, IILM University, Greater Noida, India
Dr. Kirti Shukla, IILM University, Greater Noida, India
Dr. Apoorva Jain, IILM University, Greater Noida, India
Ms. Heena Khera, IILM University, Greater Noida, India
Ms. Reeta Mishra, IILM University, Greater Noida, India
Dr. Divya Prakash, Shobhit University Gangoh
Dr. Pushpa Singh, IILM University, Greater Noida, India
Dr. Preeti Narooka, Manipal University Jaipur, Rajasthan
Dr. Daksha Baroda, IILM University, Greater Noida, India




ILM UNIVERSITY
Greater Noida
School of Computer Science and Engineering
1st IEEE National Conference
on
Technologies for Sustainable Development Goals 2025
(TECH4SDG-2025)

राष्ट्रीय सौर ऊर्जा संस्थान
(नवीन एवं नवीकरणीय ऊर्जा मंत्रालय, भारत सरकार का स्वायत संस्थान)
National Institute of Solar Energy
(An Autonomous Institute of Ministry of New and Renewable Energy, Govt. of India)
गुरूग्राम - फरीदाबाद रोड, ग्वाल पहाड़ी, गुरूग्राम - 122 003, हरियाणा, भारत
Gurugram - Faridabad Road, Gwal Pahari, Gurugram -122 003, Haryana, India

डॉ. मोहम्मद रिहान / Dr. Mohammad Rihan
महानिदेशक / Director General



MESSAGE

I am happy to know about Tech4SDG-2025, a distinguished national conference that aims to explore and highlight the transformative power of technology in achieving the United Nations Sustainable Development Goals (SDGs). This event serves as a critical platform for fostering collaboration among experts, innovators, and leaders who are dedicated to creating solutions that drive sustainable change.

As we face global challenges ranging from environmental sustainability to social equity, it is clear that technological advancements will play a pivotal role in shaping our collective future. Tech4SDG-2025 presents a unique opportunity to examine how cutting-edge technologies can contribute to solving the most pressing issues of our time, from climate change to poverty alleviation.

I look forward to the engaging discussions and innovative ideas that will emerge from this conference. I believe that by working together, we can harness the potential of technology to drive meaningful progress towards a sustainable and equitable world.

I extend my best wishes to all the participants and organizers of Tech4SDG-2025.

27.02.25

(Dr. Mohammad Rihan)

Dated: 27th February, 2025
Place: Gurugram

दूरभाष / Tel. No. : 0124-285 3000, 3056
ईमेल / Email : dgnise.mnre@nise.res.in, mohdrihan@nise.res.in, वेबसाइट/ Website : www.nise.res.in

INTERNATIONAL JOURNAL OF RESEARCH IN MODERN ENGINEERING & EMERGING TECHNOLOGY (IJRMEET)

Authors' Guidelines

Resagate Global welcomes submissions in all areas related to Management, Pharmacy, Engineering, Education, Humanities, Social Science, etc. Manuscript for all discipline must be in English prepared on a standard A4 size paper setting. It must be prepared in 12-point Times New Roman and must follow the following criteria for all discipline.

1. Each manuscript requires an abstract with a length of 15 – 20 lines in 12 point font Times New Roman and Italic font followed by 5 – 7 keywords.
2. Type-written manuscripts in MS Word (.doc) format should be submitted by E-mail to editor@ijrmeet.org
3. Research Papers/Review Articles will be published in the Journal after peer-reviewed process.
4. Leave 1 inch margin for each – top, bottom, left and right.
5. List of references must be present.
6. Papers without references will not be reviewed.
7. Section headers will be bold faced sentence case whereas sub-section header will be in normal style, both indented at 0.5 inch. Line space is 1.5 for entire article.
8. Once the paper is accepted, the authors will be required to send the signed copy of Copyright Form through E-mail to editor@ijrmeet.org
9. It is mandatory for all the authors to sign the Copyright Transfer Form.
10. It will be take more then 2-3 weeks to 1 month to publish after submitting.
11. Research paper should contain with abstract (including 200-300 words) & including minimum 1500 words and you must follow all the steps (Design) of research.
12. The decision of Reviewers will be final and canvassing in any form will be disqualification of authors in future issues.
13. In article minimum 1500 words must required.
14. Page layout must be created only A4 size only.
15. PDF file is not accepted.

Impact of Digital Documentation on Logistics Management Efficiency

S. Lakshmi Narasimma

PHD RESEARCH SCHOLAR, Management

Symbiosis International (Deemed University),

Pune, Maharashtra, India- 412115

ORCID ID https://orcid.org/0009-0006-0713-8274

Abstract : Digital documentation can improve logistics management by making shipment information easier to create, retrieve, validate, and exchange. However, converting paper records into electronic files does not necessarily improve operational performance unless document processes are integrated with logistics activities. This study examines an evaluation framework connecting digital documentation with administrative efficiency, dispatch readiness, and delivery performance. A simulated before-and-after dataset comprises 2,400 shipments across 24 matched operational groups, with 1,200 shipments in each period. The intervention combines structured electronic documents, shared access, validation rules, version control, and staff training. Paired analysis of operational group means shows that documentation processing time decreases from 24.0 to 17.0 minutes per shipment, a reduction of 29.2%. The mean reduction is 7.0 minutes, with a 95% confidence interval of 4.89–9.11 minutes. Document retrieval time decreases from 8.0 to 3.0 minutes, while shipment readiness-to-dispatch time decreases from 5.2 to 4.6 hours. Documentation errors decline from 11.0% to 5.0%, and on-time dispatch increases from 85.0% to 91.0%. These calculations demonstrate a coherent assessment approach rather than establish an observed organizational effect. Reliable field evaluation requires validated records, comparable shipment characteristics, and controls for concurrent operational changes.

Keywords: Digital documentation; logistics management; electronic records; information sharing; operational efficiency; shipment processing.

Introduction

Logistics management coordinates the movement of goods and the information required to support that movement. Purchase orders, invoices, packing lists, transport instructions, consignment notes, and delivery records connect procurement, warehousing, transport, and customer service. When these documents are incomplete, inconsistent, or difficult to retrieve, staff may repeat data entry, seek clarification, or delay shipment release.

Digital documentation encompasses more than scanning paper records. It includes structured data capture, searchable storage, controlled access, validation, electronic exchange, and traceable changes. These features can support coordination, but their value

depends on how effectively information becomes available to operational decision-makers.

Prajogo and Olhager (2012) identify relationships between information technology capabilities, information sharing, logistics integration, and operational performance. Their findings support examining digital documentation as part of an integrated logistics process rather than as an isolated administrative technology. Monash University

Nevertheless, documentation efficiency and physical logistics efficiency are different outcomes. Faster retrieval may reduce administrative effort without shortening transport time. Similarly, improved dispatch performance may reflect changes in staffing or vehicle availability rather than documentation alone.

This paper addresses that distinction by separating document processing measures from shipment execution measures. It develops a consistent evaluation design and presents a statistical analysis using simulated operational values.

Literature Review

Information Technology and Logistics Performance

Gunasekaran, Subramanian, and Papadopoulos (2017) review information technology in logistics and supply chains, linking its potential value to adaptation, alignment, and agility. Their review supports the importance of organizational fit: technology must support operating requirements rather than simply replace existing tools. Kent Academic Repository

Prajogo and Olhager (2012), using data from 232 Australian firms, find that information technology capabilities and information sharing relate to logistics integration, which in

turn relates to operational performance. Their results suggest a plausible pathway through which accessible and consistent documents could support logistics execution. However, the study does not isolate digital documentation as a separate intervention. Monash University

Flynn, Huo, and Zhao (2010) examine supply chain integration through a contingency and configuration perspective. Their work highlights the need to consider combinations of internal and external integration rather than assume that a single technology produces uniform benefits across organizations. Wiley Online Library

Digital Interoperability and Information Exchange

Pan et al. (2021) examine digital interoperability in logistics and supply chain management. Their analysis identifies information exchange as an important requirement for connecting logistics networks. For documentation management, this means that electronic records must be interpretable across systems and organizations; merely storing documents digitally does not ensure usable exchange. sciencedirect.com

Surucu-Balci, Iris, and Balci (2024) review digital information sharing through blockchain and cloud platforms in maritime supply chains. They identify capabilities, barriers, and implementation conditions relevant to document-intensive operations. Their findings indicate that adoption and effective execution involve organizational and interorganizational challenges, alongside technical requirements. White Rose Research Online

Electronic Transport Records

UNECE's *Executive Guide on e-CMR* describes the electronic consignment note within international road transport. It provides an institutional example of documentation digitalization and highlights the importance of standardized information exchange. It does not establish a universal percentage improvement applicable to all logistics organizations. UNECE



Accessible records support coordination across logistics activities

UNCITRAL's Model Law on Electronic Transferable Records provides a framework for the electronic use of transferable documents and instruments. Its emphasis on reliable methods, control, and integrity shows why a transferable electronic record involves more than an ordinary scanned copy. The framework's practical application depends on the relevant legal environment. uncitral.un.org

Information Quality and System Success

DeLone and McLean (2003) distinguish information quality, system quality, use, user satisfaction, and net benefits in their information systems success model. Applied here, the framework suggests that document accuracy and system reliability should be assessed alongside processing speed. A faster system with incomplete or unreliable records cannot be considered operationally successful. www.tandfonline.com

Trade Facilitation and Time

Moïsé and Sorescu (2013) identify document simplification, procedural streamlining, information availability, and automation as important trade facilitation dimensions. Their later study emphasizes how predictable border procedures support supply chain operation (Moïsé & Sorescu, 2015). These findings provide institutional context but should not be interpreted as firm-level estimates of documentation software benefits. www.oecd.org

The OECD (2025) further identifies a gap between establishing facilitation frameworks and implementing them effectively. Hummels and Schaur (2013) establish the economic relevance of time in international trade, supporting attention to avoidable delays without providing documentation-specific effect estimates. doi.org

Research Gap

The literature supports the importance of information sharing, interoperability, and process integration. However, broad digitalization studies do not necessarily distinguish document-related improvements from changes in physical logistics.

The gap addressed here is a measurement framework linking document processing to dispatch outcomes while avoiding overlapping measures, inconsistent denominators, and unsupported causal conclusions.

Aim and Objectives

The study aims to assess the relationship between digital documentation and logistics management efficiency.

The objectives are to:

Compare documentation processing and retrieval times across implementation periods.

Examine changes in total administrative effort and dispatch readiness.

Describe documentation errors, dispatch punctuality, and delivery punctuality.

Identify implementation conditions affecting interpretation and practical value.

Research Hypotheses

Null hypothesis: Mean documentation processing time does not differ between the pre-implementation and post-implementation periods.

Alternative hypothesis: Mean documentation processing time differs between the two periods.

Documentation processing time is the primary outcome. Other measures are secondary and exploratory.

Conceptual Framework

The framework proposes that structured records, validation, controlled versions, and accessible information reduce administrative friction. Lower friction may reduce correction work and improve document availability, potentially supporting earlier dispatch.

The expected relationship is:

Digital documentation → improved information availability and consistency → reduced administrative effort → improved dispatch coordination.

Delivery performance is more distant from documentation processes because it also depends on route conditions, vehicle reliability, customer availability, and other external factors. Accordingly, documentation improvements should not be assumed to produce equivalent improvements in every logistics outcome.

Methodology

Research Design

The study uses a matched before-and-after evaluation design with simulated aggregate values. Twenty-four operational groups represent stable combinations of warehouse, route category, and shipment service level.

Each group contributes 50 shipments before implementation and 50 afterward. The total is therefore 1,200 shipments per period and 2,400 overall.

Two six-month observation periods are specified, separated by a two-month stabilization interval. No actual organization, implementation date, or operational location is claimed.

Digital Documentation Intervention

The intervention combines structured electronic forms, a shared document repository, shipment identifiers, mandatory-field validation, version control, and access permissions.

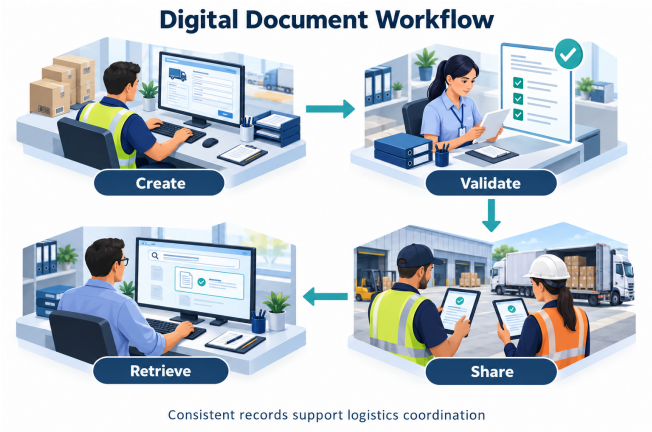
Staff training covers document creation, correction, retrieval, and exception handling. The intervention is treated as a combined technology and process package; software effects cannot be separated from training or workflow redesign.

Routine digital processing is supported by a documented fallback procedure for outages. Historical paper records are outside the intervention unless required for shipment processing.

Eligibility and Sampling

Eligible shipments have consistent identifiers, completed transport records, and valid documentation, readiness, dispatch, and delivery events.

Cancelled orders, duplicate records, and unresolved timestamp errors are excluded under predefined extraction rules. A field study should report exclusion counts and investigate whether missing records differ systematically between periods.



Within each matched group, shipments should be selected randomly from eligible records. Product handling requirements, shipment size, staffing, carrier arrangements, and service commitments require comparison before interpreting differences.

Operational Definitions

Table 1. Study measures and definitions

Measure	Operational definition	Unit
Documentation processing time	Active creation, checking, and correction of the shipment document set	Minutes per shipment

Retrieval time	Time to locate the approved shipment document set during a standardized retrieval task	Minutes per task
Administrative effort	Total active document-related staff work across shipment processing	Minutes per shipment
Readiness-to-dispatch time	Elapsed time from physical shipment readiness to departure	Hours
Documentation error	Shipment with at least one error requiring correction	Percentage
On-time dispatch	Departure within the originally agreed dispatch window	Percentage
On-time delivery	Delivery within the originally agreed delivery window	Percentage

Documentation processing is included in administrative effort and must not be added to it. Retrieval is measured through one standardized task per shipment and is reported separately from routine administrative work.

Data Collection and Validation

A field implementation would combine workflow timestamps, task observations, warehouse events, and transport records. The same measurement rules must apply in both periods.



Active work time should exclude unattended waiting. Where multiple staff members work simultaneously, administrative effort should reflect combined person-minutes.

Event records require consistent time zones and stable shipment identifiers. Original dispatch and delivery commitments must be retained; replacing them with revised promises would distort punctuality measures.

Statistical Analysis

Continuous outcomes are averaged within each operational group and period. The statistical unit is the group, producing 24 paired observations and 23 degrees of freedom.

For each outcome:

$$d_i = \text{Before mean}_i - \text{After mean}_i$$

Positive differences represent reductions. Paired t-tests assess whether the mean difference is zero:

$$t = \frac{\bar{d}}{s_d/\sqrt{24}}$$

Confidence intervals use the corresponding t-distribution critical value. The primary test uses a two-sided significance level of .05. Secondary p-values are exploratory and unadjusted for multiple testing.

Categorical outcomes are descriptive because aggregate counts do not support analysis of within-group dependence.

Ethical Considerations

The analysis contains no actual employee, customer, or organizational records. A field study would require organizational permission, confidentiality safeguards, and appropriate review of employee observation procedures. No approval or consent process is claimed to have occurred.

Results

Analytical Sample

Table 2. Composition of the simulated sample

Characteristic	Before	After
Operational groups	24	24
Shipments per group	50	50
Total shipments	1,200	1,200
Standard service shipments	800	800
Priority service shipments	400	400
Short-distance shipments	450	450
Medium-distance shipments	500	500
Long-distance shipments	250	250

Service-level and distance distributions are identical by construction. These dimensions alone do not establish full equivalence between periods.

Processing Efficiency

Table 3. Simulated continuous outcomes across 24 paired groups

Outcome	Before mean	After mean	Reduction	SD of paired differences	95% CI for reduction	t	p
Documentation processing, minutes	24.0	17.0	7.0	5.0	4.89–9.11	6.86	<.001
Retrieval task, minutes	8.0	3.0	5.0	3.0	3.73–6.27	8.16	<.001
Administrative effort, minutes	38.0	30.0	8.0	6.0	5.47–10.53	6.53	<.001
Readiness-to-dispatch, hours	5.2	4.6	0.6	0.9	0.22–0.98	3.27	.0034

Documentation processing decreases by 29.2%. The confidence interval excludes zero, rejecting the primary null hypothesis within this simulated analysis.

Retrieval time decreases by 62.5%, administrative effort by 21.1%, and readiness-to-dispatch time by 11.5%. Equal group sizes mean that equally weighted group averages also equal overall shipment averages.

Accuracy and Shipment Performance

Table 4. Simulated categorical outcomes

Indicator	Before, n (%)	After, n (%)	Change
Shipments with documentation errors	132 (11.0%)	60 (5.0%)	−6.0 percentage points
On-time dispatch	1,020 (85.0%)	1,092 (91.0%)	+6.0 percentage points
Late dispatch	180 (15.0%)	108 (9.0%)	−6.0 percentage points
On-time delivery	1,056 (88.0%)	1,080 (90.0%)	+2.0 percentage points
Late delivery	144 (12.0%)	120 (10.0%)	−2.0 percentage points

Documentation errors and punctuality are separate measures and may overlap. On-time dispatch and late dispatch are complementary, as are the delivery categories.

Delivery punctuality improves less than dispatch punctuality. On-time delivery can exceed on-time dispatch because a shipment departing late may still arrive within its agreed delivery window.

Staff-Time Implications

The eight-minute reduction in administrative effort corresponds to 160 staff hours across 1,200 shipments.

Documentation processing accounts for 140 hours of that reduction. Other administrative activities decrease from 14 to 13 minutes per shipment, accounting for the remaining 20 hours.

Retrieval-task savings are not added because standardized task performance does not establish how frequently retrieval occurs during normal operations.



Discussion

The results demonstrate a coherent relationship between document management measures and logistics outcomes. Improvements are strongest in retrieval and document processing, while changes in dispatch and delivery are smaller. This distinction reflects the intervention's proximity to each outcome.

Searchable, consistently identified records can directly affect retrieval. Structured forms and validation may reduce omissions and correction work. Dispatch performance depends additionally on loading, labor, vehicle availability, and scheduling; delivery introduces further external influences.

This interpretation aligns with the integration perspective developed by Prajogo and Olhager (2012). Information capabilities matter through their relationship with logistics processes, rather than solely through the availability of technology. Interoperability research similarly supports attention to whether partners and systems can use exchanged information. Monash University

The reduction in errors alongside shorter processing time is important. Faster processing accompanied by more correction requests could indicate rushed work. Here, speed and accuracy move consistently, although the aggregate results cannot establish which intervention component explains the change.

The smaller delivery improvement also prevents overinterpretation. Documentation can support dispatch coordination without resolving congestion, vehicle breakdowns, or customer receiving delays. Organizations should therefore maintain separate administrative, dispatch, and delivery indicators.

Statistical significance remains distinct from causation. A before-and-after comparison cannot exclude concurrent changes in staffing, shipment complexity, carrier performance, or seasonal demand. The simulated confidence intervals describe the specified variation between group differences; they do not validate an actual business effect.

Managerial Implications

Managers should prioritize standardized identifiers, reliable source data, version control, and integration with warehouse and transport systems.

Dashboards should distinguish active work from elapsed waiting and document accuracy from shipment punctuality. Staff should be trained to handle exceptions, including missing information and conflicting versions.

Economic evaluation should include implementation, training, support, and ongoing maintenance costs. Staff hours released represent potential capacity; they become monetary savings only when supported by actual changes in expenditure or productive output.

Limitations

The values are simulated and cannot support claims about an actual logistics organization. The design lacks a contemporaneous comparison group and cannot isolate technology from associated process changes.

Group averages conceal variation and unusually long delays. Operational analysis should supplement means with medians, upper percentiles, missing-record assessments, and group-specific findings.

No environmental benefit, legal compliance improvement, customer satisfaction effect, or return on investment is established. These outcomes require separate measurements.

Conclusion

Digital documentation can support logistics management through accessible records, consistent information, controlled changes, and improved coordination. Its contribution should be assessed through distinct administrative and operational measures.

The simulated analysis provides an internally consistent evaluation structure connecting document processing, errors, staff effort, dispatch, and delivery. Verified organizational records and stronger comparison designs are necessary to establish the magnitude and causes of actual improvements.

References

- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. Journal of Management Information Systems, 19(4), 9–30. https://doi.org/10.1080/07421222.2003.11045748
- Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. Journal of Operations Management, 28(1), 58–71. https://doi.org/10.1016/j.jom.2009.06.001
- Gunasekaran, A., Subramanian, N., & Papadopoulos, T. (2017). Information technology for competitive advantage within logistics and supply chains: A review. Transportation Research Part E: Logistics and Transportation Review, 99, 14–33. https://doi.org/10.1016/j.tre.2016.12.008
- Hummels, D. L., & Schaur, G. (2013). Time as a trade barrier. American Economic Review, 103(7), 2935–2959. https://doi.org/10.1257/aer.103.7.2935
- Moïsé, E., & Sorescu, S. (2013). Trade facilitation indicators: The potential impact of trade facilitation on developing countries' trade. OECD Trade Policy Papers, No. 144. https://doi.org/10.1787/5k4bw6kg6ws2-en
- Moïsé, E., & Sorescu, S. (2015). Contribution of trade facilitation measures to the operation of supply chains. OECD Trade Policy Papers, No. 181. https://doi.org/10.1787/5js0bslh9m25-en
- Organisation for Economic Co-operation and Development. (2025). OECD trade facilitation indicators. OECD Publishing. https://doi.org/10.1787/fd6f27dc-en
- Pan, S., Trentesaux, D., McFarlane, D., Montreuil, B., Ballot, E., & Huang, G. Q. (2021). Digital interoperability in logistics and supply chain management: State-of-the-art and research avenues towards Physical Internet. Computers in Industry, 128, 103435. https://doi.org/10.1016/j.compind.2021.103435
- Prajogo, D. I., & Olhager, J. (2012). Supply chain integration and performance: The effects of long-term relationships, information technology and sharing, and logistics integration. International Journal of Production Economics, 135(1), 514–522. https://doi.org/10.1016/j.ijpe.2011.09.001
- Surucu-Balci, E., Iris, Ç., & Balci, G. (2024). Digital information in maritime supply chains with blockchain and cloud platforms: Supply chain capabilities, barriers, and research opportunities. Technological Forecasting and Social Change, 198, 122978. https://doi.org/10.1016/j.techfore.2023.122978

- United Nations Commission on International Trade Law. (2017). UNCITRAL Model Law on Electronic Transferable Records. Official publication
- United Nations Economic Commission for Europe. (2023). Executive guide on e-CMR. Official publication

Published By
Resagate Global, KDP Grand Savanna, R. N. Ext.,
Ghaziabad- 201017, Uttar Pradesh, India

Copyright © 2025 Inc. All Rights Reserved Contact Us: editor@ijrmeet.org