DATA MANAGEMENT AND INTEGRATION FOR BUSINESS ANALYTICS IN LOGISTICS SMES: AUSTRALIAN BEST PRACTICES AND A RESOURCE-SENSITIVE IMPLEMENTATION FRAMEWORK FOR VIETNAM

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Received date: June 3, 2026
Revised date: June 15, 2026
Publication accepted date: July 10, 2026
DOI:

Abstract:

This study develops a nine-dimensional diagnostic framework for Vietnamese logistics SMEs by combining structured evidence synthesis with qualitative assessment. The participating firms achieved an overall maturity score of 2.63/5 (40.74/100), placing them only marginally within Level 3, defined as "standardised and partially integrated." Leadership, real-time visibility, and ecosystem data sharing emerged as relatively strong dimensions, whereas cloud architecture, standardisation, and system integration remained comparatively weak. Sensitivity analysis indicated that the maturity classification was not fully robust, supporting a cautious interpretation of firms as transitioning between Levels 2 and 3 rather than being definitively classified at Level 3. The study further identifies six transferable principles and a four-stage development pathway comprising data cleansing, architecture development, workflow integration, and analytics embedding, providing a foundation for broader empirical validation.

Keywords: *Australia, business analytics, data governance, digital logistics, logistics SMEs, maturity assessment, Vietnam*

Quản trị và tích hợp dữ liệu phục vụ phân tích kinh doanh trong các doanh nghiệp logistics nhỏ và vừa: Thực tiễn tốt từ Australia và khung triển khai phù hợp với nguồn lực tại Việt Nam

Tóm tắt:

Nghiên cứu xây dựng khung chẩn đoán chín chiều cho các doanh nghiệp vừa và nhỏ (SME) trong ngành logistics Việt Nam, kết hợp tổng hợp bằng chứng có cấu trúc với đánh giá đa phương pháp thiên về định tính. Các doanh nghiệp tham gia đạt điểm trưởng thành trung bình 2,63/5 (40,74/100), chỉ vừa đủ nằm trong Mức 3 - "được chuẩn hóa và tích hợp một phần". Các yếu tố lãnh đạo, khả năng theo dõi thời gian thực và chia sẻ dữ liệu trong hệ sinh thái có điểm số tương đối cao hơn, trong khi kiến trúc điện toán đám mây, chuẩn hóa dữ liệu và tích hợp hệ thống vẫn còn yếu. Phân tích độ nhạy cho thấy kết quả phân loại chưa thực sự vững chắc, do đó nghiên cứu đưa ra kết luận thận trọng về giai đoạn chuyển tiếp Mức 2–3, thay vì một ước tính trưởng thành chắc chắn. Nghiên cứu xác định sáu nguyên tắc có thể áp dụng và đề xuất lộ trình bốn giai đoạn - làm sạch dữ liệu, xây dựng kiến trúc, tích hợp quy trình và tích hợp phân tích vào quyết định thường xuyên - làm cơ sở cho các nghiên cứu kiểm chứng sâu hơn.

Từ khóa: *Australia, phân tích kinh doanh, quản trị dữ liệu, logistics số, doanh nghiệp logistics nhỏ và vừa, đánh giá mức độ trưởng thành, Việt Nam*

1. Introduction

Logistics operations generate continuous records through bookings, shipment handling, vehicle movements, warehouse scans, customs declarations, proof of delivery, invoicing and customer communication. These records can support route profitability, demand forecasting, asset utilisation, warehouse planning and service management, but data volume alone does not create analytical value. When identifiers are inconsistent, timestamps are missing, and operational and financial systems are disconnected, employees spend substantial effort reconciling records rather than interpreting them. Digital supply-chain research therefore distinguishes the acquisition of technology from the organisational capability to govern, connect and use information (Kache & Seuring, 2017; Sivarajah et al., 2017; Verhoef et al., 2021).

The problem is especially important for SMEs because their information environments commonly develop incrementally as accounting software, global positioning system (GPS) tools, transport or warehouse applications, customer portals and spreadsheets are added at different times. This incremental approach can be affordable and operationally flexible, but it also creates duplicated data entry, conflicting definitions and fragile spreadsheet bridges. Research on SME digitalisation similarly shows that performance depends on leadership, skills, process redesign and complementary organisational resources rather than software purchase alone (Eller et al., 2020; Nadkarni & Prügl, 2021; Priyono et al., 2020).

Australia provides a useful reference point because public freight-data initiatives, structured cargo reporting, shared identifiers, location registries and subscription-based logistics systems illustrate several ways of improving interoperability. These arrangements should not be treated as a national maturity score or as solutions that can be copied directly. Vietnam combines rapid logistics digitalization with continued use of customer-specific templates, stand-alone applications and informal data exchange. The relevant research problem is therefore how resource-constrained Vietnamese logistics SMEs can sequence data-management, integration and analytics investments without assuming that advanced technology should be adopted first (Australian Border Force, 2026; Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts, n.d.; Ministry of Industry and Trade of Vietnam, 2023, 2024).

This study addresses that gap by separating three analytical levels. Australian infrastructure and standards are examined as documented reference practices; the 12 participating Vietnamese SMEs are assessed as a bounded diagnostic sample; and policy, ecosystem and firm-level recommendations are presented as context-specific adaptations rather than demonstrated causal effects. This separation reduces ecological overreach and prevents system-level Australian evidence from being treated as proof of firm-level adoption.

2. Methodological approach

Research design: The study used a qualitative-dominant multi-method design. A structured evidence synthesis built the framework and identify documented practices, while semi-structured interviews examined operating conditions and generated qualitative themes. Numerical maturity ratings from 12 firms were used descriptively, not as psychometric validation or causal testing.

Structured evidence synthesis: The review covered materials published from January 2020 to May 2026, drawn from Scopus, Web of Science, Google Scholar and official Australian, Vietnamese and international sources, using terms related to data governance, integration, analytics and SME digitalization. Sources

were retained if they addressed relevant infrastructure, capability or policy; unclear or low-transparency documents were excluded. Given the absence of a full reproducible search log, the review is described as a structured synthesis rather than a systematic review (Page et al., 2021).

Participants, sampling and scope: Purposive maximum-variation sampling produced 19 formal interview participants: 12 directors (over eight years' experience) from road transport, freight forwarding, warehousing and 3PL firms, and seven researchers (over ten years' experience). Sample adequacy was judged by information power and thematic sufficiency rather than statistical calculation (Malterud et al., 2016).

Interview protocol and ethical procedures: The semi-structured guide covered information systems, data governance, integration, analytics use and the suitability of Australian practices. Directors discussed their own firms; researchers assessed the framework's relevance and plausible sector-level patterns without scoring individual firms. Interviews (45-60 minutes) were conducted in Vietnamese or English, online or face-to-face.

Analysis and Units of analysis: Interview material was analyzed thematically (Braun & Clarke, 2006, 2021) using deductive and inductive codes, supported by NVivo. Twelve director produced company-level maturity observations; the seven researcher ratings reflected contextual judgement rather than additional company data.

Maturity scoring: Director rated nine dimensions on a five-level ordinal rubric. Means, medians and ranges were calculated, with a 0-100 transformation used only for presentation. An equal-weight overall score was calculated for transparency, given no validated dimensions hierarchy.

Sensitivity analysis: Sensitivity analysis compared the equal-weight means against trimmed means and alternative weighting scenarios, confirming result stability across approaches.

3. Results and discussion

3.1. Transferable principles identified from Australian evidence

Shared identifiers and master data: Interoperability begins with stable definitions and controlled identifiers. APIs cannot correct conflicting customer, location or shipment codes. Australian GS1 and location-registry practices therefore provide a principle of standardization, not proof that every firm has adopted one standard (GS1 Australia, n.d.-a, n.d.-b, n.d.-c).

Federated freight-data infrastructure: The National Freight Data Hub illustrates how authoritative datasets, metadata and reusable services can improve discovery without requiring all commercial data to be stored centrally (Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts, n.d.).

Modular and portable architecture: Subscription systems can reduce entry costs, but procurement should also assess interfaces, exportability, security, service quality and exit conditions. Portability is more important than cloud adoption alone.

Integration matched to decision speed: Scheduled extracts may be suitable for profitability reporting, while urgent exceptions may require EDI, APIs or event messages. Every connection requires defined fields, validation, ownership and failure handling (Australian Border Force, 2026).

Quality, security and accountability: Unique accounts, role-based access, tested backups, vendor controls and quality scorecards protect data and make errors visible.

Analytics embedded in management: Dashboards and models create operational value only when each metric has an owner, review cadence, decision threshold and defined response (Gupta & George, 2016; Menukhin et al., 2025).

3.2. Company-level maturity profile of the participating SMEs

Table 1. Main company-level maturity results (directors, n = 12)

Dimension	Valid n	Mean	SD	Median	Score 0–100	Level
1. Data governance and management	12	2.750	0.452	3.0	43.75	Level 3
2. Standardization and master data	12	2.083	0.289	2.0	27.08	Level 2
3. Cloud and modular architecture	12	1.750	0.452	2.0	18.75	Level 1
4. System integration	12	2.250	0.452	2.0	31.25	Level 2
5. Real-time visibility	12	3.167	0.389	3.0	54.17	Level 3
6. Analytics maturity	12	2.583	0.515	3.0	39.58	Level 2
7. Security and control	12	2.500	0.522	2.5	37.50	Level 2
8. Leadership, skills and culture	12	3.417	0.515	3.0	60.42	Level 4
9. Ecosystem data sharing	12	3.167	0.389	3.0	54.17	Level 3
Overall maturity score	12	2.630	0.159	2.611	40.74	Level 3

Note. SD is the sample standard deviation. The overall SD is calculated from the 12 company-level overall means. The transformed 0- 100 score does not add measurement precision and is reported only for comparability.

The equal-weight overall mean was 2.630, equivalent to 40.74/100. It is only 0.020 points above the Level 3 cut-off of 2.61. The most defensible interpretation is therefore that the participating firms sit near the boundary between Level 2, "digitized but fragmented", and Level 3, "standardized and partially integrated", rather than that they have conclusively reached a stable Level 3.

Leadership, skills and culture had the highest mean (M = 3.417), but it was also only marginally above the Level 4 threshold. Real-time visibility and ecosystem data sharing followed (both M = 3.167). These relatively strong scores indicate managerial attention, customer-facing tracking and some external exchange, but they should not be interpreted as proof of comprehensive governance. Cloud and modular architecture were the weakest dimension (M = 1.750), followed by standardization and master data (M = 2.083) and system integration (M = 2.250). This pattern suggests that visible digital services may be developing faster than the architecture and master-data foundations needed to sustain them.

The overall company scores ranged from 2.333 to 2.889. The low overall SD partly reflects averaging across nine dimensions, which smooths contrasting capability profiles. Dimension-level results are therefore more informative than the overall score for prioritizing action.

3.3. Sensitivity and robustness of the maturity conclusion

Table 2. Overall maturity under alternative weighting scenarios

Scenario	Emphasis	Score (1–5)	Score (0–100)	Level	Difference from S0
S0: Equal weighting	1/9 for each dimension	2.630	40.74	Level 3	+0.00
S1: Data-foundation emphasis	Higher weights for governance, standardization and integration	2.533	38.33	Level 2	-2.41

S2: Analytics and decision emphasis	Higher weights for integration, visibility and analytics	2.587	39.69	Level 2	-1.05
S3: Governance and ecosystem emphasis	Higher weights for governance, security, leadership and sharing	2.677	41.92	Level 3	+1.18

The weighting analysis shows that the categorical conclusion is sensitive. Data-foundation emphasis produced 2.533 (Level 2), and analytics and decision emphasis produced 2.588 (Level 2). Governance and ecosystem emphasis produced 2.677 (Level 3). The difference is substantively important because the baseline lies close to the cut-off. Accordingly, the study reports a Level 2–3 transition and avoids presenting the equal-weight classification as robust.

Table 3. Sensitivity to alternative aggregation rules

Aggregation rule	Score (1–5)	Score (0–100)	Level	Difference from mean baseline
Arithmetic mean	2.630	40.74	Level 3	+0.00
Median of each dimension	2.611	40.28	Level 3	-0.46
Trimmed mean of each dimension	2.611	40.28	Level 3	-0.46
Complete-case / available-case	2.630	40.74	Level 3	0.00

Median and trimmed-mean aggregation both produced 2.611, remaining barely within Level 3. Eight of the 12 firms retained the same maturity category under all four weighting scenarios; four firms crossed the Level 2–3 boundary in at least one scenario. Spearman rank correlations among firm scores ranged from 0.839 to 0.971. The rankings were therefore broadly similar, but firm-level classification was not uniformly stable. The strongest and weakest groups were more stable than the precise overall category: leadership, visibility and ecosystem sharing remained relatively high, while cloud architecture, standardization and integration remained low.

3.4. Researcher contextual assessment

Table 4. Director profile and researcher contextual assessment

Dimension	Director mean (n = 12)	Researcher contextual mean (n = 7)	Difference
1. Data governance and management	2.8	2.5	+0.3
2. Standardization and master data	2.1	1.9	+0.2
3. Cloud and modular architecture	1.8	1.8	+0.0
4. System integration	2.2	2.1	+0.1
5. Real-time visibility	3.2	3.2	+0.0
6. Analytics maturity	2.6	2.5	+0.1
7. Security and control	2.5	2.4	+0.1
8. Leadership, skills and culture	3.4	3.2	+0.2
9. Ecosystem data sharing	3.2	3.0	+0.2

The researcher assessment produced a highly similar rank pattern across the nine dimensions (descriptive Spearman rho = 0.983). This statistic concerns rank ordering of dimension means, not agreement about the same 12 firms, and it is not used as an inferential test. Directors rated every dimension either equally or slightly more favorably than researchers, with differences from 0.0 to 0.3 points. The comparison supports contextual plausibility of the pattern but does not constitute independent validation of company-level scores.

3.5. Thematic findings: Constraints, mechanisms and counterpoints

The cross-stakeholder analysis identified six recurring themes. First, digital adoption without end-to-end integration: directors described multiple specialized applications still connected by spreadsheets and manual re-entry, while researchers distinguished technology ownership from process integration - suggesting firms should map the booking-to-billing process and priorities high-frequency reconciliation points. Second, weak master data and source controls: duplicate customer records, inconsistent codes and unmatched costs reduced trust, with experts linking these problems to ownership and process design rather than software alone, pointing to the need for controlled lists and named data owners before advanced analytics. Third, limited hybrid capability and vendor dependence: operational and technical knowledge often sat with different people or external providers, so researchers emphasized portability and documentation, recommending firms develop combined logistics–data roles and require exit conditions in procurement. Fourth, business-value uncertainty: investment was easier to justify when linked to measurable outcomes like billing speed or service reliability, with experts cautioning against technology-first programmed lacking baseline measures. Fifth, external fragmentation and trust: customer-specific templates and informal sharing increased risk, framed by researchers as a collective-action issue requiring industry standards alongside firm-level controls. Sixth, managerial commitment stronger than technical foundations: leadership and customer visibility were rated relatively strongly despite weak architecture, a pattern researchers considered plausible but vulnerable to owner dependence, calling for sponsorship to be converted into documented operating routines.

A central tension is that real-time visibility and ecosystem sharing were rated relatively strongly even though external fragmentation remained a major theme. This is not necessarily contradictory. Some firms may provide customer-facing tracking or exchange selected data while still depending on manual mapping, messaging applications or partner-specific templates. Similarly, relatively strong leadership may reflect owner sponsorship without stable data roles, architecture or succession routines. These counterpoints reinforce the need to interpret maturity dimensions as a profile rather than a single ladder.

3.6. Analytics opportunities by maturity stage

At the Level 2–3 transition, SMEs should priorities applications that use limited but reliable data. Descriptive dashboards may track shipment status, on-time pickup and delivery, proof-of-delivery cycle time, vehicle utilization, empty kilometers, warehouse throughput, claims and unbilled jobs. Once operational and financial data are connected, diagnostic analysis can explain margin differences by customer, route and service through cost-to-serve measures. Predictive applications should be introduced only when sufficient historical data exist and the decision is clearly defined, such as estimated arrival time, late-delivery risk or capacity forecasting. Prescriptive routing, consolidation or warehouse-slotting tools should follow only when constraints, costs, locations and service requirements are dependable. This staged logic is consistent with capability-based interpretations of digital transformation and avoids assuming that advanced analytics is automatically the highest-value investment (Kallmuenzer et al., 2025; Le et al., 2025).

3.7. Theoretical interpretation

The findings are consistent with, rather than proof of, the resource-based view and dynamic-capability reasoning. Operational data become more valuable when firms develop complementary ownership, standards, integration, analytical skills and decision routines. Cleansing and integration can improve the capacity to detect problems; dashboards and forecasts can support interpretation; and redesigned workflows can enable response. However, the study does not measure competitive advantage or performance causally. Longitudinal evidence is necessary to test the propositions by linking capability changes to billing, utilization, service, security and financial outcomes.

4. Implications for Vietnam

4.1. Macro level: Government and policy

A national logistics-data agenda should identify priority data objects, identifiers, event definitions, API principles, metadata, security controls and authoritative datasets without attempting to centralize all commercial information. A federated catalogue or hub could improve discovery and access to freight-flow, facility, port, border and trade data while preserving aggregation and access controls. Public support should priorities data-management planning, open interfaces, cybersecurity, staff capability and measurable operational improvement rather than isolated software acquisition. The Australian experience is relevant as a design reference, but requirements must be tested with Vietnamese SMEs to avoid disproportionate compliance costs.

4.2. Industry level: Associations, universities and technology providers

The Vietnam Logistics Business Association (VLA), GS1 Vietnam, ports, customs agencies, shippers and technology providers could develop a minimum logistics data dictionary, common event definitions, reference schemas, sample files, API profiles and conformance tests. Providers should offer affordable modules with documented interfaces, customer-controlled export, role-based access, audit logs, backup and clear exit terms. Universities and training providers can support hybrid capability through applied training in logistics data governance, process mapping, Power BI, SQL, low-code integration, API fundamentals and cybersecurity. Trusted associations may also offer confidential diagnostic clinics or shared analytics services, provided that ownership, confidentiality and portability remain explicit.

4.3. Micro level: Four-stage implementation pathway

Stage 1 - Cleanse and standardize: Map one priority value stream from booking to billing, identify every system and re-entry point, assign owners, define controlled identifiers and validate data at capture. Clean only the historical records required for the selected decision.

Stage 2 - Establish secure and portable architecture: Use applications that support structured capture, reliable export, tested backup, access control and a defined system of record. Cloud, hybrid or on-premises deployment may be appropriate if modularity and portability are preserved.

Stage 3 - Integrate high-value workflows: Connect booking, GPS, proof of delivery, warehouse events and billing through the simplest reliable mechanism appropriate to decision speed. Document fields, timing, reconciliation, exceptions and failure recovery.

Stage 4 - Analyze and decide: Introduce a limited set of metrics with owners, thresholds and review cadences. Progress to diagnostic, predictive or prescriptive analytics only when data quality, interface reliability and business value are demonstrated.

4.4. Implementation governance and business case

A cross-functional pilot team should include an executive sponsor, operational owner, finance

representative and technical or vendor lead, even when one person performs multiple roles. The team should maintain an issue backlog, baseline measures, benefit targets and decision gates. Direct costs include licenses, connectors, cleansing, training, security and support. Benefits should be assessed through faster billing, fewer reconciliation errors, improved utilization, reduced waiting or empty running, stronger delivery reliability, lower claims and better retention. Essential controls such as access management and recovery testing should not be deferred in favor of visible dashboard features.

Responsibility for driving this agenda spans multiple levels. At the macro level, government ministries can lower sector coordination costs by setting an interoperability agenda, a freight-data catalogue and data-sharing guidance over a 1 - 5 years horizon, measured through published standards and SME participation. At the industry level, bodies such as VLA and GS1 Vietnam can build partner compatibility through common dictionaries, identifiers and conformance testing within 6–36 months, while technology providers should offer affordable, modular systems with open interfaces to reduce lock-in, and universities can develop hybrid logistics-data capability through applied training and SME data clinics. At the micro level, SME directors should sponsor staged pilots linked to operating outcomes, while operations, finance and IT staff take ownership of definitions, quality and dashboards on a continuous basis - with success measured through benefits realized against baseline and recurring evidence-based reviews.

5. Conclusion and limitations

5.1. Conclusion

Data management and integration are organizational capabilities, not technical tasks that can be delegated entirely to software vendors. The evidence synthesis identified six transferable principles: standardize high-value data before advanced analytics; use modular and portable architecture; match integration speed to decision requirements; govern quality, security and access; preserve interoperability through documented interfaces; and embed analytics in accountable routines. The participating Vietnamese SMEs displayed stronger leadership, visibility and selected external exchange than architecture, master-data standardization and integration foundations.

The equal-weight score fell just inside Level 3, but sensitivity analysis moved the aggregate classification between Levels 2 and 3. The appropriate conclusion is therefore a transitional profile: digital tools and managerial commitment are present, while standardization, architecture, integration, analytics and control remain uneven. The four-stage pathway provides an implementation sequence, not a guarantee of performance.

5.2. Limitations

Australia provides documented infrastructure and good practices rather than a matched benchmark of logistics SMEs, so the comparison supports principal adaptation, not direct national maturity claims. The Vietnamese sample includes only 12 purposively selected firms, each represented by one director, creating risks of limited generalizability, self-report, single-informant and social-desirability bias. The seven researchers assessed sector-level plausibility rather than the same firms, so similar rankings indicate contextual triangulation, not inter-rater validation. The ordinal scoring, interpretive cut-offs, cross-sectional design, incomplete review trail, limited firm data and lack of objective outcomes prevent causal conclusions or national generalization ■

REFERENCES:

Australian Border Force. (2026). Trade data API services overview. https://www.abf.gov.au/help-and-support/ics/trade-data-api-services/overview

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2021). Thematic analysis: A practical guide. SAGE.

Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts. (n.d.). National freight data hub. https://www.infrastructure.gov.au/infrastructure-transport-vehicles/transport-strategy-policy/freight-supply-chains/national-freight-data-hub

Eller, R., Alford, P., Kallmünzer, A., & Peters, M. (2020). Antecedents, consequences, and challenges of small and medium-sized enterprise digitalization. Journal of Business Research, 112, 119-127. https://doi.org/10.1016/j.jbusres.2020.03.004

GS1 Australia. (n.d.-a). Global location number (GLN). https://www.gs1au.org/what-we-do/standards/global-location-number-gln

GS1 Australia. (n.d.-b). GS1 identification keys. https://www.gs1au.org/standards/id-keys

GS1 Australia. (n.d.-c). National location registry FAQs. https://www.gs1au.org/resources/faqs/national-location-registry

Gupta, M., & George, J. F. (2016). Toward the development of a big data analytics capability. Information & Management, 53(8), 1049-1064. https://doi.org/10.1016/j.im.2016.07.004

Kache, F., & Seuring, S. (2017). Challenges and opportunities of digital information at the intersection of big data analytics and supply chain management. International Journal of Operations & Production Management, 37(1), 10-36. https://doi.org/10.1108/IJOPM-02-2015-0078

Kallmuenzer, A., Mikhaylov, A., Chelaru, M., & Czakon, W. (2025). Adoption and performance outcome of digitalization in small and medium-sized enterprises. Review of Managerial Science, 19(7), 2011-2038. https://doi.org/10.1007/s11846-024-00744-2

Le, T. T., Nhu, Q. P. V., & Behl, A. (2025). Role of digital supply chain in promoting sustainable supply chain performance: The mediating role of supply chain integration and information sharing. The International Journal of Logistics Management, 36(5), 1439-1462. https://doi.org/10.1108/IJLM-01-2024-0031

Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample size in qualitative interview studies: Guided by information power. Qualitative Health Research, 26(13), 1753-1760. https://doi.org/10.1177/1049732315617444

Menukhin, O., Mandungu, C., Shahgholian, A., & Mehandjiev, N. (2025). Guiding the integration of analytics in business operations through a maturity framework. Annals of Operations Research, 348(3), 2017-2047. https://doi.org/10.1007/s10479-023-05614-w

Ministry of Industry and Trade of Vietnam. (2023). Vietnam logistics report 2023: Digital transformation in logistics. Industry and Trade Publishing House.

Ministry of Industry and Trade of Vietnam. (2024). Vietnam logistics report 2024: Free trade zones. Industry and Trade Publishing House.

Nadkarni, S., & Prügl, R. (2021). Digital transformation: A review, synthesis and opportunities for future research. Management Review Quarterly, 71, 233-341. https://doi.org/10.1007/s11301-020-00185-7

Page, M. J., McKenzie, J. E., et. al. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ, 372, Article n71. https://doi.org/10.1136/bmj.n71

Priyono, A., Moin, A., & Putri, V. N. A. O. (2020). Identifying digital transformation paths in the business model of SMEs during the COVID-19 pandemic. Journal of Open Innovation: Technology, Market, and Complexity, 6(4), Article 104. https://doi.org/10.3390/joitmc6040104

Sivarajah, U., Kamal, M. M., Irani, Z., & Weerakkody, V. (2017). Critical analysis of big data challenges and analytical methods. Journal of Business Research, 70, 263-286. https://doi.org/10.1016/j.jbusres.2016.08.001

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. Journal of Business Research, 122, 889-901. https://doi.org/10.1016/j.jbusres.2019.09.022